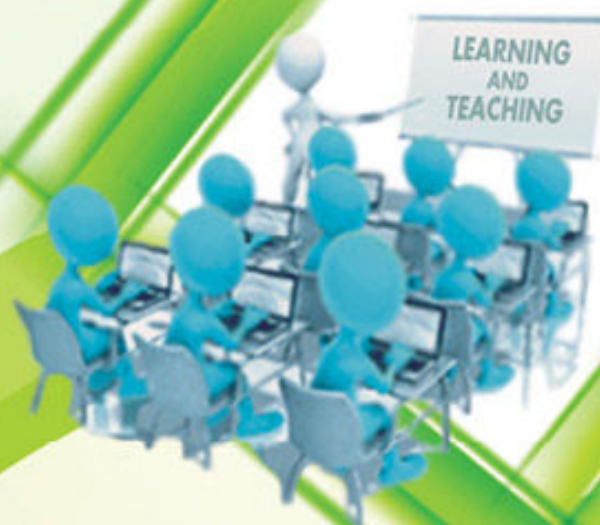


Eastern
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LEARNING — AND — TEACHING



S.K. Mangal
Shubhra Mangal

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LEARNING AND TEACHING

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LEARNING AND TEACHING

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Preface

Education of its citizens as we know is the real backbone and guiding force for the development and progress of the society and it should be well available to them from the earlier days of their schooling. For this purpose, sufficient attention should always be paid by a country for organising its school education on a quite sound footing. All the needed efforts should thus be earnestly made in organising the ongoing teaching-learning process in schools in a quite appropriate way. Here these are the students and their learning that needs to be made a focal point for planning anything regarding the school education. Therefore, what is done in schools in terms of organisation of the curricular and co-curricular activities should essentially concentrate on arranging the most suitable learning experiences for the learners for their needed development and well-being. Here the role of teachers is quite crucial. They are the real torchbearer, main actor, and mentor in helping and guiding the students well on their learning path. For realising their responsibilities in this regard, teachers need to be acquainted with all the essentials related to the learning of their students along with the teaching of their own. They should be acquainted with the very concept and nature of learning, factors, conditions, theories of learning, learning strategies and learning styles, along with the changing nature of the learner and guiding principles of making their learning effective and productive.

However, the task of helping and assisting students on their learning path expects from the teachers to carry out their teaching responsibilities in a quite appropriate way. They must know all about the basics of teaching including its very nature and concept, phases, principles and maxims, models and strategies of teaching including diverse teaching strategies for diverse learners. Besides, the task of their own professional development is also quite essential for them. They need to get acquainted with their role in the changing scenario, develop professionalism in their working and be conscious about professional ethics and code of conduct framed for them.

Now the question arises, from what and when a teacher should get the opportunity of equipping himself with all such essentials about teaching-learning. The best earlier opportunity for this purpose rested in providing him all this during his pre-service teacher education program. The NCTE has now come up with a directive to make provision for such essentials by having a compulsory paper named “Learning and Teaching” in the two years Secondary Teacher Preparation Program. As a result, all the Universities and Teacher Education Institutions running B.Ed. Courses have introduced a compulsory paper named “Learning and Teaching” in its B.Ed. curriculum. The presented text has been written to fulfill the needs and requirements of this course at the national level.

For serving its purpose well, the contents of the text have been divided into thirty chapters. The beginning in this direction has been made by discussing the concept, nature, types and importance of learning. It has been supplemented in chapter two by discussing the factors affecting learning. How the children learn, the mechanism and theories related to this aspect have been discussed in chapters three to six of the text. It has been covered with the full consideration of the schools of psychology such as behaviourism, cognitivism, humanism and constructivism. On this account, the discussion about the important theories propagated by behaviourists in the form of Thorndike’s *trial and error learning*, Watson and Pavlov’s *classical conditioning*, Skinner’s *operant conditioning*, Hull’s *systematic behaviour theory*, Guthrie’s *contiguous conditioning* and Gagne’s *theory of learning*, have been presented in chapter three of the text. The theories given by cognitivists in the form of *Gestalts theory of insightful learning*, Lewin’s *field theory of learning*, Tolman’s *sign learning* and *information processing theories* have been discussed in chapter four of the text. It follows a useful discussion of the important theories given by humanists like Abraham Maslow, Carl Rogers and Albert Bandura in chapter five and *constructivism* accompanied with its *constructivist learning* aspect in chapter six. Since, *cognition* plays quite an important role in one’s learning,

therefore its nature and its relationship with the learning of students have been discussed in chapter seven of the text. In chapter eight, the *task and process of learning* have been discussed in the light and framework of *constructivism*.

In chapter nine, a necessary description regarding the useful strategies of teaching has been provided for helping teachers in the utilisation of relevant strategies in the particular teaching-learning situations. Since learners are found to be benefited by adopting specific learning styles depending upon their own needs and characteristics, the discussion on this account has been carried out in chapter ten of the text. It has been further supplemented in chapter thirty by providing useful account of the diverse teaching strategies needed to be adopted on the part of teachers for the benefit of their diverse learners.

The latest development in the field of technology particularly in computer science has been responsible for bringing the concept and applications of e-learning and m-learning, and therefore needed discussion of these two has been carried out in chapter eleven of the text. It has been further supplemented in chapter twenty-nine by highlighting and discussing the nature and contributions of *Information and Communication Technology* (ICT) in the teaching-learning of the students. In this sequence, the two chapters (twelve and thirteen) of the text have been reserved for providing a useful discussion on two quite important aspects and dimensions of students' learning named *transfer of learning or training* and *motivation in teaching-learning*.

Since, the teacher's teaching, the main task of teachers, is found to have quite unique and important place in the ongoing teaching-learning process, the subsequent chapters of the text from fourteen to twenty-six have been devoted for discussing a number of attributes related to teaching and the improvement of its use and functioning on the part of teachers. The beginning in this pursuit has been done by discussing the concept, nature and importance of the process of teaching in chapter fourteen of the text. It has been followed by the discussion on quite useful concepts and attributes related to teaching such as *phases and levels of teaching* in chapter

fifteen, *variables in the teaching process* in chapter sixteen and *principles and maxims of teaching* in chapter seventeen of the text.

What goes in the process of teaching or how teaching gets operated has been explained by carrying out a discussion in the name of *teaching theories* in chapter eighteen. After then, some of the important teaching strategies useful for teachers in making their teaching task purposeful and handy for them have been discussed in chapter nineteen of the text. The teachers need useful teaching-learning environment and opportunities for learning and training them as teachers. For meeting this objective, a necessary discussion has been carried out in chapters twenty and twenty-three in the name of simulated teaching and micro-teaching. Teaching can be usefully carried out in a team spirit way in the joint collaboration of a team of teachers and assisting personnel, the knowledge and information in this regard for its needed application has been given in chapter twenty-one. The next chapter, i.e., chapter twenty-two provides details about equipping teachers with the use of a number of models of teaching adjudged beneficial in the teaching-learning of various concepts and contents related to the subjects of school teaching. Chapter twenty-four is concerned with the discussion of a useful technique in the name of *interaction analysis* for bringing desired modification in the behaviour of a teacher.

In this sequence, where chapter twenty-five throws light on the need and importance of using specialised techniques and methodology for teaching adults, chapter twenty-six discusses the changing roles of teachers in the varying teaching-learning contexts.

Teachers for their useful functioning as a teacher and fulfilling their responsibilities in the changed scenario of the present day needs to get aware of the professional nature of their work, their accountability for meeting their professional responsibilities and follow up of the established code of conduct and professional ethics. For getting acquainted with this requirement, a useful description has been carried out in chapter twenty-eight preceded by the discussion of the things making the teaching of a teacher effective and naming them

as an *effective teacher* in chapter twenty-seven. The last two

chapters of the text, as pointed out earlier, have been devoted for the discussion of the aspects related to the use of ICT in the teaching-learning of students and diverse teaching strategies for the diverse learners.

In this way, the presented text in its above mentioned organised format clearly stands for providing the needed information, knowledge and skills to the teachers and other concerned personnels for getting them adequately equipped to help and assist the growing children on the path of their learning, wholesome development, and overall well-being.

In its present form, the text has been adequately illustrated with examples, diagrams and tables for helping and guiding readers in their understanding and comprehension of the topics discussed. For arriving at an adequate understanding, quick glance and comprehensive view of what has been discussed in a given chapter, each chapter has been provided with its summary. In addition, with an aim to help readers delve deep into the subject, all the related references have been given at the tail of each chapter and at the end of the text in the form of a detailed bibliography as well.

The PowerPoint presentations of all chapters are available at www.phindia.com/Books/LearningCentre for adopting faculties. However, bibliography provided on the same link is available for students also.

Authors express their gratitudes to the authors and researchers whose work and opinions have been quoted in the text. It has been duly acknowledged in the form of “references” at the end of each chapters. However, much of the essence in the presentation and discussion of the text material has been the product of their own classroom and interactive experiences with the students and teacher educators at various levels. The authors are indebted to all of them for their direct and indirect influence in setting the direction and evolution of the ideas for the text material. Authors also intend to thank the publisher, PHI Learning, especially the editorial and production teams, for their praiseworthy efforts in presenting this text in such a useful form.

With the above submission, the authors express their firm belief in the appropriateness and significance of what has been presented in the text to its readers. We earnestly hope that the text will be widely read and appreciated by all those for whose benefit it has been written. In this regard, we further request them to forward their suggestions for its needed improvement to be carried out in the subsequent edition of the text.

S.K. MANGAL
SHUBHRA MANGAL

Learning Concept, Nature, Types and Importance

CONCEPT OF LEARNING

In the process of education, learning occupies a central position. Whatever exists in our educational set up is meant for the learning of the learners, i.e. students. Therefore, it is quite essential for you, as a prospective teacher, to be acquainted with the concept of the term *learning*. Let us analyse the concept of the term *learning* by

- i. knowing its meaning and definitions and
- ii. knowing the process of learning.

Meaning and Definitions of the Term Learning

Learning situations are most natural and common in life and every one of us is continuously learning one thing or the other, although he may not necessarily be aware of it. An individual starts learning immediately after his birth. While approaching a burning matchstick, the child gets burnt and he/she withdraws. Another time when he faces a burning matchstick, he takes no time to withdraw himself away. He learns to avoid not only the burning matchstick but also all burning things. When this happens, we say that the child has learned if he touches a flame, he will be burnt.

In this way, the behaviour of an individual is changed through direct or indirect experiences. This change in behaviour brought by experience is commonly known as *learning*. This is very simple explanation of the term *learning*. But a complete understanding of the term needs more clarification and exact definition. Some common definitions of the term *learning* are given below:

Gardner Murphy (1968 : 205): The term *learning* covers every modification in behaviour to meet environmental requirements.

Henry P. Smith (1962 : 260): Learning is the acquisition of new

behaviour or the strengthening or weakening of old behaviour as the result of experience.

Woodworth (1945 : 288): Any activity can be called 'Learning' so far as it develops the individual (in any respect, good or bad) and makes him alter behaviour and experiences different from what otherwise would have been.

Kingsley and Garry (1957 : 12): Learning is the process by which behaviour (in the broader sense) is originated or changes through practice or training.

Robinson and Horrocks (1967 : 232): Learning is an episode in which a motivated individual attempts to adapt his behaviour so as to succeed in a situation which he perceives as requiring action to attain a goal.

Crow and Crow (1973 : 225): Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things and it operates in an individual's attempts to overcome obstacles or to adjust to new situations. It represents progressive changes in behaviour. It enables him to satisfy interests to attain goals.

Hilgard (1958 : 3): Learning is the process by which an activity originates or is changed through reacting to an encountered situation provided that the characteristics of the change in activity cannot be explained on the basis of native response, tendencies, maturation, or temporary states of the organism (e.g., fatigue or drugs etc.).

An overview of the above definitions may clearly reveal that learning may be turned as a process or its outcome in which necessary changes in the behaviour of the learner are brought through experience—direct or indirect. Here it has been also emphasised that although changes in behaviour are also brought by the factors other than experience yet all such changes in behaviour are not associated with the process and product of learning. In this connection, special mention can be made about the Hilgard's definition. Let us reconsider this definition now.

On the basis of Hilgard's definition of learning, the factors or forces responsible for bringing changes in our behaviour can be divided into following three main categories:

- The factors or forces that bring permanent or enduring changes in our behaviour, e.g. maturation.
- The factors or forces that bring temporary changes in our behaviour, like mental or physical fatigue, illness, drugs or intoxicating objects, medicines, sleeplessness and emotions like anger, fear, etc.
- The factors or forces that bring relatively enduring or permanent changes (the changes lying between the temporary and permanent status—neither too temporary nor too permanent) in our behaviour, e.g. training, practice, experiences, etc.

Let us now analyse the type of changes brought by these three categories of factors or forces in our behaviour. First, let us consider the effect of maturation.

Changes brought by maturation

Maturation may be found to result in permanent or enduring changes in behaviour. Let us try to understand this phenomenon. Maturation as a biological mechanism is related with the process of natural growth and development. Therefore, it is responsible for bringing only those changes that are purely associated with the natural process of growth and development. Changes brought in the behaviour of the individual through maturation do not necessarily need any type of learning or training. The blueprints of these changes are in fact heralded in the genetic inheritance of the child. As an example, we can take the changes occurred in the voice tone of the male and female children as soon as they are approaching the age of adolescence. While in the case of girls it is characterised by shrillness and becomes sweet (i.e., acquiring the quality of musical sound), in boys it gets deepened and becomes harsher. Such distinct changes in voice among the two sexes at the onset of puberty are simply the result of the process of maturation (natural process of growth and development). However, such changes in behaviour brought by maturation are to be judged as quite enduring or permanent changes. We cannot undo the effect of such changes. After acquiring the distinctive female or male voices, a female or

male child cannot be reverted to his previous stage of voice that enjoyed by him in the period prior to the beginning of adolescence. Similarly, many of the changes brought out in the motor activities of the children may be found to be associated with the biological mechanism of maturation. However, once a child acquires the strength and skill of using his arms or legs, the done cannot be undone unless the child is affected by some serious diseases, accidents or physical/mental abnormalities.

In this way, maturation is found to be credited for bringing enduring and permanent changes in the behaviour.

Factors associated with temporary changes in behaviour

Let us now think over the second category of factors responsible for bringing temporary changes in behaviour, i.e., Fatigue, illness, medicine, intoxicating objects, fear, anger, etc. inflict serious and quite effective changes in one's behaviour. The person who happened to be quite right when leaving home for his office in the morning may be seen to be quite fussy and irritable after returning home in the evening. This change in his behaviour is the consequence of his getting mentally and physically fatigued. However, the change is quite temporary as the behaviour may again turn into a normal behaviour after taking some rest or refreshment. The same is true with the behavioural changes introduced on account of taking drugs, alcohol and other intoxicating objects. The behaviour becomes normal as soon as one gets rid of the intoxication influences. Similarly under emotional current, one may be drifted away from his normal behaviour but as soon as one comes to his senses after being cooled down, one realises his out-burst and irrational behaviour and begins to behave as usual. In this way, the changes introduced in our behaviour on account of the factors falling in the second category are quite transitory and temporary. The changes in behaviour automatically vanish as soon as the impact of the factors or forces responsible for introducing such changes, comes to an end. You may very well equate these changes in behaviour to the type of changes called *physical changes* known to you as a student of physical sciences like change of ice into water, lightening of an electric bulb, etc. On the other hand, the

changes brought by maturation are quite permanent like chemical changes, e.g. burning of a piece of paper, conversion of milk into curd, etc.

Relatively permanent changes through experience and training

The third category of changes in behaviour are neither too temporary (as brought by the factors like fatigue, illness, alcohol, etc.) nor too permanent (as brought by maturation). They somewhat lie between these two and therefore may be termed as relatively permanent or enduring changes in one's behaviour. The factors or forces responsible for bringing such changes are named as experiences (direct or indirect, involving training, practice and formal as well as informal education attempts). Only such type of relatively permanent changes in our behaviour brought through experience may be associated with the process and product of learning. Their characteristic of being neither too permanent nor too temporary is a boon to the system of education. Imagine if the results of our learning, i.e. changes in behaviour would have been too temporary, the strenuous efforts for making the students learn, remember and utilise the results of learning would have been futile. Being temporary and transitory changes, all what was learnt by a child could have vanished in no time. Similarly, the introduction of too permanent changes in one's behaviour through learning would have been a quite unpleasant experience as a student's learning to pronounce PUT as *pat* might become a lifelong mistake. The done could not have been undone and thus picking up of the bad habits on account of any learning might have ruined the future of ill-fated learners. In this way, it is quite a welcome sign that changes introduced only through experience are termed as learning.

In this way, if we attempt to analyse the nature of changes introduced in our behaviour in reference to the factors responsible for such changes, a proper definition of the term learning may be evolved in the following words.

Learning is a process of bringing relatively enduring or permanent changes in behaviour through experience or training.

The Process of Learning

Learning is a process and not a product. This process is continuous and is carried over through various steps. While summing up these steps, Smith gives the following verdict:

In short, the learning process involves a motive or drive, an attractive goal and a block to the attainment of the goal. All these are essential. (1962, p. 262)

Let us try to examine the statement of Smith. The first step in the process of learning is motive or drive. Motives are the dynamic force that energise behaviour and compel the child to act. Every individual has to take care of the satisfaction of his basic motives and needs. As long as our present behaviour, knowledge, skill and performance are adequate to satisfy all our needs, we do not feel any necessity to change our behaviour or acquire new knowledge and skills. It is this requirement which initiates a learner to learn something.

Motives and needs of the learner demand their satisfaction. When the need of a learner is strong enough, he is compelled to strive for its satisfaction. For this purpose, he has to set definite goals and aims for achievement. Definiteness of the aim and setting of the goal helps in making the learning purposeful and interesting. The goal attracts us to learn (Figure 1.1).

Then comes the third step in the process of learning which is equally essential as the previous ones. It is in terms of some obstacle or block or barrier that keeps us from attaining that goal. If we face no difficulty of any kind in attaining our goal, we need not bring any change in our present behaviour, stock of knowledge and skills. This means that we have no necessity to learn. In this way the block or problem is an essential step in the learning process. We try to change or modify our behaviour only when there is a need to do so to reach the goals that our unsatisfied motives create.

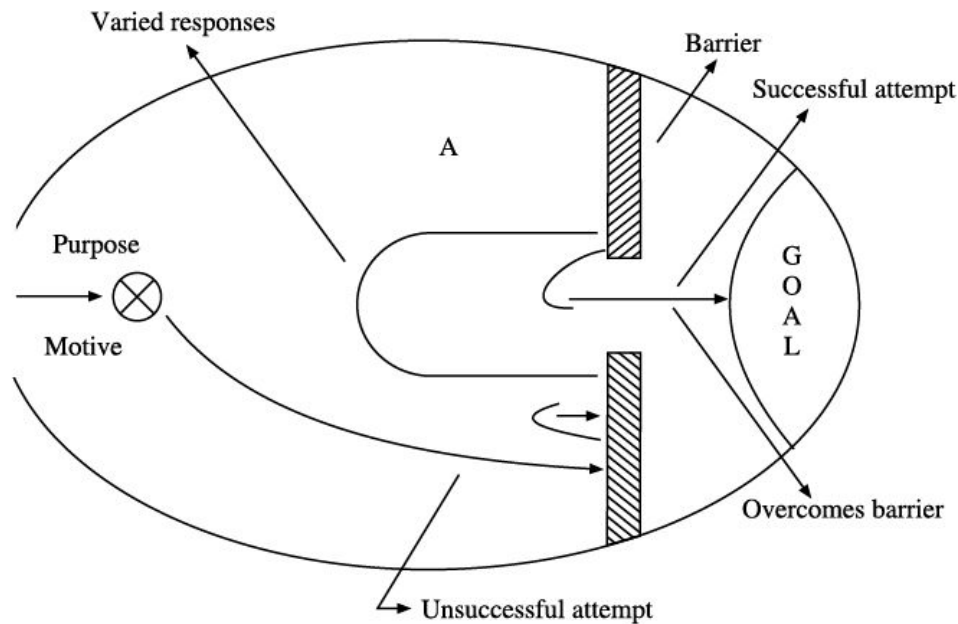


Figure 1.1 Elements in the process of learning.

Let us clear the above views by taking an example. Suppose, you wish to be included in your college hockey team, playing game that appeal to many of your psychological needs. You want the esteem of your colleagues and your teachers. You are also motivated by the interesting experiences that you may enjoy. But you are blocked by your lack of skill in dodging, tackling and handling the ball. These obstacles and blocks in the path of goal achievement will set you make up your deficiency and acquire essential skill through sufficient practice and coaching.

By these steps, Smith has tried to consider the problem, why we learn, and has emphasised the role of motivation, needs and goals in the process of learning.

But the process of learning remains incomplete with these three elements—motives, goals and blocks—which Smith has suggested. It is rather a preparatory stage for learning them, being the stage for actual learning. With these three steps, strong desire and essential readiness is produced in the child for learning something. It is very essential for any scheme of learning. The child's readiness (his positive attitude towards learning) is to be ascertained before beginning the learning programs. There are many factors which contribute towards the learning readiness. The worth mentioning among them are his physical and mental maturity, previously

acquired knowledge and skills and his ability in goal setting. With the help of all these factors, teachers or the parents should try to fix an appropriate level of aspiration for the child so that he may proceed properly on the path of learning.

The next steps in the process of learning, after the preparatory stage, are concerned with the task of actual learning by the learner. One of such important steps is the *learning situation*. The learning situation provides opportunity for learning. The quality, speed and effectiveness of learning depend much upon the kind of learning situation and environment available to the learner. Healthy and favourable learning environment brings satisfactory results in learning while the poor and unfavourable learning environment proves an obstacle in the path of learning.

In a particular learning environment, when the learner strives to learn something, the process of learning involves constant interaction. According to Udai Pareek, *Interaction is the process of responding to a situation and getting feedback from it—satisfaction or thwarting of the needs. Learning results from such interaction.* (Kuppuswamy, B, 1964, p. 112)

In fact, when the child strives to learn something in order to achieve his desired goal, he is very curious to know the results of his striving. On this path when he acquires some new knowledge and skills or brings changes in his behaviour, he is desirous to know, whether or not, with these changes he is able to cherish the desired end. If he finds that all which is learned so far is useful and feels satisfied with his progress, he is sure to gain speed in the path of his learning. Moreover, the learning process is continuous in its flow. What has been learnt so far in the path of learning, works as a running capital and base for further learning.

Learning at a particular moment in a learning environment brings essential changes in the behaviour of an individual. These changes later on become part and parcel of the learning behaviour. These learned acts are retained for a longer time, depending upon the nature of the learner and effectiveness of the learning process and used in similar situations when the need and opportunity arises. Therefore, the process of learning does not end only with the acquisition of certain knowledge, skill and changes in behaviour in

one particular situation. It is a never ending process. The change once acquired or the learning once accomplished gets its fixation in other likewise situations. It stands for its modification and thus seems always in a process of continuous change and development.

RELATIONSHIP BETWEEN DEVELOPMENT AND LEARNING

Both development and learning co-exist and influence each other in the following ways:

Learning and development

Learning may prove quite helpful in bringing desired development in the various aspects and dimensions of the personality of the growing children. Therefore, the term *learning* can be defined as a process of bringing desired modification or changes in the behaviour of a learner through experience or training. As a result of learning, desired changes in the behaviour (cognitive, conative and affective) may take place at one time or the other among the learners and it may result in bringing desired development in the physical, mental, emotional, social lingual and moral aspects or dimensions of their personality (Figure 1.2). Let us try to elaborate this assertion.

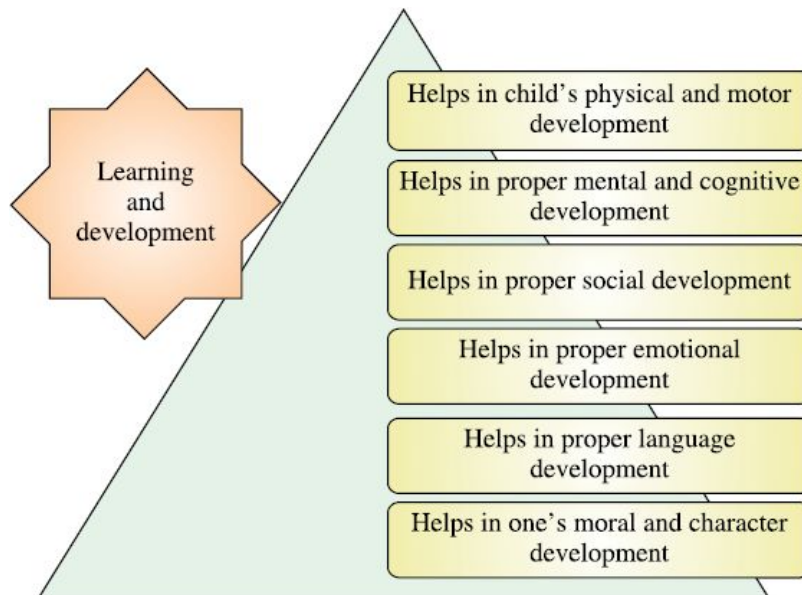


Figure 1.2 Relationship between learning and development.

Learning helps in child's physical and motor development: Learning in the form of acquiring formal and informal experiences helps a child in his adequate physical and motor development by equipping him with necessary knowledge, skills, habits, interest and attitudes essential for:

1. Maintaining good physical health.
2. Acquiring necessary motor skills and practices for his physical movement, exercising and body fitness.
3. Taking necessary preventive and curative measures for the protection from the diseases and environmental abnormalities.
4. Acquiring healthy food and living habits contributing towards proper physical and motor development.

Learning helps in proper mental and cognitive development:

One's mental and cognitive development includes the development of one's mental or cognitive abilities and capacities in a proper functional way. These abilities or capacities may be named as thinking and reasoning power, power of imagination and memorisation, ability to analyse, synthesise and conclude, ability to discriminate and critically examine or evaluate, ability to take decision and judgement, power of argumentation and reaching on consent or agreement, etc. These are not inherited but are acquired through the deliberate formal or informal experiences (called *learning*) by an individual in his life.

Learning helps in proper social development: A child, as we know, is quite self-centered and unsociable in the beginning of his life but as he acquires and gathers various learning experiences he becomes mature in terms of his social development. The learning experiences received by him at his home, neighbourhood, school and various other encounters in social situations make him to acquire necessary social virtues, habits, interests and attitudes helpful in his proper social development.

Learning helps in proper emotional development: Emotional development of an individual requires attaining a reasonable level of emotional maturity. One must be able to express his emotions in the right amount, in the right way, at the right time and at the right place. Decidedly, the acquisition of this ability is not an inherited phenomenon. It is acquired and developed properly through a number of formal and informal experiences called learning in one's life time.

Learning helps in one's proper language development: The language we speak or use in communication in various ways is mainly acquired through a number of informal and formal experiences called *learning*. We get skilled and competent in the use of one or the other languages to the extent of learning acquired by us, our efforts in further learning and using that language. So, the knowledge a child at a particular age has acquired in terms of language skill is a product of his learning or acquired behaviour rather than a function of his hereditary characteristics.

Learning helps in one's moral or character development: Morality or character as we know is fashioned or shaped as a result of various experiences or encounters an individual receives in his life. No genes and chromosomes are responsible for the character formation in a good or bad way. It is entirely an environmental phenomenon and thus necessarily a product of the formal or informal experiences called *learning*. By providing desirable learning experiences, we can certainly help a child in the development of morality or character in desirable ways.

Thus, whatever may be the direction and dimension of one's development, the learning experiences in a formal or informal way essentially help him in acquiring the desired maturity level of his development.

Development and learning

One's learning is equally influenced and affected by the level of his development in one or the other aspect or dimension—physical, motor, mental, social, emotional, linguistic and moral development (Figure 1.3). Let us try to examine the nature of these influences in relation to various developmental dimensions.

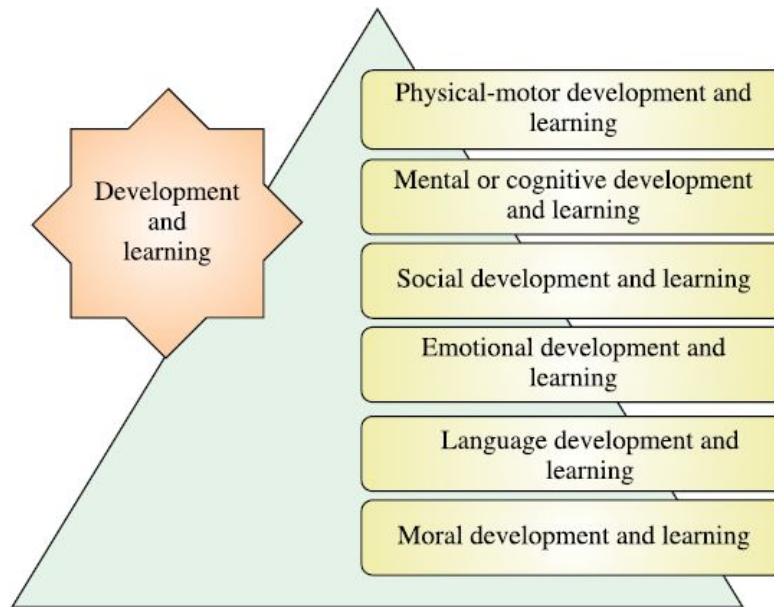


Figure 1.3 Relationship between development and learning.

Physical-motor development and learning: Learning of many physical and motor skills is very much dependent on the level of maturity earned in terms of one's physical and motor development. One cannot learn or practice many physical games and cannot participate in sports activities unless he or she has attained the desired level of one's physical and motor development. Similarly, learning many tasks needing physical and mental labour cannot be undertaken properly by an individual unless he enjoys a good level of physical health, motor coordination and physical development.

Mental or cognitive development and learning: Learning and acquisition of knowledge and skills related to various areas or aspects of school curriculum as well as tasks and activities related to living one's life in a desired way depends very much on the level of maturity and development acquired by an individual. While studying the pattern of cognitive development of the children in their development period, Piaget well concluded that children belonging to sensori motor, pre-operational, concrete operational and formal operational stages are capable only to learn and acquire the knowledge and skills fitting properly in their level of cognitive development. As a result, we cannot expect from the little children to grasp the abstract concept and learn difficult cognitive skills. We have to wait for the desired level of their mental maturity for teaching

the abstract concept and complex cognitive skills.

Social development and learning: Learning of a child is very much facilitated by the desired level of social development attained by the developing child. According to Albert Bandura, much of the children's learning is carried out through the mechanism of social learning. Many of the behaviours involving one or the other knowledge area, skills and interests are learned by children through observation, initiation and practice of the observed behaviour. Social company and social interaction, in view of the social constructivists like Vygotsky and Bruner, much helps children in learning many things by constructing knowledge in the company and guidance of their elders, knowledgeable peers and teachers. It can only happen well when a child is able to attain a desired level of his social maturity and development and that is why social development of a child is said to be very much linked with the tasks and responsibilities of his learning.

Emotional development and learning: A child's emotional development is very much linked with the tasks of his learning. One can learn well when he is found well in tune with his emotional adjustment and emotional development. We cannot expect any good learning by a student who is experiencing intensive anger, fear, jealousy, envy, hate, joy and excitement. He must be able to exercise proper control over the aroused emotions not only at the time of his learning and practising but also at the time of the evaluation of his achievements and performances. Decidedly it can happen well only after attaining a proper level of emotional maturity and emotional development.

Moral development and learning: The processes and products of learning are very much affected and influenced by one's level of character or moral development. The sincerity, punctuality, duty boundedness, honesty, truthfulness, respect for others' opinion, faith in cooperation and collaboration, team spirit, etc. The qualities and virtues which are the part and parcel of a man's character, prove quite effective as well as instrumental in carrying out a learning process on a proper line. The students who are morally deviant or ill-conceived are found to resort to foul means in carrying out their processes of learning. They play truancy and resort to excuses at

the time of learning and cheat at the time of examination and hence fail to learn or acquire well for their proper development and progress. On the other hand, morally sound and mature students may be seen making a desired level of progress in their learning and progress.

Language development and learning: Art of communication is the key to learning. One who can grasp and understand well what he is supposed to learn and can communicate or use the outcomes of his learning in a proper way is always adjudged as a good learner and productive citizen. This can be possible only if one's task of learning is properly matched with the level of the communication language used in the process of one's teaching and learning. The students who lag in their language development (especially in the language to be employed for their learning and classroom teaching) are found to experience difficulties and lag behind in their studies.

NATURE AND CHARACTERISTICS OF LEARNING

The changes brought in our behaviour through learning by all means are accounted as an acquired phenomenon. Learning in this way cannot be attributed to the hereditary influences. It is earned and acquired by us like other attributes of our personality and that is why all types of learning are given a common name, i.e. acquired behaviour. It has its special nature and characteristics, a glimpse of which you may find through the following description:

Learning is the change in behaviour: Learning in its any form or shape is always associated with some or the other changes in learner's behaviour. That is why learning is always directed or aimed at bringing changes in learner's behaviour. However, these changes in learner's behaviour should always be desirable ones. The undesirable changes, if allowed to happen, prove detrimental to the welfare of the learner as well as to the society.

Change in behaviour caused by learning is relatively enduring or permanent: Change in behaviour caused by learning is neither too permanent (as caused through maturation) nor too temporary (as caused by the factors like fatigue, illness, etc.). Those lie between these two states and are usually referred to as relatively permanent changes implying that although frequent or unwanted changes in the learned behaviour cannot take place yet the needed changes can be introduced in the manner such as getting rid of the bad habits or unlearning a wrong method of doing things, etc.

Learning is a continuous lifelong process: Learning is not inherited yet its beginning can be very well made right from the conception of the child. The environment available in the womb of the mother may work as facilitator for such learning. We have Abhimanyu before us as an example who was able to learn the art of *Chakravueh Bhedan* from his father *Arjuna* while being in the womb of his mother *Shubhadra*. The process of learning after birth picks up a greater speed with the constant interaction and stimulation received from the physical, social, cultural and environmental forces and it does not stop till one's death. We have enough evidences for the fact that one activity leads to another and the individual engages

himself to learn more and more. New problems are faced, every day new situations are created and the individual has to face these situations and bring essential changes in his behaviour. Thus, it is a never ending process and it is why we refer that it goes from womb to tomb.

Learning is a universal process. We all the living creatures on the earth have the abilities and capacities for learning irrespective of the nature of our species, caste, colour, sex, geographical location or other such individual differences. Therefore the myths like members of the upper castes especially *Brahmins* have more capacity of learning than the members belonging to the lower castes and untouchables, women have inferior learning capacity to men, or the blacks possess subnormal capacities for learning in comparison to whites, etc. have no substantial ground. On the contrary, the truth is that every living being on the earth has been favoured by the nature to possess the capacity to learn according to the species specific characteristics and environment as well as opportunities available for learning.

Learning is purposive and goal directed: All learning is goal-directed. It is the definiteness of the aim and clear understanding of the purpose which makes an individual learn immediately the techniques of performing a particular task. It is the purpose or goal which determines what he sees in the learning situations and how he acts therein. Therefore, the purpose or goal is the pivot around which the entire system of learning revolves. In case where there is no purpose, there would hardly be any learning.

Learning involves reconstruction of experiences: We learn something at a particular stage and it is accumulated in the store of our learning experiences in the shape of previous experience or learning for the learning of a future task. However, what has been learnt by us at a particular occasion, always remains in the state of modification in the light of the new or richer experiences gained by us in this respect. As a result the old learning is replaced by the new learning and our previous experiences are restructured and reorganised for giving birth to a new structure composed of the reconstructed experiences. It is therefore education, i.e. the process

of learning is often referred to as the process of continuous reconstruction of experiences.

Learning is the product of activity and environment: The basic condition of the emergence of any learning essentially lies in one's active response to the stimuli received from one's environment. In case the child is not willing to respond to the stimuli received from his learning environment, he cannot be persuaded to proceed on the path of his learning. More the learner will actively respond to the stimuli received from his learning environment the more he will be able to progress in terms of his learning. Therefore the key to success in any teaching- learning process always lies in the active response of the learner to the stimuli received or the activities going on in the teaching-learning environment.

Learning is transferable from one situation to another: Learning has a special characteristic of being transferred from one learning situation to another having positive as well as negative effect. In its positive transfer the learning in one situation helps the learning in another situation but in the case of negative transfer we may observe the adverse effect when learning in one situation hinders or obstructs the path of learning in another situation.

Learning does not necessarily imply improvement: Learning is often considered as a process of improvement with practice or training. This means that all types of learning help the child in the path of his progress towards desired results. But this is not always true. The child learns many things in the classroom that do not help him at all to achieve his goal. Habits of idleness, disrespect towards authority, truancy, developing poor handwriting, defective pronunciation and exposition, etc. are among those. Therefore, it should be clearly understood that learning does not necessarily imply improvement (with respect to the achievement of an end).

Learning does not necessarily imply the development in right direction: In a similar way, while defining learning as a process of development, the word 'development' should never be misunderstood as 'progress in right direction to achieve certain ends or results.' As Woodworth clarifies in his definition (see definition no.

3 given earlier), as a result of learning the pattern of development is free to move to either direction—positive or negative. There is no guarantee that the individual will always pick up good knowledge, desirable habits, interest and attitudes. He has equal chances to be drifted to the debit side of the human personality.

Learning helps in bringing desired changes in behaviour:

Learning is the process of bringing changes in behaviour. It can help bring desired changes in the behaviour of the learner in all its three domains, i.e. cognitive, conative and affective.

Learning helps in the attainment of teaching–learning objectives:

The teaching–learning objectives and teaching–learning situation can be effectively achieved through the help of learning and consequently the children can be made to acquire essential knowledge, skills, applications, attitude and interests, etc.

Learning helps in the proper growth and development: Learning helps in attaining one's maximum growth and development from various aspects of growth and development dimensions namely physical, mental (cognitive), emotional, social, moral, aesthetic and lingual.

Learning helps in the balanced development of personality: Our educational efforts are directed to bring an all-round development in the personality of a child. The process of learning results in bringing such development of the personality.

Learning helps in proper adjustment: Adjustment is the key to success in life. Learning helps the individual to seek adjustment with oneself and environment.

Learning helps in the realisation of the goals of life: Every person has his own philosophy and style of life and he strives to achieve the goals of his life. Learning process helps the individual realise the goals of his life.

Learning is a very comprehensive process, possessing a quite wide scope: The world of learning is considered to be limited to the walls of the classroom concerning with intellectual and motor efficiency. It is often thought of as the acquisition of some knowledge and skills, memorisation of certain facts and principles, development of reasoning and thinking power, etc. These are some of the learning

activities which are formally conducted inside the classroom or in any arranged learning situation. But learning is not only limited to these activities. It is a very comprehensive process which covers nearly all the aspects of the human personality. Its scope includes aspects like formation of habits, development of interests, attitudes, sense of appreciation and critical observation, acquisition of beliefs, perfection of values and ideals and setting of the goals and purposes.

Therefore, learning as a whole is not confined to the formal classroom learning activities. Life presents enormous opportunities to learn and learning activities are so numerous that it is difficult to limit them in specific categories. How one eats, drinks, dresses, what his specific hobbies are, interests, attitudes, beliefs and aspirations, how he strives and what ideals and values he aims at, what his concept of himself is, etc., all are examples of learned and acquired behaviour. And the scope of learning definitely includes all these aspects.

TYPES OF LEARNING

Learning (defined as a process of bringing relatively permanent changes in the behaviour of an organism) may be classified in a number of ways depending on the domain or specific area of behaviour in which changes are introduced or in terms of methods or techniques that are employed for the introduction of behavioural changes.

If we follow the former criterion learning can be classified as verbal learning (involving verbal expression), learning of motor skills (such as walking, dancing, typing, swimming, etc.), affective learning (learning of habits, interest attitudes, appreciation, etc.) and cognitive learning (learning of concepts, principles, problem-solving, etc.).

In case of the latter criterion, we may categorise learning as trial and error learning, classical conditioning, operant conditioning, chain learning, shaping, learning through generalisation, learning through discrimination, serial learning, associate learning, insightful learning, etc.

An alternative basis adopted by Gagne (1970) for the purpose of classifying learning is worth mentioning. By taking into consideration a specific hierarchical order, he has classified learning into eight types as given below:

1. Signal learning (classical conditioning)
2. S-R learning (instrumental and operant conditioning)
3. Chain learning
4. Verbal associate or paired associate learning
5. Multiple discrimination learning
6. Concept learning
7. Principle learning
8. Problem-solving learning

Let us know about the meaning and nature of a few important types of the above in the coming pages.

Verbal learning: Learning of this type helps in the acquisition of verbal behaviour. The language we speak, the communication

devices we use are the result of such learning. Rote learning and rote-memorisation which is a type of school learning is also included in verbal learning. Signs, pictures, symbols, words, figures, sounds, voices, etc. are employed by the individual as an essential instrument for engaging him in the process of *verbal learning*.

Motor learning: The learning of all types of motor skills may be included in such type of learning. Learning how to swim, riding a horse, driving a car, flying a plane, playing the piano, hitting a moving target, drawing a geometrical design, adding and multiplying long digits, performing experiments and handling various instruments are the examples of such learning. Acquisition of various skills through such learning helps acquire speed and accuracy in the field of operation of these skills and builds confidence in him to perform the task with great ease and satisfaction. These skills can be acquired through a systematic and planned way of acquisition and fixation of a series of organised actions or responses by making use of some appropriate learning methods and devices.

Concept learning: A concept in the form of a mental image denotes a generalised idea about the things, persons or events. For example, our concept of *tree* is a mental image that brings to us the similarities or common features of all the different trees we know. We will call a thing *tree* when it has some specific characteristics the image of which we have already acquired in our mind on account of our previous experience, perception or rich imagination. The formation of such concepts on account of previous experience, training or cognitive processes is called *concept learning*. Such type of *concept learning* proves very useful in recognising, naming and identifying the things. Our entire behaviour; verbal, symbolic, motor as well as cognitive, is influenced by our concepts. Thus what we do, say, understand, reason and judge, to a great extent, is controlled by the quality of our *concept learning*.

Problem-solving: In the ladder of learning and acquisition of behaviour, problem-solving denotes a higher type of learning. Such type of learning requires the use of the cognitive abilities like reasoning, thinking, power of observation, discrimination, generalisation, imagination, ability to infer and draw conclusions,

trying out novel ways, experimenting, etc. Based on the grounds of earlier experiences, effect of coaching, training, formal or informal learning and acquisition of knowledge, habits, attitudes, interests, learning sets, etc. an individual may be motivated to reach an unknown target or to unfold the mystery of an unresolved problem. How he can be trained to accomplish such a task is the function of problem-solving. This type of learning has essentially enabled human beings to contribute significantly to the progress and improvement of society.

In the process of acquiring the above and other types of learning, one has to adopt an adequate technique in the form of some methods or processes. In some cases, connections or associations in the form of stimulus-response mechanism, instrumental or conditioning may help while in other cases organisation of the perceptual field and the use of cognitive abilities may work. The use of special techniques like serial learning, associate learning, etc. developed by the psychologists may also help in this direction. Let us describe what we mean by them.

Serial learning: *Serial learning* consists of such learning in which the learner is presented with learning material that exhibits some sequential or serial order. Children often encounter such a learning situation in schools where they are expected to master the lists of material such as the alphabet, multiplication tables, the names of all the states in their country, the names of presidents or prime ministers in order, etc. The experimental studies performed in the field of *serial learning* tell us that out of the *serial learning* material, the items presented in the beginning and the end of the list are easier to remember than those in the middle. This appears true whether the items are nonsense syllables, actual words or longer passages such as poems.

Paired-associate learning: In this learning, learning tasks are presented in such a way that they may be learnt on account of their associations. The name of a village like *Kishanpur* is remembered on account of its association with the name of *Lord Krishna* or a girl's name *Ganga* by learning it in the form of making paired association with River *Ganges*. Much of the verbal or motor learning may thus be learnt or remembered on account of the technique of paired or

multiple association.

In the practice of such paired-associate learning the learner may be presented a series of paired words or nonsense syllables like the following:

<i>Paired words</i>	<i>Paired nonsense syllables</i>
Dog–animals	PN–PF
Parrot–bird	NLP–JDS
Cat–milk	RJBP–RNYS
Motor–child	TIPBK–GMPRK

The learner views the pair (two words or syllables) for a brief spell, usually less than five seconds. He is then presented with one word of the pair and asked to recall the other. The practice with such procedure then helps build what is known as *associate learning*. An example of paired associate learning is the acquisition of foreign language vocabulary items that are paired, with their mother-tongue equivalents. The matching items presented in the objective-type questions of the achievement test also lay emphasis on such type of learning.

DOMAINS OF LEARNING

Learning, as already emphasised, is always designed to bring desired changes in the behaviour of learner. These changes in the behaviour of learner are brought in all the aspects and domains of his behaviour. Let us try to know the meaning and types of the domains of one's behaviour.

The term behaviour carries a wide meaning in its scope and application. While emphasising this truth, Woodworth (1993) writes:

Any manifestation of life is activity and behaviour is a collective name for these activities.

Hence, scope of the term 'behaviour' can be safely extended to any type of activity that we as human beings resort to at one or the other time in our life situations. From the moment our life starts, we are always doing one or the other type of activity in life situations. Even if you are sitting or lying idle, you would be wrong if you say that you are doing nothing. Even at that particular moment, you would be engaged in one activity or the other.

One is always engaged in some or the other activity, i.e. either doing something, thinking or feeling about something. These 'doing', 'thinking' and 'feeling' aspects of our behaviour may thus constitute the different domains of our behaviour.

In the language of psychology and education these three different aspects or domains of behaviour are known as—conative, cognitive and affective domains of our behaviour. Since learning absolutely stands for bringing changes in one's behaviour, it implies that with the help of the learning attained by a learner at one or the other time, it will surely result in bringing changes in one and/or the other domains of his behaviour.

From the discussion so far we may easily conclude that domains of learning are nothing but the domains of our behaviour which are subjected to some or the other changes as a result of our one or the other type of learning at a particular time. Consequently, we may classify the domains of our learning into the following three types:

1. Conative domain of learning

2. Cognitive domain of learning
3. Affective domain of learning

Let us have a brief description on these domains of learning.

Conative domain of learning: The learning related with this domain is expected to bring changes in one's conative behaviour. It is characterised by 'doing' aspect of our behaviour. Therefore, changes brought by performing activities like walking, talking, running, jumping, dancing, bending, moulding, eating, drinking, sewing, knitting, smelling, chewing, touching, throwing, holding, seeing, hearing, watching, grinding, etc. (performed through our actions as well as sense organs—*Karmendriyana* and *Gyanendriyana*) may fall in the conative domain of one's learning. Learning related to this domain of behaviour usually results in the acquisition of necessary skills for the adequate physical and motor development as well as seeking adjustment to one's environment and ways of living.

Cognitive domain of learning: The learning related with this domain is expected to bring changes in one's cognitive behaviour. It is characterised by 'thinking' aspect of one's behaviour. Therefore, changes brought in performing activities like thinking, reasoning, imagining, analysing, synthesising, concluding, generalising, estimating, interpreting, memorising, elaborating, summarising, explaining, illustrating, etc. may fall in the cognitive domains of one's learning. The learning related to this domain of behaviour usually results in the acquisition of intellectual competencies and academic abilities leading to one's mental and intellectual development and harmonious adjustment with oneself and the environment.

Affective domain of learning: The learning related with this domain is expected to bring changes in one's affective behaviour. It is characterised by 'feeling' aspect of one's behaviour. Therefore, changes brought by performing activities like feeling happy or sad, angry or cool, expressing one's emotions in a desired way, exhibiting one's preferences, likes and dislikes, attitudes and interests, holding values and ideas, etc. may fall in the affective domains of one's learning. The learning related to this domain of behaviour usually results in the acquisition of social skills, emotional maturity, moral

and character development and makes an individual a right human being.

In this way, domains of learning categorised as conative, cognitive and affective, stand for the different aspects or components of one's behaviour in which desired behavioural changes are planned through a system of education. In the classroom or school situations, deliberate attempts are usually made for bringing desired changes in these domains of learning for the realisation of stipulated teaching-learning or educational objectives.

IMPORTANCE OF LEARNING

Learning, as already discussed in this chapter, is considered a quite continuous and comprehensive process. It accompanies an individual from womb to tomb in the shape of variety of experiences—direct or indirect, concrete or abstract, formal or informal, individual or organised occurring in a variety of situations and environmental surroundings.

In its such widespread existence, learning in its all shapes and forms occupies a quite unique place and importance in one's life. Its uniqueness and importance in our life may be summarised as below:

Modification of behaviour in a desired direction: Through learning (in a well planned and controlled way), it is possible to shape the individual's behaviour in a desired shape and direction. It is very much needed in our life for the personal as well as social development and welfare. Learning, formal or informal, helps us to grasp the following for this purpose:

- Our proper and healthy habits to live, learn and work.
- Our proper and desired attitude towards, things, persons and events.
- Our interests and aptitudes giving a unique meaning to our life and occupation.
- The development of desired personality traits, like integrity, honesty, truthfulness, sincerity, punctuality, duty boundness, cooperation, empathy, social etiquettes and responsibilities, etc.
- The feelings and actions in accordance with serving the society and humanity at large and development of national and international understanding.

Helping in the process of growth and development: Growth and development in our all aspects of personality—physical, motor, cognitive, social, emotional, aesthetic, moral and spiritual is the result of a close interaction between maturation and learning. Maturation as we know is a natural process of growth and

development and it is thus beyond our power to guide and control the process and outcomes of maturation. Learning, however, is man-made and thus can prove quite helpful in determining the magnitude and direction of growth and development related to various dimensions of our personality.

Learning is the key component and goal of any process of education: Education by its all means, forms and shapes, is aimed to have the desired learning of the students. Therefore, what is to be planned and organised to provide education to the children of all ages depends upon providing them such learning experiences as to yield the attainment of desired educational objectives. In this way, learning of learners is the main goal of any process of education. Learning as a process and product thus makes the task of education a reality in terms of taking decisions regarding planning, implementation, evaluation and application of the task and activities concerning education. The teaching of the teacher, administration of the educational administrators and planning of the educational planners are all decided by the learning capacities, learning requirements, learning styles and learning goals of the learner. In this way, it is the learning of the learners that is the key figure in deciding the contents, methods and outcomes of the process of education. If there is no mention or concern about learning of the learners, there will remain nothing in education. The world of education is the world of learning.

Learning is the key of all individual and social progress: The innate abilities and capacities of a child are externalised through the learning opportunities provided to him in the form of experiences or training. It is these opportunities that help him develop and progress in his life not only at personal level but he is also enabled by his learning to contribute in his own way towards the development and progress of the society. Learning provides the individuals, solid background in terms of knowledge, skill, attitudes and interest related to a subject area or task and thus makes them progress in the study and application of these subjects or tasks. The expansion of knowledge and skilled application of this acquired knowledge by human beings can only be possible with the help of mechanism of learning. In this way, what we see in our world in the form of

tremendous progress in various areas of pure and applied knowledge is the result of the mechanism of learning. None other than learning is thus responsible for the culture, civilisation and progress that is owned by our society at any moment of its existence.

In this way, learning is responsible for making us and our society as a whole, what is there in our personal and social life including our world of work and action.

SUMMARY

1. Learning refers to the process of bringing changes in behaviour through experience or teaching. However, all types of changes in our behaviour are not necessarily caused by learning. Maturation (the natural process of growth and development) causes changes quite independent of any experience, practice or learning. Similarly, the changes produced by some factors like fatigue, illness, medicine, intoxicating objects, fear, anger, etc. also do not cause such serious and enduring changes in behaviour. The changes associated with our direct and indirect experiences and formal attempts of practice and teaching can only result in quite stable and enduring changes in our behaviour and that is why such type of changes are likely to be associated with the processes and product of learning.
2. The process of learning is carried out in the stages namely preparatory stage involving learning readiness, active stage involving the task of actual learning and the feedback stage necessary for the continuity of the cycle of learning. However, the process of learning does not end in one cycle. It is a never-ending process that needs to be carried out for bringing changes in one's behaviour in facing never ending changes and situation of one's life.
3. Development and learning are closely related and are found to exhibit a reciprocal relationship each influencing and contributing towards the proper progress of the other. In this sense where the proper acquisition of knowledge, skills, attitudes, and interests, etc. may help in the desired development in the various aspects and dimensions of the personality of growing children, the level of one's learning is equally influenced and affected by the levels of development in one or the other aspects or dimension-physical, motor, mental, social, emotional, linguistic and moral of his development.

4. Learning cannot be attributed to any hereditary influences. It is by all means an acquired behaviour earned by us through our experiences and teaching. The other distinctive feature of learning includes (i) its ability to bring relatively permanent changes in behaviour (ii) it's being a continuous and universal lifelong process (iii) it's being purposive and goal-directed (iv) transfer ability from one situation to another (v) not always necessarily associated with improvement or development in right direction (vi) planned learning attempts are always directed to bring desirable behaviour changes, balanced development of the personality, etc.
5. Learning can be classified into specific types depending upon the domain or specific area of the behaviour in which changes are introduced or in terms of the methods or techniques that are employed for the introduction of behavioural changes. Gagne, in this connection, has classified learning into eight types such as (i) Signal learning, (ii) S-R learning, (iii) Chain learning, (iv) Verbal associate or paired associate learning, (v) Multiple discrimination learning, (vi) Concept learning, (vii) Principle learning and (viii) Problem-solving learning.
6. Changes in the behaviour of the learner can be brought in all the aspects and domains of his behaviour. In general, the domains of one's behaviour are usually categorised and labeled as cognitive, conative and affective domains of behaviour. Cognitive domain of one's behaviour is characterised by 'thinking' aspect, conative, by 'doing' aspect and affective by 'feeling' aspect. In bringing changes through any planned process of learning we have to take care of the desirable changes in all the three domains of child's behaviour.
7. With all its virtues and actions, thus learning may be found to occupy a quite unique place and importance in one's life exhibited through its strength of (i) modifying the behaviour in a desired direction, (ii) helping us in the process of growth

and development, (iii) proving a key component and goal of any process of education and (iv) helping in a proper way in the progress and development of the individual and society.

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Factors Affecting Learning

INTRODUCTION

In the preceding chapter, we have tried to understand the concept and nature of learning. So, we are now able to conclude that learning brings relatively permanent or enduring changes in our behaviour, quite distinctive to the changes brought through maturation and factors like fatigue and illness. It is also known to us that learning behaviour by all means is an acquired behaviour. Whatever we learn, we learn through experiences gained in our environment. Learning can no way be called a gift or contribution from our hereditary stock. It is always regarded as a coefficient of friction between oneself and the environment. Therefore, it is the environment that influences and shapes our learning. The contribution of the mechanism of motivation is also no less than the actual efforts and attempts of a learner in learning something. The motivation is also influenced by many environmental factors like the process and product of teaching-learning process. In this chapter, we shall discuss various factors that are responsible for one's learning related to one or the other type of teaching-learning process.

FACTORS AFFECTING LEARNING

Learning, as you have studied earlier, can be defined as a process of bringing relatively enduring changes in the behaviour of the learner through experience and learning. An analysis of this definition may reveal that the learning process related to a particular teaching–learning situation is mainly centered around the following:

1. The learner whose behaviour is to be modified.
2. The type of experience and training available for the modification in the learner's behaviour.

Therefore, the success or failure in the attempt of learning in a particular teaching–learning situation or environment mainly involves two types of factors, one related with the learner and other with the prevailing learning environment. Therefore, the differences observed in the results of learning or performances exhibited by a group of learners may be surely attributed to the differences present in the learner's themselves or within their learning environment. Consequently the factors influencing learning may be broadly classified as personal (learner related) and environmental (learning facilities and situations) related. The environmental related factors can be further categorised as teacher related, content related and process related (sources available to the learners for learning). As a result the factors influencing learning may be categorised as below:

1. Learner related factors
2. Teacher related factors
3. Content related factors
4. Process related factors

Let us discuss the above four types of factors:

Learner Related Factors

The learner is the key figure in any learning process. He has to learn to bring desired modification in his behaviour. How he will learn or

what he will achieve through a particular learning act depends heavily on his own characteristics and way of learning. Such factors associated with him can be described as below:

Learner's physical and mental health: Learning is greatly affected by the learner's physical and mental health particularly at the time of learning. A simple headache or stomach ache can play a havoc with the process and products of learning. Children who do not keep up with satisfactory physical health, have to suffer adversely in terms of the gain in learning. Similarly, the mental state and health of the learner at the time of learning become potent factors in the outcome of learning. A tense, emotionally and mentally disturbed learner cannot be expected to show satisfactory results in learning.

Basic potential of the learner: The results achieved by the learner through the process of learning depend heavily upon his basic potential to undergo such learning. Such potential may consist of the following things:

- Learner's innate abilities and capacities for learning a thing.
- Learner's basic potential in terms of general intelligence and specific knowledge, understanding and skills related to particular learning area.
- Learner's basic interests, aptitudes and attitudes related to the learning of a particular thing or area.

Level of aspiration and achievement motivation: Learning is greatly influenced by the level of aspiration and nature of achievement motivation possessed by the learner. How can we expect from a learner to achieve a thing for which he has no aspiration? One has to maintain the level of his aspiration and achievement motivation to a reasonable level—neither too high causing frustration for non-achievement nor too low so as not to try for things for which he is quite capable. In this way, one's level of aspiration and achievement motivation work significantly towards gain in learning.

Goals of life: The philosophy, immediate as well as ultimate goals of one's life affect the process and products of learning. His mode and

ways of looking towards the things, his inclination towards learning in a particular area, patience and persistence maintained to continuing his learning despite the heavy odds, all depend upon his goals and philosophy of life.

Readiness and will power: Learner's readiness and power to learn is a great deciding factor in the results of learning. No power on the earth can make a learner learn if he is not ready to learn. Contrarily, if he has a will to learn something, he will himself find the way for effective learning.

Teacher Related Factors

If the learner stands at one end of the ongoing teaching–learning process as one of the pole, then inevitably it is the teacher who is entrusted to act as the other pole for the desired flow of the teaching–learning activities in the classroom. He is the person who has to play the role of friend, philosopher and guide for initiating, interacting as well as concluding all the activities pertaining to the classroom journey travelled along with the students of the class. Hence, teacher related factors are bound to play significant role in shaping and directing the teaching-learning process of a classroom or work situation. Let us briefly summarise here the role of such teacher related factors in the teaching–learning process.

Mastery over the subject matter: A teacher should know the art and skill of teaching so that the students are able to realise the stipulated teaching–learning objective in a particular teaching–learning situation. He may know his subject well but for sharing and communicating various experiences related to the learning of a subject, he needs specific teaching skill, art and science of his teaching profession. The proficiency and deficiency possessed by a teacher in this regard are quite responsible for turning the teaching–learning process into a big success or a failure.

Personality traits and behaviour of the teacher: A teacher as a leader has to lead his students in the teaching-learning process through the magnetic influence and incredible impression left on the minds of the students on the basis of his personality traits and behaviour. He is a role model for his students. His actions, behaviour

pattern and personality traits carry a great meaning to be imitated by his students being and brought into practice. Therefore, much of the desirable behaviour modification, an essential target meant for any teaching-learning act, is very much influenced by the types of personality traits and behaviour pattern demonstrated by the teacher in his action and behaviour in the classroom and work situations. Moreover, how he behaves with his students during the various types of activities and interactions carried out in the teaching-learning process also prove a decisive factor in finalising the teaching-learning outcomes.

Level of adjustment and mental health of the teacher: How adjusted a teacher feels in his personal and professional life and the state of mental health maintained by the teacher carries much weight in influencing his behaviour and effectiveness needed for the effective control and management of the teaching-learning process. A teacher possessing poor mental health and lack of adjustment in his personal and professional life may prove total failure in the realisation of teaching-learning objectives, whereas a teacher possessing good mental health and adjustment may prove an ideal image for his students and boon to the effectiveness of the teaching-learning process.

Type of discipline and interaction maintained by the teacher: A teacher who is a good disciplinarian (democratic and persuasive) and believes in providing due interactive roles to his students in the teaching-learning process brings more positive and better teaching-learning outcomes in comparison to the teachers who are poor in maintaining discipline (autocratic or lethargic) and are in the habit of providing unidirectional flow of communication by discouraging any initiative and interaction from his students.

Content Related Factors

In a teaching-learning process, one thing that is shared the most between the learner and the teacher is the contents of the subject matter. Desired instructional objectives and educational aims can be effectively achieved only on the basis of the quality of these contents or learning experiences shared during the process of teaching-learning. Poor contents lead to poor teaching, inadequate or

sometimes no learning while contents rich in the desired learning experiences suited to the nature, interest and ability of the learner always pay rich dividend in terms of the realisation of set teaching–learning objectives. In brief, the factors related to contents influencing teaching–learning may be broadly divided into three main categories named and discussed as below:

Nature of the contents or learning experiences: Teaching–learning process is influenced by the nature of the contents, subject matter or learning experiences shared in the process. Whether the nature of the content material or learning experience provided in a teaching–learning process is formal or informal, incidental or organised, direct or indirect, proves quite an influential factor in the process and products of teaching–learning.

Selection of the contents or learning experiences: Proper attention, time and energy employed for the desired selection of the contents or learning experiences, best suited to the realisation of the teaching–learning objectives in a particular teaching–learning situation, always proves decisive in influencing the process and products of teaching–learning. Therefore, it is always advisable to select content material or the learning experiences on the basis of the desired principles like principle of child centeredness, principle of activity, criterion of activity, age, grade and experiences of the learners, etc.

Organisation of the contents or learning experiences: Selected contents or learning experiences need better organisation for the effective sharing between the learners and teacher. A better organisation will be more convenient and provide strength to the learners and teacher for the better realisation of the stipulated teaching–learning objectives. Therefore, the methods like logical v/s psychological, spiral v/s concentric, criterion of difficulty level, correlation, etc. should be properly employed for the effective organisation of the contents or learning experiences.

Process Related Factors

Teaching–learning output can always be better realised in terms of the stipulated teaching–learning objectives if the factors related to

the process of teaching–learning are better planned, organised and executed in a proper way. Such process related factors have been explained as under:

Methodology adopted for teaching–learning experiences: In teaching-learning, much depends upon the methods, techniques and approaches employed for the teaching and learning of the selected contents and learning experiences. Let us weigh the truth of this statement from various angles.

1. *Linking of the new learning with the past:* The quality of the result in teaching-learning depends much on the abilities of the teacher and the learner to link the new present learning with the past experiences of the learner. Past experience helps the learner to assimilate and understand the new learning by providing success as well as cementing force for this purpose.
2. *Correlating the learning in different areas:* Correlation facilitates the task of teaching–learning as it allows maximum transfer of training or learning from one area to another. Accordingly, one can expect good results in learning if learning experiences are given in view of seeking correlation—(i) among the different subjects or areas, (ii) within the branches or experiences of the same area and (iii) with the real-life events and situations.
3. *Utilisation of maximum number of senses:* Senses are said to be the gateway of knowledge and consequently the results in teaching–learning are very much influenced by the nature and type of the utilisation of one's senses for the acquisition of learning experiences. A learner who learns through the maximum utilisation of his senses like sense of sight, hearing, touch, smell, taste and also tries to learn by doing the things himself always gets the advantage.
4. *Provision of drill work, revision and practice:* Review and practice always bring good results in the achievements of student's learning. A learner who makes use of sufficient drill work, practice work, revision and review of his learning

can be expected to harvest a good yield in terms of its good retention, reproduction and utilisation at the proper time.

5. *Provision of proper feedback and reinforcement:* The teaching–learning yields are much dependent on the nature, quality of the feedback and reinforcement provided to the learner in his learning task. One must be acquainted with the progress of his learning in terms of his strengths and weaknesses. Remedial action may be taken at the proper time, if needed. The knowledge of the results and progress may work well for providing immediate reinforcement to the learner. In addition, the learning process can be suitably designed if we take due care for the proper reinforcement technique in the form of approval of the learning response. Nodding of the head, smiling, saying good-bye etc., bring a magic in terms of learner's interest and achievement.
6. *The selection of the suitable learning methods and teaching:* There are sufficient methods and a number of good techniques available for the teaching and learning of different subjects and areas of experiences. The results in teaching–learning are always influenced by the nature and quality of the methods and techniques employed for the teaching and learning of a particular content, subject matter or learning experiences like those given below:
 - i. Whether or not, the methods and techniques are helpful in learning at memory, understanding or reflective level?
 - ii. Whether or not these are teacher-dominated, learner-centered or allow useful teacher-pupil interaction?
 - iii. Is it possible to proceed on the path of self learning through them?

Teaching-learning environment and resources: The learner is helped by the available resources and environment available for bringing desirable changes in his behaviour. How effectively will such

changes be introduced in his behaviour depend much on the equality and management of these resources. Such things and factors affecting teaching-learning process may be listed as below:

1. The socio-emotional climate available in the institution in the form of teacher-pupil relationships, pupil-pupil relationships and school-staff relationships, etc.
2. The availability of appropriate learning material and facilities in terms of teaching-learning aids, textbooks, library and laboratory facilities, project work, etc.
3. The proper conducive environment and learning situations like those given below:
 - i. Proper seating arrangement
 - ii. Calm and peaceful environment
 - iii. Management and control of the factors leading to distraction
 - iv. Cooperative and competitive group situations
 - v. Congenial learning environment at home
 - vi. Provision of proper change, rest and recreation
 - vii. Provision of opportunity for creativity and self-expression

In this way, the process and products of teaching-learning are said to be influenced by the personal factors associated with the learner, teachers and the external factors (like type of content material and its proper delivery by the learner) lying within the teaching-learning environment.

SUMMARY

Learning activities are quite independent of learner's hereditary stock. The environmental forces and factors go in a variety of ways to shape the processes and products of learning. In fact, learning in all its means is always regarded as a coefficient of friction between the self of the learner and the teaching–learning environment. This is why the factors influencing one's learning may be categorised as learner related factors, teacher related factors, content related factors and process related factors.

In the process of learning, much depends on the learner. How well he will learn thus depends upon so many learner's related factors like his physical and mental health, basic potential, level of aspiration and achievement motivation, goals of life and his readiness and will power for learning.

Teacher is always a key figure in any teaching–learning process and his all attempts are almost directed to help the learners in his learning. How he will be helpful in the task depends upon the factors like his mastery over the subject matter, art and skills of teaching, personality traits and behaviour, level of adjustment, mental health, discipline and interaction he can be able to maintain, etc.

Apart from the learner and teacher (dependent and independent variables in a teaching–learning process) the role of intervening variables involving mainly the contents as well as the process related factors can never be underestimated. In content related factors we can mainly include factors like the nature of the contents or learning experiences and the selection as well as organisation of these learning experiences. The process related factors, on the other hand, are related with the processing of selected and organised learning experiences in the hands of both the teacher and the learner and may thus be grouped into two distinct categories, i.e., factors related with the methodology adopted for teaching and learning, and factors associated with the type and nature of the teaching–learning environment and resources.

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Behaviourism and Behaviouristic Theories of Learning

WHAT IS BEHAVIOURISM?

Behaviourism represents a school of psychology or doctrine that lays emphasis on (i) the study of behaviour for knowing about the individuality of an individual and (ii) use of the method of conditioning for the acquisition of all types of behaviour—conative, cognitive and affective.

HISTORICAL EVOLUTION AND DEVELOPMENT OF BEHAVIOURISM

American psychologist John B. Watson (1878–1950) is generally known as the father of the doctrine or school of psychology referred to as behaviourism. However, his contemporary Ivan Pavlov (1849–1936), the famous Russian psychologist, was in fact the pioneer in conducting useful experiments with the idea and views held in behaviourism. *Behaviourism* as a new doctrine stood boldly against the then prevalent method of introspection or self-observation for studying human behaviour. He argued that a thing like mind or consciousness that cannot be observed or tested scientifically should not be made subject of study for knowing about the individuality of an individual. It should be replaced with our observable and measurable behaviour.

Consequently, *behaviourism* as a method of studying behaviour focused its attention totally on the overt or observable behaviour. For this purpose, it tried to reduce all of man's activity, including his thinking, feeling and volition to the that level of behaviour which could be observed and objectively recorded. Thus, a behaviourist is not interested in the feeling of fear (because it is not measurable) but pays attention to the changes in heart rate and blood pressure which are the effects of fear and can be objectively measured. The theory of behaviourism as propagated by Watson was in fact based on the findings of the Russian psychologist Ivan Pavlov (1849–1936), the propagator of the theory of classical conditioning.

In his classic experiment, Pavlov conditioned a dog to salivate in response to the sound of a bell by substituting that sound for the sight and smell of meat and concluded that all behaviour is a response to some stimulus in the environment. Watson tried to apply this approach in the field of human behaviour. In the famous experiment with an 11-month old baby named Albert, he conditioned the baby's behaviour to fear a rat by substituting the rat with a sudden loud noise. He concluded that behaviour is merely the response to some environmental stimulus. How we behave and why we behave in a particular way can be successfully demonstrated and explained through habit formation or conditioning. Thus, conditioning

through environmental influences and not hereditary endowments or innate differences is responsible for shaping the behaviour of a child.

Behaviourism thus tried to project human beings as rather more complex than machines which respond in a particular fashion to a particular kind of stimulus. The behaviour of an individual may thus be controlled by environmental forces and not by hereditary endowments or innate differences.

His strong convictions about the stimulus response automatism and environmental influences made Watson assert boldly in 1926.

Give me a dozen healthy infants, well informed and my own specified world to bring them up in and I will guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant chief and yes, even beggar and thief, regardless of his talents, penchants, tendencies, abilities, vocations and race of his ancestors.

The doctrine of behaviourism propounded by Watson and his disciples thus ushered a new era in the field of psychology by making it somewhat materialistic, mechanistic, deterministic and objective like most of the physical and natural sciences. However, it suffered from a number of drawbacks, limitations and shortcomings. For this reason it has been subjected to criticism and has been modified and refined in a number of ways by contemporary psychologists like Lashley, Tolman, Hull and Skinner. While Lashley devoted himself to neurophysiology and Tolman believed in purposive behaviourism. B.F. Skinner, a leading American behaviourist of the present age, emphasised a system of learning known as *operant conditioning*, quite different from the type of conditioning advocated by Pavlov and Watson. The task of behaviour modification he advocated and the teaching machines he popularised by using the principles of reward, yield significant influence in the field of psychology, education and medicine.

MAIN CHARACTERISTICS AND FEATURES OF BEHAVIOURISM

The main ideas and assumptions associated with the doctrine of behaviourism may be outlined as below:

Nature of the learner: When born, child's mind is 'tabula rasa' (a blank state). He has no free will, but his environment determines his behaviour. Heredity has no role in shaping the behaviour of the learner.

Environment is every thing: One's environment play a quite dominant role in Shaping one's behaviour and giving direction and dimensions to his personality development. The individual and his behaviour is the sole product of his interaction with the environment.

Similarity between human and animal learning: The propagation of behaviourism believed that there is a little difference between learning that takes place in humans and that in other animals or birds. Therefore, research can be carried out on animals/birds and findings may be generalised to human beings.

Psychology should be considered as a science: *Behaviourism* defined psychology as a science of behaviour. It tried to assert that psychology should be considered as a science because therein we can have a scientific study of the behaviour of the animals and human beings through its systematic and objective observation under controlled condition. Expressing his view on this account. Watson stated that,

Psychology as a behaviorist views it as a purely objective experimental branch of natural science. Its theoretical goal is ... prediction and control. (1913, p. 158)

Focusing on observable behaviour: Behaviourism focused on the study of one's observable behaviour as opposed to his internal behaviour (what is going inside the mind and consciousness) and internal events like thinking and feeling. For this purpose, it argued that it is only the observable behaviour that can be objectively and scientifically measured. Therefore, it is the only one that can be made a subject of experimental and scientific study by the psychologist and researcher.

Behaviour as a stimulus-response mechanism: In view of *behaviourism*, all behaviour, no matter how complex, can be reduced to a simple stimulus-response mechanism. The whole purpose of the *science psychology* is centred around this stimulus-response mechanism mentioned by Watson as:

To predict, given the stimulus, what reaction will take place; or, given the reaction, state what the situation or stimulus is that has caused the reaction.
(1930, p. 11)

BEHAVIOURISM AND BEHAVIOURISTIC LEARNING

Behaviourism as a school of psychology or doctrine is credited to propagate a number of useful learning theories for helping the learners and teachers in carrying out the teaching-learning process in a more satisfactory and productive way. A few of such learning theories propagated by the major thinkers and psychologists belonging to the school of behaviourism have been outlined in the table given below:

	<i>Name of the theory</i>	<i>Main propagator</i>
1.	Trial and error theory of learning	E.L. Thorndike (1874–1949)
2.	Theory of classical conditioning	Ivan Pavlov (1849–1936)
		J.B. Watson (1878–1958)
3.	Theory of operant conditioning	B.F. Skinner (1904–1990)
4.	Theory of contiguous conditioning	E.R. Guthrie (1886–1959)
5.	Hull's systematic behaviour theory	Clark L. Hull (1884–1952)
6.	Gagne's theory of learning	Robert M. Gagne (1916–2002)

All the above cited learning theories try to propagate and apply the viewpoints emphasised by the doctrine of behaviourism in their own ways. Let us discuss all these theories one by one.

Thorndike's Trial and Error or S-R Theory of Learning

Thorndike propagated his theory with the help of the experiments performed on chickens, rats and cats. For this purpose he put them under different learning situations, Pierre Flourens (1794–1857) proposed that conclusions drawn from animal experimentation should be equally applicable to man. This proposition started the chain of experimentation in the field of learning with animals. Thorndike selected chickens, rats and cats for experimentation. He placed them under different learning situations and studied them carefully. With the help of these experiments, he tried to evolve certain laws and propagated his theory of connectionism or trial and error learning. It is interesting to know the type of experiments he

performed on these animals. For illustration, we narrate one of his experiments below with the help of Figure 3.1.

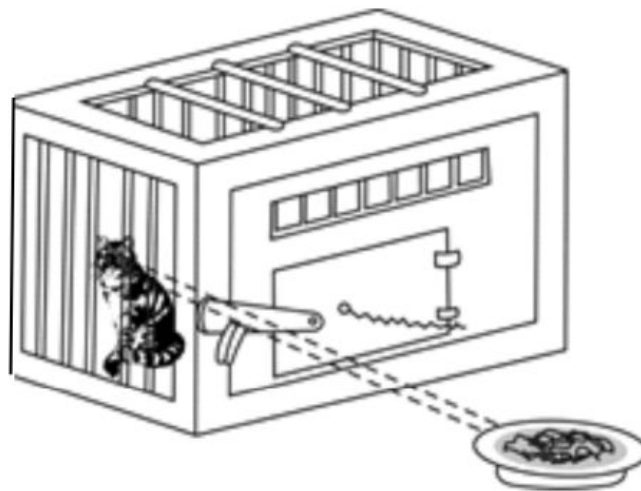


Figure 3.1 Thorndike's cat is trying to come out.

He put a hungry cat in a puzzle box. There was only one door for exit which could be opened by correctly manipulating a latch. A fish was placed outside the box. The smell of the fish worked as a strong motive for the hungry cat to come outside the box. Consequently, the cat made every possible effort to exit the box. Thorndike described the situation (1911) as *It tries to squeeze through every opening; it claws and bites at the bars or wires, it thrusts its paws through any opening and claws at everything it reaches*. In this way, it made a number of random movements. In one of the random movements, by chance, the latch was manipulated. The cat came outside and got its reward. Now it was able to open the door without any error in other words, learned the way of opening the door.

The experiment shows the following stages in the process of learning:

Drive: In the present experiment it was hunger and was intensified with the sight of the food.

Goal: To get the food by coming outside the box.

Block: The cat was confined in the box with the door.

Random movements: The cat persistently tried to exit the box.

Chance success: As a result of striving and random movement, the cat by chance succeeded in opening the door.

Selection (of proper movement): The cat gradually recognised the manipulation of latch. It selected the proper way of manipulating the latch out of its random movements.

Fixation: At last, the cat learned the proper way of opening the door by eliminating all the incorrect responses and fixing the right responses only. Now it was able to open the door without any error or in other words, learned the way of opening the door.

Thorndike named the learning of his experimental cat as *Trial and Error Learning*. He maintained that the learning is nothing but the stamping in of the correct responses and stamping out of the incorrect responses through trial and error. To know the correct solution the cat made many vain attempts. It committed several errors before getting success. In subsequent trials it tried to avoid the erroneous ways and repeat the correct way of manipulating the latch. Thorndike called it *Learning by selecting and connecting* as it provides an opportunity for the selection of the proper responses and correct or associate them with adequate stimuli. In this reference, Thorndike has written *Learning is connecting. The mind is man's connection system.* (1931, p. 122)

As a result learning is caused by the formation of connection between stimuli and responses in the nervous system. There is definite association between sense impression and impulses to action. This association can be known as a bond or connection. Since it is these bonds or connections which become strengthened or weakened in the making and breaking of habits, Thorndike's system is sometimes called a *bond psychology* or simply *Connectionism*.

Thorndike propounded the following laws of learning on the basis of his theory:

Law of readiness: The statement runs as under:

When any conduction unit is ready to conduct, for it to do so is satisfying.
When any condition unit is not in readiness to conduct, for it to conduct is annoying.
When any condition unit is in readiness to conduct, for it not to do so is annoying.

This law is indicative of learner's state to participate in the learning process. Readiness according to Thorndike is preparation for action. It is very essential for learning. If the child is ready to learn

he learns more quickly, effectively and with greater satisfaction than if he is not ready to learn. It warns us not to make the child learn till he is ready to learn and also not to miss any opportunity of providing learning experience if the child is already prepared to learn. The right movements concerning the learning situation and the learner's state of mind should be very well recognised and maximum use of this knowledge should be made by the teacher. He should also attempt to motivate the students by getting their attention and generating interest and curiosity.

Law of effect: In the words of Thorndike, the statement of the law runs as under:

When a modifiable connection between situation and response is made and is accompanied or followed by a satisfying state of affairs, that connection's strength is increased. When made and accompanied or followed by an annoying state of affairs, its strength is decreased.

In simple words, it means that the learning takes place properly when it results in satisfaction and the learner derives pleasure out of it. In the situation when the child meets a failure or gets dissatisfaction, the progress on the path of learning is blocked. All the pleasant experiences have a lasting influence and are remembered for a long time while the unpleasant ones are soon forgotten. Therefore, the satisfaction and dissatisfaction, pleasure or displeasure obtained as a result of some learning ensures the degree of effectiveness of that learning.

In the words, this law emphasises the role of rewards and punishment in the process of learning. Getting reward as a result of some learning motivates and encourages the child to proceed on the same path with more intensity and enthusiasm while the punishment of any sort discourages him and creates distaste and repulsion towards that learning.

Law of exercise: This law has two sub-parts—law of use and law of disuse. The statements regarding these sub-parts run as under:

Law of use: When a modifiable connection is made between a situation and response that connection's strength is, other things being equal, increased.

Law of disuse: When a modifiable connection is not made between a situation and response, during a length of time, that

connection's strength is decreased.

In this way, Law of use refers to the strengthening of connection with practice while the law of disuse to the weakening of connection or forgetting, when the practice is discontinued. In brief, it can be said that *Law of Exercise* as a whole, emphasises the need of repetition, practice and drill work in the process of learning.

Changed form of the 2nd and 3rd laws: In the later years of his life, Thorndike changed his stand on the laws of exercise and effect.

He experimented upon a blindfolded man who was asked to draw a line of 3 inches in length. Mere repetition did not bring any change or improvement. So, he concluded that practice without rewarding the response was meaningless which follows that in the process of learning connections get strengthened by being rewarded and not by just occurring.

Regarding the *Law of Effect*, he began to think that rewards and punishment were not equal and opposite in effect. Rewards strengthen the connection considerably whereas punishment does not weaken the connection to the same degree. The intensity and speed of reward in casting influence on learning is greater than that of punishment. It also brings healthy and desirable improvement in the personality of the child. In this way, he began to give more importance to rewards and praise in place of punishment and blame.

All these three laws—*law of readiness*, *law of effect* and *law of exercise*—have a wide field of application in the teaching–learning process. These laws imply the truth of the well-known proverbs and maxims like

You can lead a horse to water but you cannot make him drink.

Nothing succeeds like success.

Practice makes a man perfect.

Some more laws of learning given by Thorndike

Law of multiple response or varied reactions: The law implies that when an individual is confronted with a new situation, he responds in a variety of ways before arriving at the correct response.

Law of attitude: Learning is guided by a total attitude or *set* of the organism. The learner performs the task properly if he has developed a healthy attitude towards the task.

Law of analogy: An individual responds to a new situation on the basis of the responses made by him in similar situations in the past. He makes responses by comparison or analogy.

Law of associative shifting: The statement of law runs as *We can get any response from the learner which he is capable of, associated with any situation which he is sensitive to.* In other words, any response which is possible can be linked with any stimulus. *Thorndike* clarified his stand through one of his experiments in which he demonstrated how a cat can be trained to stand up on command. He concluded that first of all, a bit of fish is dangled before the cat while you say *Stand up*. After enough trials, there will be a stage when you will not need the help of fish. The oral signal or command will alone evoke the response. The idea given by this law gave birth to a new theory of learning known as *Theory of conditioning*.

Educational implications of Thorndike's theory and his various laws of learning

Theory of *trial and error* has enough educational significance. It tries to explain the process of learning on the basis of carefully performed actual experiments. Not only the animals, but human learning also, follows the path of trial and error to a great extent. A child, while confronted with a Mathematical problem, tries many possibilities of its solution before he arrives correct one. Even the discoveries and inventions in various fields of knowledge are the results of trial and error process.

For example, let us consider the discovery made by Archimedes in the form of his well-known principle. He was given a problem by his Emperor. There was a *Drive* that he will be beheaded if he could not get the solution of problem. There was a *Block*, as he could not think of any solution. The problem was difficult. He went on experimenting and made a number of attempts (trials) for the solution of problem. One day while taking bath, he got *Chance success* in one of his attempts and this led to the formulation of the law of floating bodies.

But the excessive use of the method, trial and error, without caring for the development of understanding should not be encouraged in any circumstances. We cannot reduce the human learning as

mechanical and blind-folded as advocated by this theory. It must be supported by reason, understanding and insight. Trials and practice coupled with insight will make the process of learning more effective than either of the methods adopted alone.

As far as the Thorndike's laws of learning are concerned, he has done a valuable service to the field of learning and teaching by providing these laws. These laws imply the following things in general:

1. In the process of teaching and learning the main task of the teacher is to see what things he likes to be remembered or forgotten by his students. After this, he must try to strengthen the bonds or connections between the stimuli and responses of those things which are to be remembered; through repetition, drill and reward. For forgetting, the connections should be weakened through disuse and annoying results.
2. The child must be made ready to learn. His interest, attitude and mental preparation is essential for the smooth sailing in the teaching-learning process.
3. It is also emphasised that the past experiences and learning give an adequate base for the new learning. Therefore, the teacher should try to make use of the previous knowledge and experiences of the students. The child must also be encouraged to see similarities and dissimilarities between the different kinds of responses to stimuli and with the help of comparison and contrast, should try to apply the learning of something in one situation to the other similar situations.
4. The child should be encouraged to do his work independently. He must try various solutions of the problem before arriving the correct one. But every care should be taken to see that he may not waste his time and energy. He should not be allowed to repeat his mistakes and proceed blindly without using his reasoning and thinking powers and utilise the past learning experiences.

In short, Thorndike's theory and laws of learning have contributed a lot to educational theory and practice. It has made the learning purposeful and goal-directed and has brought motivation in the forefront. It has also given impetus to the work of practice, drill and repetition and realised the psychological importance of rewards and praise in the process of teaching and learning.

WATSON'S AND PAVLOV'S CLASSICAL CONDITIONING

After performing various experiments on the subjects like dogs, rats and cats, Psychologists like Watson and Pavlov introduced a new theory of learning known as *conditioned response theory* or simply as *learning by conditioning*. For understanding what *conditioning* is and what this theory implies, it is desirable to have an idea of the type of experiments performed by these psychologists.

Experiment by Pavlov: In one of the experiments, Pavlov kept a dog hungry for the night and then tied him on to the experimental table which was fitted with certain mechanically controlled devices. The dog was made comfortable and distractions were excluded as far as it was possible to do so. The observer kept himself hidden from the dog but able to view the experiment by means of a set of mirrors. Arrangement was made to give food to the dog through automatic devices. Every time when the food was presented before the dog, he also arranged for the ringing of a bell. When the food was presented before the dog and the bell was rung, there was automatic secretion of saliva from the mouth of the dog. The activity of presenting the food accompanied with a ringing of the bell was repeated several times and the amount of saliva secreted was measured.

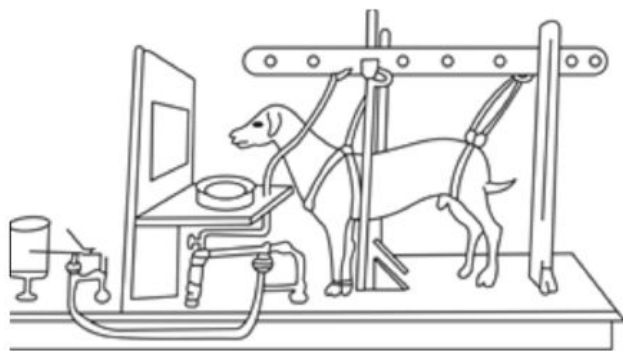


Figure 3.2 Diagrammatic view of the experiment conducted by Pavlov.
(Garrett, *General Psychology*, 1968 p. 254).

After several trials the dog was given no food but the bell was rung. In this case also the amount of saliva secreted was recorded and measured. It was found that even in the absence of food (the

natural stimulus), the ringing of the bell (an artificial stimulus) caused the dog to secrete saliva (natural response).

It considers the learning as a habit formation and is based on the principle of *association and substitution*. It is simply a stimulus-response type of learning where in place of a natural stimulus like food, water, sexual contact, etc., the artificial stimulus like sound of the bell, sight of the light of a definite colour, etc., can evoke a natural response. When both the artificial or natural stimulus (ringing of the bell) and natural stimulus (food) are brought together several times, the dog becomes habituated or conditioned to respond to this situation. There becomes perfect association between the types of stimuli presented together. As a result, after some time natural stimulus can be substituted or replaced by an artificial stimulus and this artificial stimulus is able to evoke the natural response.

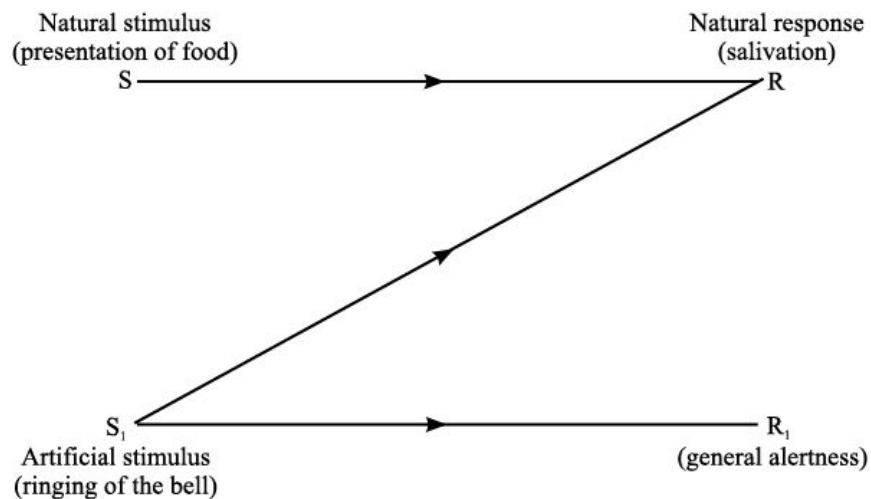


Figure 3.3 Diagrammatic presentation of the experiment.

In this experiment, the dog learned to salivate at the sound of the bell. This kind of learning was named as *learning by conditioning*.

Another experiment: In one of the experiments done by Watson, the subject was a human baby of 11 months. The baby was given a rabbit to play. The baby liked it very much and was pleased to touch its fur. He watched carefully the pleasant responses of the baby. After some time in the course of the experiment, a loud noise was produced to frighten the baby. As soon as the baby touched the rabbit. The baby was frightened. Each time when he tried to touch the rabbit, the loud noise was produced and he gave *fear* response.

After some time he began to fear the rabbit even if no loud noise accompanied it. In this way he learned to fear the rabbit through conditioning.

From these experiments, Watson and Pavlov concluded that all types of learning can be explained through the process of conditioning. This process can be understood through the following conclusion:

It is a learning process whereby an artificial stimulus is able to behave like a natural stimulus when both natural and artificial stimuli are presented together. In this kind of learning, association plays a great role since the individual responds to an artificial stimulus because he associates it with the natural stimulus.

The conditioning theory of learning suggested by Watson and Pavlov actually involves the conditioning of the respondent behaviour through the process of stimulus association and substitution. Here the responses of the learner become so much conditioned—behaving in the same way or responding similarly to the similar situation that he does not care for the natural stimuli for evoking the related natural response. As a result, the new substituted stimulus behaves like original stimulus and is able to evoke the desired response.

Educational implications of the theory of conditioning

The phenomenon of *conditioning* does not limit itself to such laboratory experiments only. The day-to-day learning at home, school, etc., consists of plenty of examples where the child learns through conditioning.

Fear, love and hatred towards the subjects are created through *conditioning*. A mathematics teacher with his defective methods of teaching or improper behaviour may be disliked by students or by a particular student. If he, without caring to know the basic reason, always rebukes and punishes the child while returning him the checked home-assignments, the child gradually begins to fear home assignments of any sort. The child also develops a distaste and hatred towards the subject of Mathematics.

On the contrary, the empathetic treatment given by the teacher and his interesting and effective methodology can bring a desired

impact on the students through the process of conditioning. They develop a positive attitude towards the subject and love their teacher as well as the subject taught by him.

The use of audio-visual aids in the teaching-learning process involves the conditioning theory in making the students learn many things. The child gets an idea of a particular object or phenomenon through this aid. For example, the teacher shows him the picture of a cat along with the written words *cat*. The teacher speaks out *cat* and asks the student to say *cat* every time when the picture is presented. After some time the picture of the cat is not presented, only the written word *cat* is shown. Still the child responds to it by saying *cat*. He associates the written word *cat* with the picture of the cat and sound of the word.

In developing desired habits, interests, attitudes, sense of appreciation in the children, etc., the conditioning process may help the teachers and parents a lot. It not only helps the development of proper behaviour in them, but also is helpful in removing many bad habits—unhealthy attitudes, superstition, fear and phobias—through reconditioning. A child who fears a particular object can be made to seek pleasure with it. Another child who thinks it a dangerous sign if a cat crosses his way can be made to give up his misbelief. In this way, the conditioning theory throws light on many aspects of learning and helps the teacher and parents in their task.

Skinner's Operant Conditioning

Although classified and included in the category of conditioning, *operant conditioning* differs a lot from the *classical conditioning* advocated by Pavlov and Watson. The most outstanding difference lies in the order related with the initiation and response, i.e., stimulus response mechanism. In *classical conditioning* the organism is passive. It must wait for something to happen for responding. The presence of a stimulus for evoking a response is essential. The behaviour cannot be emitted in the absence of a cause. The child expresses fear only when he hears a loud noise, the dog waits for food before salivating. In each of such instances, the subject has no control over the happening. He is made to behave in response to the stimulus situations. Thus, the behaviour is said to be initiated by the

environmental response, the organism simply responds to.

Skinner revolted against *no stimulus, no response* mechanism in the evolution of behaviour. He argued that in practical situations in our life we cannot always wait for things to happen in the environment. Man is not a victim of the environment. He may often manipulate the things in the environment with his own initiative. Therefore, it is not always essential that there must be some known stimuli or cause for evoking a response. Quite often, most of our responses could not be attributed to the known stimuli. The organism itself initiates the behaviour. A dog, a child or an individual *does* something, *behaves* in some manner, it *operates* on the environment and in turn the environment responds to the activity. How the environment responds to the activity—rewarding or not, largely determines whether the behaviour will be repeated, maintained or avoided.

From where Skinner got the cure for such ideas is a question that can arise at this stage. Definitely, it was from the studies and observations of an earlier psychologist named *Edward Lee Thorndike*. Through his experiments for propagating his famous *trial and error theory* of learning, Thorndike concluded that the rewards of a response (like getting food after a *chance success* through the randomised movements) leads to repetition of an act and the strengthening of S-R associations. These conclusions made Skinner begin a series of experiments to find the consequences of the rewards in repeating and maintaining behaviour. Based on the findings of his experiments, he concluded that behaviour is shaped and maintained by its consequences. It is operated by the organism and maintained by its result. The occurrence of such behaviour was named as *operant behaviour* and the process of learning that plays the part in learning such behaviour was named by him as *operant conditioning*.

For understanding what Skinner propagated through his theory of *operant conditioning*, let us try to build a base by defining and explaining some of the concepts used by him for bringing out his theory.

Respondent and operant behaviour

As we have seen, the earlier theories of learning assumed the existence of a known stimulus as a necessary pre-requisite for evoking a response. Skinner, first time, got the idea that most of the responses could not be attributed to the known stimuli. He defined two types of responses—the one *elicited* by known stimuli which he called as *respondent behaviour* and the other *emitted* by the unknown stimuli which he called as *operant behaviour*. Examples of respondent behaviour may include all reflexes such as shaking one's hands when poked with a pin and the pupillary contraction due to bright light or salivation in the presence of food.

In the respondent behaviour, the stimulus preceding the response is responsible for causing the behaviour. On the other hand, in the operant behaviour, the stimulus causing such behaviour is unknown and it is not important to know the cause of the behaviour. Here it is not the stimulus but the consequences of the behaviour which are more important and hence the operant behaviour is controlled by the strength of its consequences instead of stimuli. Examples of such behaviour may include the behaviour like arbitrarily moving one's hand, arms or legs, a child abandoning one toy in favour of the other, eating a meal, writing a letter, standing up and walking about and similar other everyday activities.

Operant: Skinner considers an operant as a set of acts which constitutes an organism's doing something, e.g., raising its head, walking about, pushing a lever, etc.

Reinforcer and reinforcement: The concept of reinforcement is identical to the presentation of a reward. A reinforcer is the stimulus whose presentation or removal increases the probability of a response's re-occurrence. Skinner thinks of two kinds of reinforcer—positive and negative.

A *positive reinforcer* is any stimulus the introduction or presentation of which increases the likelihood of a particular behaviour. Food, water, sexual contact, etc., are classified as *positive reinforcers*. A *negative reinforcer* is any stimulus the removal or withdrawal of which increases the likelihood of a particular behaviour. Electric shock, a loud noise, etc., are said to be *negative reinforcers*.

Schedules of reinforcement: Skinner suggested the idea of

planning Schedules of reinforcement for conditioning the operant behaviour of the organism. The important schedules are as under:

1. *Continuous reinforcement schedule*: It is hundred per cent reinforcement schedule wherein provision is made to reinforce or reward every correct response of the organism during acquisition of a learning. For example, a student may be rewarded for every correct answer he gives to the questions or problems given by his teacher.
2. *Fixed interval reinforcement schedule*: In this schedule the organism is rewarded for a response made only after a set interval of time, e.g., every 3 minutes or every 5 minutes. How many times he has given correct response during this fixed interval of time does not matter. It is only after the expiry of the fixed interval that he is presented with some reinforcement.
3. *Fixed ratio reinforcement schedule*: In this schedule the reinforcement is given after a fixed number of responses. A rat, for example, may be given a pellet of food after a certain number of lever presses. A student may be properly rewarded after answering a fixed number of questions, say 3 or 5. Fixed ratio schedule is used in some factories and by employers of casual workers or laborers where salary is paid on a workpiece basis, number of garments sewn, and number of baskets of fruit packed.
4. *Variable reinforcement schedule*: When reinforcement is given at varying intervals of time or after a varying number of responses, it is called a variable reinforcement schedule. In this case reinforcement is intermittent or irregular. The individual does not know when he is going to be rewarded and consequently he remains motivated throughout the learning process in the wait of reinforcement. The most common example of such schedule in human behaviour is the reinforcement operation schedules of gambling devices. Here rewards are unpredictable and keep the players well motivated though occasional returns.

Conclusion about the various reinforcement schedules:

Reinforcement and its schedules play a key role in the *conditioning* of *operant behaviour* and acquisition of a learning. While a continuous reinforcement schedule increases the response rate, the discontinuation of reinforcement may result in the extinction of that response or behaviour. *Continuous reinforcement* schedule thus yields the least resistance to extinction and the lowest response rate during learning. Therefore, learning of a response takes place quickly if every correct response is rewarded, but it is easily forgotten when the reinforcement is stopped. If reinforcement is given after a varying number of correct responses or at varying intervals of time, the response is remarkably resistant to extinction. However, the fixed interval reinforcement schedules are found to provide the lowest yield in terms of performance as the individual may soon learn to respond correctly only when it is the time for reinforcement. Similarly, he may lose interest in getting reinforcement after a fixed interval or fixed number of correct responses. Weighing all these properly, Skinner suggests to begin with 100 per cent schedule, practice the fixed interval or fixed ratio schedule and finally arrive at the variable reinforcement schedule for better results in learning or training.

Defining operant conditioning: *Operant conditioning* refers to a kind of learning process whereby a response is made more probable or more frequent by reinforcement. It helps in the learning of *operant behaviour*, the behaviour that is not necessarily associated with a known stimulus.

Distinction between classical and operant conditioning:

Classical or respondent conditioning is based on respondent behaviour. Specifically, it deals with responses that invariably follow a specific stimulus and are thus elicited, e.g., eye blinking in response to bright light, Jumping in response to electric shock, salivation in response to the taste of food, and so forth. In this, greater importance is attached to the stimulus for eliciting the desired response. That is why it is also called *S type conditioning*.

On the other hand, *operant conditioning* helps in conditioning or learning of *operant behaviour*—behaviour that is emitted (rather than elicited). The organism seems to initiate *operant behaviour* on his own without a single, explicit, preceding stimulus. In this type of

learning much emphasis is placed on the response rather than the stimulus causing the response. That is why it is also named as type *R conditioning*. In type *S conditioning*, the problem with the trainer or teacher is to select appropriate stimuli for evoking desired response. On the other hand, in *R type conditioning*, out of many responses which an organism is capable of giving, the problem with the trainer or teacher is to evoke only the appropriate responses and then fix them properly with the help of suitable reinforcement.

The difference between these two types of conditioning may thus be summarised as under:

<i>Classical respondent conditioning</i>	<i>Operant conditioning</i>
1. It helps in the learning of <i>respondent behaviour</i> .	It helps in the learning of <i>operant behaviour</i> .
2. It is called type <i>S conditioning</i> to emphasise the importance of the stimulus in eliciting desired response.	It is called type <i>R conditioning</i> because of the emphasis on the response.
3. In this type of conditioning beginning is made with the help of specific stimuli that bring certain responses.	Here beginning is made with the responses as they occur 'naturally' or 'unnaturally' shaping them into existence.
4. Here strength of conditioning is usually determined by the magnitude of the conditioned response, i.e. the amount of saliva (as in the case of classical experiment of Pavlov with the dog).	Here strength of conditioning is shown by the response, i.e. the rate at which an operant response occurs as a result of some reinforcement.

Skinner's experiments regarding operant conditioning

B.F. Skinner conducted a series of experiments with animals. For conducting the experiments with rats, he designed a special apparatus known as Skinner's Box. It was a modified form of the puzzle box used by Thorndike for his experiments with cats. The darkened sound-proof box mainly consists of a grid floor, a system of light or sound produced at the time of delivering a pallet of food in the food cup, a lever and a food cup. It is arranged so that when a rat (hungry or thirsty) presses the lever, the feeder mechanism is activated, a light or a special sound is produced and a small pallet of food (or small drops of water) is released into the food cup. For recording the observations of the experiments, the lever is connected with a recording system which produces a graphical tracing of the lever pressings against the length of time the rat is in the box.

To begin with, Skinner, in one of his experiments, placed a hungry rat in the above described box. In this experiment, pressing of the bar in a desirable way by the rat could result in the production of a click sound and presence of a food pallet. The click-sound acted as a cue or signal indicating to the rat if it responds by going to the food cup, it will be rewarded. The rat was rewarded for each of his proper attempts for pressing the lever. The lever press response having been rewarded, was repeated and when it occurred, it was again rewarded which further increased the probability of the repetition of the lever press response and so on. In this way, ultimately the rat learned the art of pressing the lever as desired by the experimenter.



Figure 3.4 A rat in a Skinner box.

For doing experiments with pigeons, Skinner made use of another specific apparatus called *pigeon's box*. A pigeon in this experiment had to peck at a lighted plastic key mounted on the wall at head height and was consequently rewarded by receiving grain.



Figure 3.5 A pigeon in a pigeon box.

With the help of such experiments, Skinner suggested his theory of *operant conditioning* for learning not only for the simple responses like pressing of the lever but also for learning the most difficult and complex series of responses.

Mechanism of operant conditioning

Operant conditioning as emphasised earlier is correlated with operant behaviour. An operant is a set of acts that constitutes an organism's doing something. Hence, the process of *operant conditioning* may start with the responses as they occur *naturally* or *at random*. In case they do not occur naturally then attempts may be made for shaping them into existence. How it can be done will be explained later on in this chapter under the heading *Shaping*.

Once a response (as desired by the trainer, experimenter or teacher) occurs, it is reinforced through a suitable reinforcer (primary or secondary, positive or negative). In due course, this response gets conditioned by constantly reinforcing it. In Skinner's experiment, a pallet of food worked as a positive primary reinforcer for the hungry rat. He got the reinforcement after emitting a certain response (pressing of the lever as desired by the experimenter). The Secondary reinforcement may also produce the same results as brought by the primary reinforcement. It is a sort of neutral stimulus which acquires the reinforcing properties (rewarding value) after getting paired or associated with a primary reinforcer (e.g., food or water). The clicking of a sound and lighting of a bulb in Skinner's experiment may work as secondary reinforcement if they are paired with the appearance of a pallet of food.

The important thing in the mechanism of *operant conditioning* is the emitting of a desired response and its proper management through suitable reinforcement. Here the organism is to respond in such a way as to produce the reinforcing stimulus. The subsequent reinforcement gradually conditions the organism to emit the desired response and thus learn the desired act.

Shaping

There are situations especially in case of the acquisition of complex behaviour and learning of difficult skills, etc. where there may arise very remote chances of occurrence. In such cases waiting for an organism to behave in specific way at random (the natural occurrence) may take a lifetime. For example, the chances for a pigeon to dance in a specific way are extremely remote. The same holds true for a child learning Russian or even table manners. In

these situations where the desired responses do not occur at random (or naturally), efforts are made for eliciting the appropriate responses. It is done by building a chain of responses through a step-by-step process called *shaping*.

In one of his experiments for shaping the behaviour of a pigeon—to teach it to walk in a figure of number eight—Skinner watched its activity and gave it a small amount of grain (reward) for its every proper movement. At first the pigeon got his reward for simply turning to the right direction, then for taking a step in the right direction, then for making the correct turn, and so on, until it had learned to walk in the complete figure of number eight.

Shaping, in this way, may be used as a successful technique for making individuals learn difficult and complex behaviour and also for introducing desirable modifications in the behaviour. Behaviour modification technique and aversive therapy used in treating the problem behaviour and abnormality have come into existence through the use of the shaping of behaviour mechanism.

Implications of the theory of operant conditioning

Theory of *operant conditioning* has revolutionised the field of training or learning by bringing forward the following practical ideas and implications:

1. A response or behaviour is not necessarily dependent (contingent) upon specific known stimuli. It is more correct to think that a behaviour or response is dependent upon its consequences. Therefore, for training an organism to learn a particular behaviour or response, he may be initiated to respond in such a way as to produce the reinforcing stimulus. His behaviour should get the reward and in turn he should again act in such a way as he is rewarded and so on. Therefore, the learning or training process and environment must be so designed as to create minimum frustration and maximum satisfaction to a learner to provide him proper reinforcement for the desired training or learning.
2. The principle of *operant conditioning* may be successfully

applied in the task of behaviour modification. We have to find something which is rewarding for the individual whose behaviour we wish to modify, wait until the desired behaviour occurs and immediately reward him when it does. When this is done, the rate at which the desired response occurs goes up. When the same behaviour reoccurs, it is rewarded again, and the rate of responding goes up even more. Going the same way, we will be able to make the individual learn the desired behaviour.

3. The task of the development of human personality can be successfully manipulated through operant conditioning. According to Skinner, *We are what we have been rewarded for being. What we call personality is nothing more than consistent behaviour patterns that summarise our reinforcement history. We learn to speak English, for example, because we have been rewarded for approximating the sounds of the English language in our early home environment. If we happened to be brought up in a Japanese or a Russian home, we would learn to speak Japanese or Russian because when we approximate sound in that language, we would have been rewarded in some other way.* (Hergenhahn, 1976, p. 87)
4. The theory of *operant conditioning* does not attribute motivation to internal processes within the organism. It takes for granted the consequences of a behaviour or response as a source of motivation for further occurrence of that behaviour. Food is reinforcing to a rat or pigeon. Knowledge of correct response is reinforcing to a learner. Secondary reinforcers also prove very important sources of motivation for a learner. Verbal praise, positive facial expressions of the trainer or teacher, feeling of success, scores, grades, prizes, medals and the opportunity to do the work of one's liking, all are good motivators. In this way *operant conditioning* provides an external approach to motivation.
5. *Operant conditioning* lays stress on the importance of schedules in the process of reinforcement of the behaviour.

Therefore, in trying to train or learn a behaviour, great care is to be taken for the proper planning of the schedules of reinforcement.

6. This theory advocates the avoidance of punishment for unlearning the undesired behaviour and for shaping the desired behaviour. Punishment proves ineffective in the long run. It appears that punishment simply suppresses behaviour and when the threat of punishment is removed, behaviour returns to its original level. Therefore, *operant conditioning* experiments suggested rewarding appropriate behaviour and ignoring the inappropriate behaviour for its gradual extinction.
7. In its most effective application, theory of *operant conditioning* has contributed a lot towards the development of teaching machines and programmed learning. The theory of *operant conditioning* had led us to think that learning proceeds most effectively if:
 - i. the learning material is so designed that it creates less opportunities for failure and more opportunities for success,
 - ii. the learner is given rapid feedback concerning the accuracy of his learning, and
 - iii. the learner is allowed to learn at his own pace.

These principles originating from *operant conditioning* have revolutionised the training and learning programmes. As a result, mechanical learning in the form of teaching machines and computer-assisted instructions has replaced usual classroom instructions.

Guthrie's Theory of Contiguous Conditioning

Edwin Ray Guthrie (1886–1959), an earlier behaviourist, was professor of psychology at the University of Washington. While he was influenced by some of the theoretical findings of his contemporaries like *selection*, *connection* and *associate shifting* advocated by Thorndike and *classical conditioning* propagated by

Watson and Pavlov, he took a quite distinctive stand in propounding his own theory of learning. He devised a new model of learning by synthesising his idea of *temporal contiguity* (togetherness of stimulus and response) with the Pavlovian model of *classical conditioning*.

Guthrie–Horton experiment

Guthrie tried to propagate his theory on the basis of a number of experiments on cats performed in collaboration with G.P. Horton by using a puzzle box (an apparatus similar to that used by Thorndike in his experiments). The experimental situation consisted of placing a cat in the box with a small pole in the middle of the box as a release mechanism. The cat could escape through a door by touching the pole from any side and in any manner. There was an arrangement of food for the cat outside the cage which it could reach after its release. Guthrie and Horton carefully observed approximately eight hundred escapes by a number of cats from a puzzle box and noted that each cat learned to escape from the puzzle box in its own manner. The specific response learned by a particular cat was the one that the cat had hit upon just before it escaped from the box. For example, if a cat used its paw to press the pole, it learned to use its paw in almost the same way for coming outside whenever it was put in the box. They also noted that very often, the cats after escaping from the box, would ignore the food that was offered to them. In spite of their lack of interest in the food, however, they were just as quick in their escape from the box the next time they were placed in it irrespective of the way in which they were placed in it. The manner in which they sought their release was the same as was used by them for their first escape. The cats never tried new ways of release. This was referred to as stereotyped behaviour. On the basis of his experiments, Guthrie reached certain conclusions and laid down basic principles for explaining learning. These conclusions and principles are discussed in detail in the following pages.

Law of contiguity: The *law of contiguity* proposed by Guthrie is the real cornerstone of his unique theory of learning. Guthrie asserted that all rules by which stimuli and responses become associated to assist any learning, may flow from a single law—the law of contiguity. He gave two explanations for his law:

1. *A combination of stimuli which has resulted in a movement, on its recurrence, will tend to be followed by that movement* (1952).
2. *What is being noticed becomes a signal for what is being done* (1959).

According to these interpretations, stimuli acting together with response tend to evoke that response on their recurrence. Consequently, if we do something in a given situation then we tend to do that thing again in case we are again put in that situation. It happens due to the formation of a close association between a stimulus or stimuli and the response and this association is formed because of contiguity, i.e. the coming together of the stimulus (or pattern of stimuli) and a response.

One trial learning: Most behaviourists believe in the law of frequency which implies that learning is proportional to the strength of an association which in turn depends upon the frequency with which it has occurred. This is why Thorndike emphasised repetition and drill for a satisfactory state of affairs. Similarly, Watson and Pavlov also emphasised the repetition of the association between conditioned and unconditioned stimuli for the conditioning of a required response. In contradiction to these behaviourists, Guthrie (1942) completely rejected the law of frequency by saying:

A stimulus pattern gains its full associative strength on the association of its first pairing with a response.

In other words, there is no need for repetition of the S-R bond as the association develops its full strength and the learning becomes quite complete only after one pairing between the stimuli and the response. Guthrie thus emphasised one-trial learning in preference over the need for a number of trials for the establishment of an association. In other words, one experience or trial is sufficient to establish an association, i.e. learning.

The recency principle: Guthrie's theory also rests on the principle of recency which states that what was being done in the past in the presence of a set of stimuli will tend to be done next when that stimulus combination occurs.

Movement-produced stimuli function: Learning is the result of contiguity between a pattern of stimulation and a response. The stimuli present in one's environment and the responses thereto are, however, separated by a fairly long interval of time and therefore cannot be thought of as contiguous. There must definitely be something to fill in the gap or interval between the occurrence of an external stimulus and the final response to it. Guthrie explained this by inventing the term *movement-produced stimuli*.

Movement-produced stimuli are those (different from the external stimulation that initially caused the movement) which are produced by the movement of our body and are responsible for conditioning the responses to elicit the desired behaviour. Thus, when a response is being initiated by an external stimulus, the body holds the responsibility of producing the stimulus for the next response and that response can furnish the stimulus for the next one in the shape of a chain reaction (chaining) for the movements in a desired direction. To throw light on the mechanism of *movement-produced stimuli* Guthrie (1935) writes:

Such a movement as listening or looking is not like a flash or an explosion. It takes time. The movement, once started, maintains itself by the stimuli it furnishes. When the telephone bell rings we rise and go to the instrument. Long before we have reached the telephone the second has ceased to act as a stimulus. We are kept in action by the stimuli from our own movements toward the telephone. One movement starts another, then a third, the third a fourth, and so on—our movements form series, very often stereotyped in the form of habit. These movements and their movement-produced stimuli make possible a far-reaching extension of association or conditioning.

Learning of acts or behaviour: Our behaviour may involve learning of many skills like driving a car, playing badminton, typing a letter, eating meal, etc. A skill is made up of many acts and acts are made up of many movements which result from muscular contraction. These muscular contractions are directly predicted by the principle of association. Therefore, learning of a skill or performing an act consists of learning thousands of associations between specific stimuli and specific movements.

While the learning of a single movement (requiring association between a specific stimulus and a specific response or movement) requires only one trial, its degree is not dependent on practice. For

example, the skill of typing or playing badminton involves an enormous number of specific S-R bonds each of which is learned in a single trial. Naturally, it will require time and practice for the establishment of all the necessary connections or bonds. Therefore, we may conclude that learning of an act or skill needs practice and it is the practice which helps in attaining proficiency in performing an act or skill. The need of such practice can be better explained in the words of Guthrie and Horton (1946).

Learning of an act takes practice. We assume that the reason for this is that the act names an end result that is attained under varied circumstances and by movements varied to suit the circumstances. Learning an act as distinguished from a movement needs practice because it requires that the proper movement has been associated with its own cues. Even a simple act as grasping a rattle requires different movements according to the distance and direction and position of the object. One successful experience is not sufficient to equip the infant with an act because one movement acquired on that occasion might never be successful again.

Role of reinforcement or reward: It was noticed by Guthrie in the behaviour of cats that though they often ignored the food placed outside the box, that did not affect their proficiency in coming outside the box. This observation caused him disagree with Thorndike and re-define the role of reward or reinforcement. According to him, reward or reinforcement is not an essential condition for the recurrence of the previous response. In other words, learning is not dependent on reinforcement of behaviour. The law of contiguity, accompanied by the *recency principle*, is enough to explain the learning behaviour. The animal is likely to repeat the preserved association between being in the puzzle box and moving the pole resulting in its release. Therefore, regardless of the food it gets after its release, the animal would try to repeat the last response which helped it to obtain its release.

Reward or reinforcement like food in this case, according to Guthrie, may simply work as a mechanical arrangement for changing the stimulating conditions and thereby preventing unlearning. In the words of Guthrie (1940):

The animal learns to escape with its first escape . . . what encountering the

food does is not to intensify a previous item of behaviour but to protect that item from being unlearned.

Forgetting and extinction of behaviour: According to Guthrie's conclusion, extinction or forgetting (weakening or disappearance of the association or bond between a stimulating condition and a response) occurs not due to non-reinforcement but due to the phenomenon of interference. He accepts an extreme form of retroactive inhibition (interference in old learning by new learning) to explain extinction and forgetting. According to him, for the extinction and forgetting of a wrong response of undesirable learning, one is required to learn something new in such a way as the old learning is completely reversed. According to Guthrie (1942):

Forgetting is not a passive fading of stimulus-response associations contingent upon the lapse of time, but requires active unlearning which consists in learning to do something else under the given circumstances.

Role of punishment: The role played by punishment in learning or forgetting a behaviour was also studied by Guthrie. He accepted the role of punishment in this situation but emphasised that punishment is effective only through its associations resulting in a new response to the same stimuli. In the words of Guthrie (1952):

It is not the feeling caused by punishment, but the specific action caused by punishment that determines what will be learned. In training a dog to jump through a hoop, the effectiveness of punishment depends on where it is applied, front or rear. It is what the punishment makes the dog do that counts or what it makes a man do, not what it makes him feel.

In this way, punishment works not because it induces certain kinds of painful experiences but because it forces the organism to do something different thus establishes inhibitory conditioning of unwanted habit resulting in a behaviour incompatible with the punished behaviour. For example, punishing a dog which is in the habit of chasing your motorcycle, a slap on the nose or a slap on the rear is equally painful to the dog. However, the slap on the nose in this case would prove more effective because, the slap on the nose will tend to make him stop and jump backward in the presence of the motorcycle, resulting in incompatible behaviour. On the other hand, a slap on the rear will make him continue moving forward, perhaps with a little more speed and will thus fail in its purpose by eliciting a behaviour not compatible with the punished behaviour.

Thus for making punishment effective, we have to arrange things in such a way that stimuli which previously elicited an undesirable response, now elicit an unwanted response (incompatible with the punished response) that can make the organism think of changing its ways of behaviour so that it may learn a favourable response, instead of an unfavourable one.

Motives and drives: On the basis of his studies, Guthrie concluded that motives and drives occupy an important place in the field of learning as they provide with the maintenance of stimuli for keeping the organism active until the goal is reached. For example, by being hungry or thirsty, one is stimulated and this stimulated behaviour is maintained until one gets food or water. Similarly, when one is anxious to achieve a target, it stimulates one and the stimulated behaviour is maintained until one gets what one aspires to, in terms of money, success or recognition. Therefore, *drives and motives* are not only physiological but also socio-psychological and external and in this way any source of stimulation, whether internal or external, capable of maintaining stimuli can be termed as a useful motive or drive for accelerating the movement of the organism to reach a goal.

Transfer of training: While rejecting the formal discipline theory outright, Guthrie's theory of learning gives some consideration to Thorndike's identical element theory of transfer. According to that, similarity between two situations may act as a deciding factor for the probability of a similar response in two situations. However, Guthrie's theory asserts that transfer in two situations can only take place if the stimulating conditions in both the situations are identical and consequently on account of the variation in the stimulating conditions there is no guarantee that a child who learns something in his study room will be able to reproduce it in the classroom or examination hall.

Summary of Guthrie's theory of contiguous conditioning

Guthrie's theory is based on a single law of learning, that is, the law of contiguity which states when two events occur together, they are learned. In other words, learning is based on the association or connection between a stimulus and a response and this association occurs simply because of the contiguity, that is, occurrence of the

stimulus and response together. For maintaining the chain of contiguity between the external stimuli and the responses finally made by us, our body through its movements, tends to produce the stimulus for subsequent responses in a chain-like mechanism. However, as far as learning in the form of establishing a bond between a stimulating situation and a response is concerned, it occurs in a single trial and this association tends to be continued until there is change in the stimulating conditions or a response is prevented from occurring. The association once made and established on this bond, makes the organism exhibit the same response (usually in the form of the last movement which helped it to reach a goal, i.e. a cat hitting the pole in a particular way to escape from the box) in case it is faced with the same stimulating conditions and when this happens, we say the organism has learned how it should behave to attain its goals (Figure 3.6).

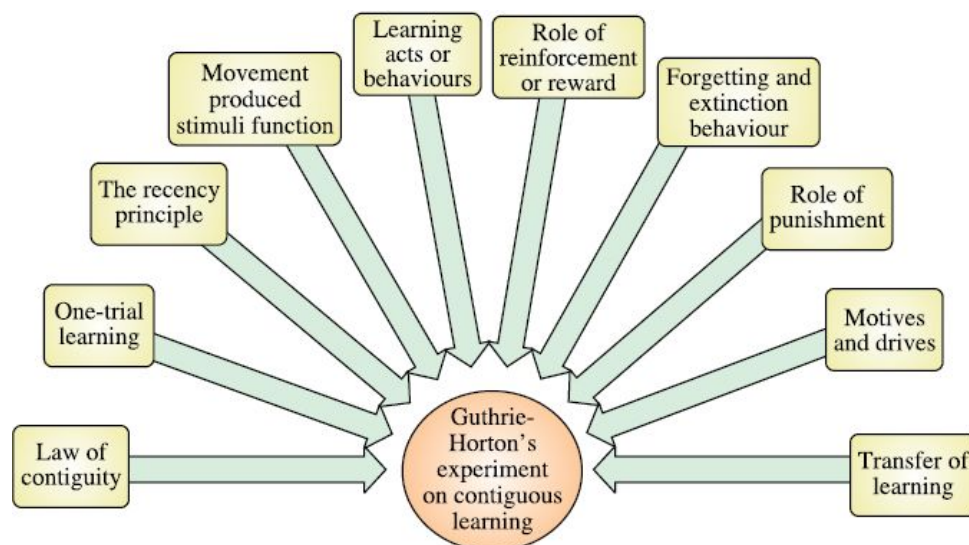


Figure 3.6 Guthrie's contiguous conditioning.

Contribution and educational implications of Guthrie's theory of contiguous conditioning:

1. Guthrie's emphasis that learning is complete after only one pairing between the stimuli and the response, makes us take care in the organisation of stimulating conditions for eliciting the desired response.
2. The law of contiguity and the recency principle which

emerged from this law, require that in case we want to revoke a learned response we have to arrange for the occurrence of stimulating conditions identical to the ones in which the response behaviour has been learned. It makes us exercise caution in learning things the way in which these are going to be utilised by us in the future. For example, if a student is required to teach in the class after becoming a teacher, he must be trained in the actual classroom set up. Similarly, if a student has to be examined in a classroom laboratory or particular examination set up, he can be expected to do better only if he has been taught in conditions in which he is required to demonstrate his performance later on. It enables us to introduce radical changes in the teaching-learning materials, processes and conditions so that the associations made at the time of learning are utilised to the maximum at the time of utilisation of the outcomes of learning. The school programme or the task of formal learning must be made so functional and natural as to coincide with the real-life settings so that what is learned in school may prove useful to the learner in real life.

3. Guthrie's theory lays stress on the need of drill and practice as this generates more and more stimuli for eliciting the desired behaviour. According to Guthrie, since learning is complete in terms of the establishment of an association between a stimulus and response, every learning in itself is a unique experience and its transfer from one situation to another cannot properly take place until the two situations are identical. As it is very difficult for stimulating conditions to be identical, we must make the child practise a behaviour under different stimulating conditions. For example, for learning addition of numbers like two and two, the child should not learn only from the blackboard or in his notebook but must also learn it through making various associations (in the form of two and two equals four) with the help of concrete objects like chalks, books, pens, apples, etc. in the school or outside the school.

4. Guthrie believes in the interference theory and the mechanism of retroactive inhibition to explain the causes of forgetting. Therefore, we must make sure that the interference caused to the past learning by the new learning is avoided. For minimising forgetting, he advocates what is being learned should be learned properly and the new learning should be so planned and associated that it may cause least interference to the past learning. A thing to be learned properly needs strengthening of the bond or association between stimuli and response when it is learned the first time. This may necessitate the following:
 - i. Since any behaviour is a complex of movements in response to a complex of stimuli, for evoking a desired response or making the child learn a particular behaviour, we must have the support of as many stimuli as possible. The more is the stimuli used for evoking a desired response, the less will be the likelihood of an interfering or distracting behaviour.
 - ii. In order to evoke a desired response, we must look for all possible ways and means for evoking that particular response. All types of drives, motives and means like rewards and punishment must be utilised for evoking and then intensifying the response.
5. Guthrie's theory provided valuable cues and ways for breaking bad habits. For this purpose, Guthrie outlined the following three different techniques:

Threshold technique: According to Guthrie (1938), this technique is about:

Introducing the stimulus at such weak strength that it will not cause the response and then gradually increasing the intensity of the stimulus, always taking care that it is below the *threshold* of the response.

For instance, suppose there is a boy who does not like to take a bag full of books, note-books, etc. on his shoulder while going to school. If the mother puts the bag on his shoulder, he throws it down and insists that it should be carried by some servant. Now, the

technique consists of first putting some eatables and objects of light-weight toys in the bag and ask him to carry it on his shoulder. If he carries it, then we can gradually increase the weights of these and finally replace these things with books and notebooks, etc. and so break his habit of not carrying the school bag himself.

Fatigue technique: The fatigue method consists in allowing an individual to perform the task concerning the bad habit repeatedly until he becomes too tired to continue further and thus making him allergic to that task. For example, a little boy who is in the habit of tearing paper unnecessarily may be set right by being allowed or rather forced to tear papers till the task remains no longer a fun. As a result, the paper will become a cue to doing something other than tearing them. As a result, the child will develop an attitude of avoidance.

Incompatible response technique: In this technique, an undesired response elicited by particular stimuli is inhibited by a simultaneous presentation of both types of stimuli, the one causing undesired response and the other a stronger stimulus producing a response which is incompatible with the undesired response. For example, if a child is afraid of a dog then he would be allowed to come close to the dog in the presence of his mother, a dominant stimulus for evoking warm relaxed feelings in the child. The pairing of dog and mother will create a feeling of relaxation in the child. Once such relaxation has been experienced by the child, it will pave the way for the child to face the dog alone (without pairing it with his mother) without showing any sign of fear.

All these three techniques can be safely employed by teachers and parents in the task of breaking bad habits as all of them are based on the following general rules:

1. First find the cues that are responsible for the undesired responses concerning the bad habit and then
2. Practice another response in the presence of these discovered cues for getting rid of the undesired response.

HULL'S SYSTEMATIC BEHAVIOUR THEORY

Clark L. Hull (1884–1952), a teacher in the universities of Wisconsin and Yale, is credited with putting forth a systematic mathematical and scientific theory of human behaviour based on conditioning and connectionism of the earlier behaviourists. He built his theory on a logical structure of postulates and theorems.

Hull's theory was first presented in 1943 in his major book *Principles of Behaviour*. This theory was extended in 1952 through his last book *A Behaviour System*. The system provided in this book for explaining human learning and behaviour consists of 17 postulates and 133 theorems. We shall discuss here a few major concepts and theoretical notions emerging from them:

Change in the traditional S-R notion: Hull rejected the Guthrie's contiguity approach as well as the *S-R formula* given by Thorndike. Guthrie emphasised only the contiguity, i.e. togetherness of the stimuli and response, for the formation of an association and Thorndike made it out to be mechanical, a trigger-like function of *stimuli-response*. Hull introduced the concept of intervening variables (the processes which are thought to be taking place within the organism but are not directly observable) between S and R. Accordingly, when a stimulus (S) impinges on the organism, it results in a sensory neural impulse (s) a kind of stimulus trace. This stimulus trace ultimately causes a motor neural reaction (r) that results in an *overt response* (R). Thus we may have the formula S-s-r-R instead of the traditional S-R.

However, there are many other things within the inner mechanism of the organism like his interests, needs and drives and also the reinforcing mechanism that may influence his response or behaviour. Consequently, the traditional S-R formula in Hull's approach was extended to S-O-R incorporating all intervening variables existing between environmental stimulation and *overt response*.

The concept of reinforcement and drive-stimuli reduction: Hull maintained that the establishment of a simple S-R connection is not enough for learning. In this regard, he refuted Guthrie's claim that learning is completed in a single trial. Instead, he maintained that it is stamped through a process of repeated reinforcement like getting

food or avoiding pain, etc. However, Hull's reinforcement was different from that of Thorndike or Skinner. Whereas Thorndike used the *law of effect* for stating his concept of reinforcement and Skinner called it anything that increases the probability of the re-occurrence of a response, Hull viewed it in terms of the reduction of one's need, drive or drive-stimuli. Drive, according to him may be referred to as a state of tension resulting from a need. For example, the thirst drive arises from our body's need to take in water for its maintenance. If the response or reaction of the organism reduces the need or state of tension or drive, then we have a condition of reinforcement enabling the organism to repeat the S-R association and thus to habitually react in the same way in a particular situation.

Drive stimuli are stimuli that characteristically accompany a certain drive, e.g. dryness of the mouth, lips and throat accompanying the thirst drive and hunger pains accompanying the hunger drive.

During his work, Hull changed his stand twice from need reduction to drive reduction and finally to drive stimulus reduction for associating it with the task of reinforcement for the following two reasons:

1. It was experimentally observed that the behaviour of the hungry rats could be effectively reinforced by saccharine-sweetened water which is sweet but utterly non-nutritive, i.e. not possessing the capacity to reduce the food need in the least. In this case according to Hull (1952):
The ingestion of saccharine-sweetened water reduces hunger tension or hunger pains (drive stimulus associated with hunger drive) for a brief period sufficient for a mild reinforcement, much as the tightening of the belt is said to do in hungry men, thus reinforcing that act.
2. Reduction of a drive takes considerable time. For example, if we consider the thirst drive, it takes a long time for the water to go into the mouth, the throat, the stomach, the blood and the effect of its ingestion to be conveyed to the brain to reduce the thirst drive. Reduction of a drive stimulus is a relatively quick process that occurs soon or

even immediately after the presentation of a reinforcer. Water is taken by organism and it soon results in the reduction of thirst drive stimuli (the dryness of the mouth, lips and throat). The behaviour is reinforced and thus the reinforcement of one's behaviour can be better explained through the concept of drive-stimuli reduction than the drive reduction.

Hull thus considered the aim of reinforcement to be the reduction of the drive or drive stimuli. He thought reinforcement to be of two kinds—primary and secondary. Primary reinforcement tends to strengthen a certain behaviour through the satisfaction of basic biological needs, drives or drive stimuli. Secondary reinforcement, on the other hand, is brought by an originally neutral stimulus like money by association with a primary reinforcing agent like food.

Habit formation and habit strength

According to Hull, when a stimulus emits a certain type of response and it is accompanied by a reinforcer, (capable of reducing the drive or drive stimuli) the association between the stimulus and that response is strengthened. Repetition of the reinforcement then helps to progressively strengthen the association thus formed. Eventually, it brings an organisation in the nervous system known as 'habit' or a particular response to a particular stimulus and when this happens we say the behaviour is learned. In this way, Hull reduced learning to habit formation. The success of this learning behaviour is measured through a concept termed as *habit strength* and symbolised as *sHr*.

By definition, Hull considers habit strength as the strength of the association between a stimulus and a response. It goes up with the number of trials (pairing between a stimulus and a response) provided there is a reinforcement in every trial.

Stimulus generalisation: Another concept in Hull's theory is stimulus generalisation. It means that if there are two or more similar stimuli, they can elicit the same or nearly the same response from the organism as was elicited by the original stimulus. For example, a child who fears a snake also fears a rope or any other thing which looks like a snake. Based on the characteristic of stimulus

generalisation, the habit strength sHr will generalise from one stimulus to another to the extent to which the two stimuli are similar. Hull provided the term *generalised habit strength* symbolised as sHr to describe the generalisation of *habit strength* through the phenomenon of stimulus generalisation. With this type of the generalisation of *habit strength* he tried to explain the phenomenon of transfer of training (on the lines of Thorndike's Identical Element Theory) by emphasising that learning performed under similar conditions was likely to be transferred to the new learning situation.

Reaction potential: Yet another concept elaborated by Hull is that of *reaction potential* that indicates the potential of an individual to react or respond. He defined it as the probability of the repetition of a learned response at any given moment and provided the following formula to explain its meaning and purpose.

$$\text{Reaction potential} = sEr = sHr ; \text{times}$$

Cognitivism and Cognitivist Theories of Learning

WHAT IS COGNITIVISM?

This new school of contemporary psychology is the result of the wave of intellectualism demonstrating faith in man's higher cognitive abilities and capacity to adapt to his environment and struggle for perfection. It may be defined as one of the school of psychology or doctrine that lays emphasis on the role of the cognitive structure and cognitive processes like thinking, memory, knowing and problem solving, etc. in one's learning or behaving in one way or the other. The underlying concept of cognitivism tries to convey that how we think and gain knowledge for our needed adjustment, development and progress in our life.

HISTORICAL EVOLUTION AND DEVELOPMENT OF COGNITIVISM

The roots of *cognitivism* may be traced back to the early decades of 20th century in the cognitive outlook of the propagates of gestalt psychology, like Max Wertheimer (1880–1943), Kurt Koffka (1886–1941), Wolfgang Kohler (1887–1967) and Kurt Lewin (1890–1947), etc. These Gestaltists vehemently opposed the behaviourism doctrine of stimulus-response conditioning or machine like operation of human behaviour. They advocated an overall mental functioning and insight in place of a molecule and mechanistic approach for the study of human behaviour and explanation of human learning. Gestalt psychologist provided a unique theory of learning known as *Theory of insightful learning*, emphasising the role of insight or intelligence in one's learning and understanding things in his environment.

Taking clue from the Gestaltists, the other contemporary psychologists also tried to evaluate the role of higher cognitive processes in one's learning and behaving. The notable American psychologist, Edward Chace Tolman (1886–1959), provided the lead in this direction by propounding a theory of learning in 1932 with the publication of his work

Purposive behaviour in animals and men. His theory known as Tolman's sign learning stands midway between the behaviouristic S.R. theories and cognitivist gestalt theories. While advocating his cognitivist views, he compared the behaviouristic S.R. learning system with the operational activities of a telephone exchange — *incoming calls from sense organs and outgoing messages to muscles*. However, learning according to his cognitivist views cannot be reduced to so simple mechanism undertaken through simple S.R. connections of a telephone switch-board but involves complex cognitive activities helped by the brain processes. Edward Tolman by his revolutionary cognitivist views thus tried to make notable contributions in the field of learning, thinking and creative functioning. While explaining the problem-solving behaviour of the higher organisms, he stated that the organism tries to set up mental hypotheses about the ways to solve problems and then sets out to

test these hypotheses through purposeful behaviour.

The cognitivist ideas of learning, behaving and developing were further advanced through the sincere efforts of Jean Piaget and J.S. Bruner who are famous for their theories of cognitive development and cognitive functioning. Equally notable was the work of the information processing theorists like George A. Miller (1960), Atkinson and Shiffrin (1968), and Craik and Lockhart (1972) who provided the famous cognitive theories of learning named as (i) Miller's information processing theory, (ii) Three stage information processing theory and (iii) Levels of processing theory, respectively.

In its latest trend, cognitive psychology is using the metaphor of the mind as computer: information comes in (input), is being processed (process), and leads to certain outcomes (output). It has come up with the idea and application of artificial intelligence for the explanation of human behaviour and development of the new psychological theories.

MAIN CHARACTERISTICS AND FEATURES OF COGNITIVISM

The main idea and assumptions associated with the doctrine of *cognitivism* may be outlined as below:

1. In sharp contrast to behaviorism, cognitivism does not consider people as 'programmed animals' that merely respond to environment stimuli. Rather it considers them as rational beings that require active participation in order to learn, and whose actions are a consequence of thinking.
2. Like behaviourism, cognitivism is also interested in the observations of the changes in behaviour but only as an indication of what is occurring in the learner's head.
3. Cognitive perspective challenges the limitations of behaviourism in its focus on observable behaviour. It incorporates mental structure and process in their learning theories.
4. Cognitive psychologists share with behaviourists the belief that the study of learning should be objective and that learning theories should be developed from the results of empirical research. However, cognitivists disagree with the behaviourists in one critical aspect. By observing the responses of individuals to different stimulus conditions, cognitivists believe that they can draw inferences about the nature of the internal cognitive processes that produce those responses.
5. The main theme of this new school is cognitive revolution (sometimes referred to as the *white-box theory*) which postulates that internal processes are the subject matter of psychology. This contrasts with behaviourism (sometimes called the *black-box theory*). By referring to it as the black-box theory, it is implied that behaviourists are concerned with the output or response (R) of the organism in a certain situation, and to some degree with the input or stimulus (S) but do not consider what transpires between the stimulus

and the response. This unexplored element is represented by a *black box* which intervenes between S and R.

6. Cognitive psychology studies man's thinking, memory, language, development, perception, imagery and other mental processes in order to peep into the higher human mental functions like insight, creativity and problem solving.
7. Cognitive psychologists are totally opposed to the stimulus-response approach of the behaviourists. They maintain that there is more about learning and behaving than just single responses to stimuli. The human mind does not accept the information from its environment in exactly the form and style it is conveyed to him. The conveyed information is compared with the information already stored in the mind. It is then analysed, often enlarged and given a quite new form. Finally, it is subjected to interpretation and then used or stored according to the need of the time.
8. Cognitive psychology presents the system's viewpoint to explain the behavioural mechanism. In this system, whatever is conveyed through stimuli in the environment is the *input*. The cognitive functioning of the human mind is the 'process' and the result of the cognitive functioning is the *output* or the *product*.
9. The central issues that interest cognitive psychologists include the internal mechanism of human thought and the processes of knowing. Cognitive psychologists have attempted to find out the answers to mental structures, such as what is stored and how it is stored, and to mental processes concerning how the integration and retrieval of information is operated. The theoretical assumptions in cognitive psychology lend instructional systems a hand in the design of efficient processing strategies for the learners to acquire knowledge, e.g. mnemonic devices to reduce the workload of the short-term memory, rehearsal strategies to maintain information, and the use of metaphors and analogies to relate meaning of the new information to prior knowledge.

COGNITIVISTIC AND THEORIES OF LEARNING

The various thinkers associated with the school of cognitivism have brought out a number of theories mainly focusing on two different aspects, namely (i) the course of cognitive development of the developing children and (ii) the way in which they learn or acquire one or the other things. On the first issue, we can very well mention the works done by Jean Piaget and Jerome Bruner in the name of Piaget theory of cognitive development and Bruner's theory of cognitive development. Whereas on the second issue, we can mention the various theories of learning based on cognitivism like Gestalt's theory of insight, Tolman's sign learning and the information processing theories. All of these developmental and learning theories reflect the views and philosophy of cognitivism in one way or the other therefore, it is quite relevant to know about them for getting acquainted with the implication of cognitivism to the learner, teacher and teaching-learning process. However, since in this text, we are mainly focusing on the learning among children and adolescents, therefore, here we would like to throw light mainly on the cognitivistic learning theories named as (i) Gestalt's theory of insightful learning, (ii) Lewin's field theory of learning, (iii) Tolman's sign learning, and (iv) Information processing theory of learning.

Gestalt's Theory of Insightful Learning

The learning theory named as *Learning by insight* is the contribution of Gestalt psychologists. Gestalt psychology began with the work of German psychologists who were studying the nature of perception. Wertheimer is generally considered to be the founding father of *Gestalt psychology*. Wertheimer, Kohler, Koffka and Lewin all these four men, originally German, finally settled in America, are the leaders of what is historically known as Gestalt psychology.

Gestalt is a German noun for which there is no English word equivalent. So the term was carried over to English psychological literature. The nearest English translation of Gestalt is *configuration*

or more simply *an organised whole* in contrast to a collection of parts. Gestalt psychologists consider the process of learning as a Gestaltan organised whole. A thing cannot be understood by the study of its constituent parts but only by the study of its whole, is a basic idea behind this theory.

In the practical sense, Gestalt psychology is primarily concerned with the nature of perception. According to it, an individual perceives the thing as a whole while the Behaviourists and Stimulus Response theorists define perception in such a way as to make it analogous with taking photographs. They think that sensation comes prior to meaning and consider these who acts as separate. But the Gestalt Psychologists do not separate sensation of an object from its meaning. They are of the opinion that unless a person sees some meaning in an object he will pay little or no attention to it. Further to a Gestalt psychologist, the meaning of sensation or perception is always related to the total situation. According to them, perception always involves a problem of organisation. A thing is perceived as a relationship within a field which includes the thing, the viewer and a complex background incorporating the viewer's purposes and previous experience.

Gestalt psychologists tried to interpret learning as a purposive, exploratory and creative enterprise instead of trial and error or simple stimulus-response mechanism. Learner always perceives the situation as a whole while learning and after seeing and evaluating the different relationships takes the proper decision in an intelligent way. He always responds to the proper relationship rather than the specific stimuli. Gestalt Psychology used the term 'insight' to describe the perception of the whole situation by the learner and his intelligence in responding to the proper relationships. Kohler, before all, used this term (insight) to describe the learning of his apes. Kohler conducted many experiments on chimpanzees and brought out a book 'Mentality of Apes' in 1925 which was the result of his experiments conducted during the period 1913–17 on the Canary Island. These experiments show learning by insight. Some of them are given below:

1. In one experiment, Kohler put the chimpanzee *Sultan*

inside a cage and a banana was hung with the roof of the cage. A box was placed inside the cage. The chimpanzee tried to reach the banana by jumping but could not succeed. Suddenly, he got an idea and used the box as a jumping platform by placing it just below the hanging banana.

2. In other experiment, Kohler made this problem more difficult. Now it required two or three boxes to reach the banana. Moreover, the placing of one box over the other required different specific arrangements.
3. In a more complicated experiment banana was placed outside the cage of the chimpanzee. Two sticks, one larger than the other, were placed inside the cage. One was hollow at one end so that the other stick could be thrust into it to form a longer stick. The banana was so kept that it could not be picked up by one of the sticks.

The chimpanzee first tried these sticks one after another but failed. Suddenly, he got a bright idea. The animal joined the two sticks together and reached the banana.

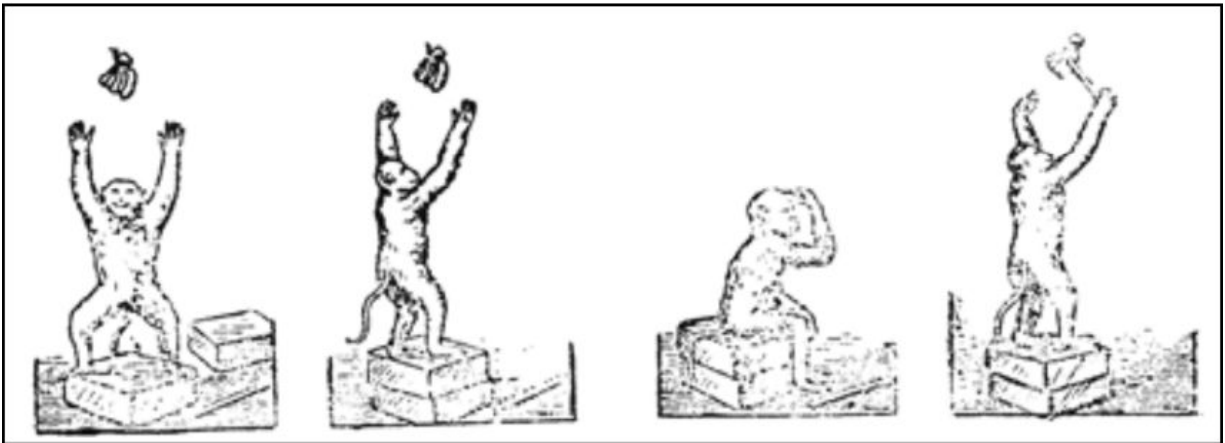


Figure 4.1 Kohler's experiment on chimpanzee.

In these experiments, Kohler used many different chimpanzees. Sultan, who was the most intelligent among Kohler's chimpanzees, could solve all the problems. Other chimpanzees could solve the problems only when they saw Sultan solving them.

With such experiments, Kohler concluded that in the solution of

problems, his apes did not blindly resort to Trial and Error mechanism but reacted intelligently. Kohler used the term *Insight* to describe the learning of his apes. Insight involves the following criteria:

1. The situation as a whole is perceived by the learner.
2. The learner tries to see and judge the relationship between various factors involved in the situation.
3. As a result, the learner is helped in the sudden grasping of the solution to the problem.

On the similar line, experiments were conducted by the Gestalt psychologists which showed that at some stage there is a new organisation of the perceptual field suddenly resulting in a solution. Therefore, the learning according to them is re-structuring the field of perception through insight. As a whole, Insight depends upon the following factors:

Experience: Past experiences help much in the insightful solutions of the problems. A child cannot solve the problem of Modern Mathematics unless he is well acquainted with its symbolic languages.

Intelligence: Insightful solution depends upon the basic intelligence of the learner. The more intelligent the individual is the greater will be his insight.

Learning situation: How insightfully the organism will react depends upon the situation in which he has to act. Some situations are more favourable for insightful solution than others. As a common observation, insight occurs when the learning situation is so arranged that all the necessary aspects are open for observation.

Initial efforts: Insightful learning has to pass through the process of trial and error. But this stage does not last long. These initial efforts, in the form of simple trial and error mechanism, open the way for insightful learning.

Repetition and generalisation: After having an insightful solution to a particular type of problem, the organism tries to repeat it in another situation, demanding similar solution. The way found in one situation

helps him react insightfully in the other identical situations.

Educational implication of the theory of insightful learning

This theory brings the following important facts under lime light.

1. The whole is greater than the parts and therefore, the situation should be viewed as a whole.
2. The use of blind fumbling and mechanical trial and error should be minimised. The learner should try to see relevant relationships and act intelligently.
3. The purpose or motive plays the central role in the learning process.

Based on this theory, teachers are required to pay attention to the following aspects:

1. Subject-matter (learning material) should be presented in Gestalt form. While beginning to teach the topic, parts of a flowering plant or flower should not be presented. The plant or flower as a whole should be presented before them and later on the parts should be emphasised. The problem of Mathematics requiring solution should be presented as a whole and after grasping it as a whole, it should be tried for the solution.
2. In the organisation of syllabus and planning of curriculum, the Gestalt principles should be given due consideration. A particular subject should not be treated as the mere collection of isolated facts or topics. It should be closely integrated as a whole. Similarly, the curriculum comprising of different subjects and activities should reflect unity and cohesiveness.
3. This theory had brought *motivation* in the fore-front by assigning purpose and motive, the central role in learning process. The child should be motivated by arousing his interest and curiosity and he should be acquainted well with the specific aims and purpose of his learning.

4. The greater contribution of the *Insight theory of learning* is that it has made learning an intelligent task requiring mental abilities instead of blind fumbling and automatic responses to specific stimuli. It has outdated mechanical memorisation, drill and practice work which lack basic understanding, thinking, reasoning and creative mental powers.

Lewin's Field Theory of Learning

Kurt Lewin born in 1890 was a German psychologist who finally settled in USA and worked as professor at the Stanford University and University of IOWA. He is the most renowned for his development of the *field theory* based on his doctoral dissertation. It was propounded by him in the year 1917.

In simple words, the field theory propagated by him proposes that *human behaviour is the function of both the persons and the environment expressed in symbolic term; $B = f(P.E.)$* . Lewin in his own terminology symbolised 'P' for a psychological person (not just the biological organism) and *E* for his psychological environment (not the physical and social environment as exists) and *f* for the field or life space denoting the interaction of the psychological person with his psychological environment.

His system of describing human behaviour and learning is based mainly on three key concepts and terms

1. Life space
2. Vectors and Valences
3. Topology

Let us discuss these terms and their concepts:

Life space

The life space of person is also known as the psychological field. According to Lewin's

basic behaviour formula, i.e. $B = f(P.E.)$, the psychological field or life space (*f*) is nothing but the result of the interaction between a

psychological person (P) and his psychological environment (E).

Let us make it more clear by considering what is meant by the terms psychological person and psychological environment here. Psychological person as Lewin advocates should not be considered (under no circumstances) a person identical with a biological organism. A person is neither limited to a mind or body nor a mind and body. He is in fact a conscious self. It is why a person in his life space represents complete human being in a given situation. It represents his psychological self expressed as *I* or *me*. He cannot be seen in isolation from his psychological environment simply because it is only his environment and his psychological perception that helps him in the emergence and evolution of his self throughout his life. Diagrammatically a psychological person (P) is always represented as point P moving about in his life space, affected by pulls and pushes and overcoming barriers in his way of reaching goal.

Psychological environment

By one's environment we ordinarily mean that everything external to him in physical and social context that may affect his learning, development or behaviour at one or the other time. Lewin tried to assert that one's psychological environment should not be taken as identical with that of his physical and social environment. It is not one's physical and social environment but rather his perception that is more responsible for an individual's behaviour in a particular situation. Therefore, perceived situation and the psychological meanings derived by the person from the available physical and social environment (affecting him psychologically) must be taken as his psychological environment at a particular moment in a given situation.

Now we can further to understand one's life space or psychological field.

A psychological person interacts with psychological environment for the formation of his psychological field or life space at a particular moment in a given environmental situation related to his life. In a life space a person and his environment are in the constant stage of mutual interaction and mutual independence. One cannot exist and function without the other. A life space is surrounded by a foreign hull

—the aspects of the physical and social environment which are not psychological, i.e. not included in his psychological environment to the person at that particular moment, however, as and when this aspect of the physical and social environment, previously termed as foreign hull, becomes the subject of his psychological environment and the psychological person begins to interact with it, it becomes a part and parcel of his life space. The foreign hull is very much a part of one's physical and social environment but so long as it does not become a subject of interaction with the psychological person, it cannot be included into one's life space. For example, there is definitely a snake in the corner of a room. It is observable by a person who is deservng the other person but for the person being observed at that moment, this snake does not exist. It may lie in the boundaries or foreign hull of his life space but at the present moment it is not there in his life space. As and when the situation changes it may emerge into his perception by coming out through the boundaries of foreign hull and then becomes a part of his life space. Therefore, in a nutshell one's life space at a particular moment may be termed as *the space in which one lives psychologically at that moment involving one's own perception and depicting one's own viewpoint*. It includes each and every object, person or idea with which one is concerned at a given time in relation to his goal and the incentives for and barriers to reaching the goal (Figure 4.2).

Therefore, *perception* is the key concept and core element in the definition and understanding of one's life space. How does one react to his environment or his self, interacts with the perceived environment constituting his life space, at a particular moment. The life space of an individual with all its characteristics as advocated by Lewin can be represented by Figure 4.2.

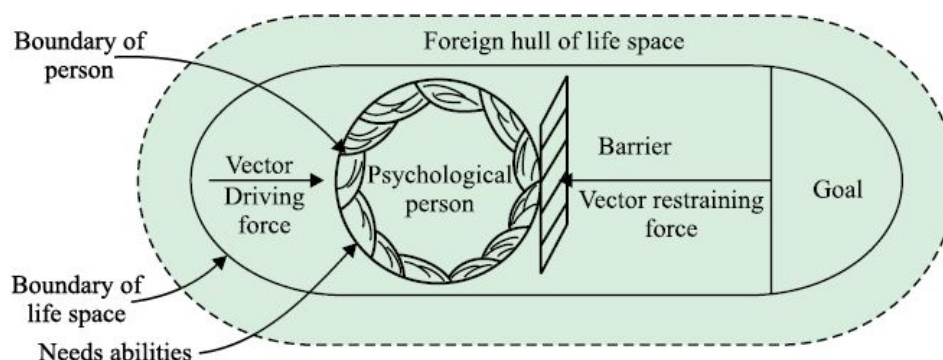


Figure 4.2 Life space of an individual according to Lewin.

Let us now try to analyse the above diagram depicting one's life space at a particular moment in a given situation.

1. A psychological person with his needs and abilities has been shown by a centrally closed circular figure.
2. In his life space, he has himself, his psychological environment, driving forces and restraining force (due of the barrier) for attaining his goal.
3. Foreign hull just lies outside the boundary of his life space in a concentric order.
4. One's life space, including his foreign hull, may provide base for his behaviour, learning and developmental pattern at a particular moment in a given situation.

Vectors and valences

The term *vectors* and *valences* were borrowed by Lewin from mechanics and physics. He used the term vector in his field theory for representing a force capable of influencing movement towards or away from the goal. In case there is only one vector (force) then the movement must be in the direction of the vector but if there are two or more vectors (forces) simultaneously acting in different directions (some pulling and some pushing) then the resultant vector arising from the vectors in action will decide the direction as well as the magnitude of the movement towards or away from the goal. The outcome of the vectors (driving or restraining forces) are thus able to predict dynamics of a relation—What is happening or is likely to happen in terms of the likewise changes introduced in one's life space at a particular time in a given situation?

With regard to the concept of valences it can be said that Lewin used two types of valences—positive (+ve) and negative (–ve) for describing their power of attraction and repulsion. According to him, when a person is attracted by a goal or a region of his life space, that goal or region is said to have a positive valence. On the other hand, if he is repelled, the goal or region of the life space possesses a negative valence. Consequently, the person is likely to be pulled

along or pushed away by the positive or negative valence inherent in the region of his life space or goal.

Topology

The term topology was borrowed by Lewin from the field of mathematics. In mathematics, this concept is employed to describe the relative position of geometrical figures in a space using terms like inside, outside and boundary. In this way, topologically things may be described as next to, inside or outside one another instead of their usual description in terms of length, breadth, thickness, area and volume, etc. It is why topology makes no difference between a circle, an ellipse, a regular or irregular polygon with any number of sides.

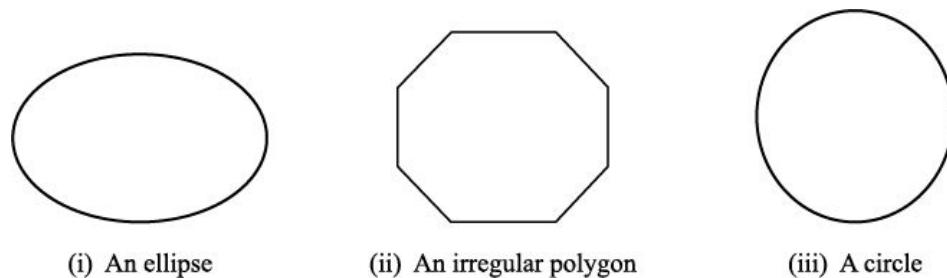


Figure 4.3 Topologically equivalent figures.

Topologically, there lies no difference among figures (boundary area) drawn above. Their topological equivalence may be well demonstrated through an experiment.

Take a rubber or an elastic band, dip it in a red or blue ink or colour. Now stretch it in the shape of an ellipse, regular or irregular polygon, circle or any geometrical shape you like and place it on a paper for getting various shapes and designs. The figures you will have on paper will be considered topologically equivalent to one another (These have been obtained by the same rubber band on being stretched in different ways.). Lewin made the best possible use of the above topological concept for representing the structure of life space in such a way as to define the range of possible perceptions and actions. He achieved that by showing the arrangement of functional parts of the life space as several regions and their boundaries and then their restructuring through the equivalent topological figures (product of the various vectors and valences in varying psychological situations).

How does Lewin's field theory explain learning and its outcomes?

After getting acquainted with the key concepts used in Lewin's field psychology, let us now study what is conveyed by it for explaining the mechanism of learning and its outcomes. Learning, in its simplest meaning, is known as the change in one's behaviour. The elicitation of behaviour is, however, explained by the *field theory* in the following way.

According to the *field theory*, a person in a given situation always lives in his life space. His perception about his life space provides a cognitive structure to his life space. As a result of this cognitive structuring he, at a particular moment and situation, is well aware of his needs, goal, attraction for attaining the goal and the barrier to the goal attainments, etc. The perception of situation, i.e. cognition of one's life space in a particular situation at a particular moment, may create a psychological tension in relation to the realisation of the felt needs, i.e. attainment of the desired goal. There are two alternatives for the release of his tension either through reaching a goal or through restructuring one's life space, i.e. learning to see things differently (bring change in one's goal or methods of reaching goal). It may be seen that it is the latter development that makes one bring changes in the behaviour leading to the process of learning in given situation.

Let us illustrate this point with an example. Suppose a bright and ambitious student has an ambition to become an IAS officer in a given situation at a particular time period. He organises his life space to attain this goal, however, he does not succeed. Now there lie two alternatives for the release of his tension. He can either repeat the attempt without bringing any change in his life space or reconstruct the life space for attaining the desired goal. This reconstruction of the life space may also involve two different channels. One is to bring change in one's method of attempts, ways of studying, preparing and striving to become an IAS officer and the other is to bring changes in the nature of the goal substituting the higher goal with some other attainable goal, i.e. striving for being selected in state cadre like provincial civil services (PCS) or becoming lecturer in a university or a college. In fact, such reconstruction of life space

is the essence of one's learning process. Learning starts the moment one feels the need of bringing some changes in his life space and engages oneself in bringing such changes.

So, learning is the cognitive structure (development of new insight or change in the old views) of one's life space needed for achieving a particular goal or fulfilling needs of an individual at a particular time in a given situation.

Elaborating further, the *field theory* emphasises that the changes in cognitive structure (resulting in the processes and products of learning) are generally of three types—differentiation, generalisation and restructuration.

Differentiation: This helps in responding to different environments of stimuli in different ways. In the language of psychology, it refers to the process in which regions of one's life space are subdivided into smaller but distinct areas and regions. In the case of small children, as they grow up with the help of learning, these unstructured vague and undefined regions or areas of life space become cognitively structured and thus more distinct and specific. The child can then discriminate and distinguish one thing from the other, i.e. eatable from non-eatable, realities from the unrealities of his present environment, past and future, and so on.

Generalisation: It is another product that arises gradually from one's learning. It is defined in psychology as a process of deriving valid conclusions through categorisation of sub regions into a unified region of one's life space. When a child learns that bananas, apples, oranges, mangoes are fruits and petrol, diesel, electricity, liquefied or compressed natural gases are the sources of energy, he is said to reach generalisation as a result of his learning.

Restructuration: Learning is a never-ending process. Therefore, according to Lewin, the regions and sub-regions of the life space of an individual always remain in a state of continuous organisation and reorganisation. Therefore, an individual, not only differentiates and generalises his life space new regions but also remains engaged in restructuring and reorganising these regions of his life space so as to provide them new meaning for the better understanding of himself and his environment.

Finally, as a result of the process of differentiation, generalisation and restructuration of the regions of his life space, one may be able to enjoy the fruits of his learning in terms of habit formations, development of thinking and reasoning power, memorisation, problem-solving ability and intelligence for the benefits of himself and the environment.

In explaining the process and product of one's learning, *Lewin's field theory* has adopted its own terminology and language. Let us have a brief discussion on them as below:

Motivation and learning: *Lewin's field theory* of learning attaches much significance to motivation in the process of learning. It takes motivation as attraction towards a goal and clarifies its strength through a relative role of valences, the level of aspiration, needs and aroused tension by concluding that the study of one's motivation determines the result of one's learning.

Development of problem-solving ability: In problem solving, learning behaviour, problematic situations faced by an individual represent an unstructured region of his life space. The need of solving the problem generates tension and this tension can be resolved by working for the structuring of his life space or in other words; reorganisation of the field of perception to devise a new insight and understanding to solve the given problem. When this is done, the problem gets solved and the method of solving similar problems can thus be learnt.

Habit formation: In the learning of the habit one uses his insight, i.e. the organisation and structuring of his life space. He gives a meaning to an event, a sub region of his life space by fully knowing what action will lead to what results in a particular situation. This is the basis of *habit formation*.

Learning and intelligent behaviour: By defining all learning as *essentially a process of developing cognitive structure or insights*, field theory provides great significance to learning for the development of *intelligent behaviour*. The clarity about the purpose and goal has a greater value for one's learning. It is further enhanced through one's insight, i.e. learning new ways of responding and behaving. The clarity of purpose and using insight

thus become the forerunner of one's intelligent behaviour. Accordingly, Lewin advocates an intelligent behaviour as that behaviour in which one has the purpose followed by the essential insight for achieving the purpose.

Rewards and punishment: Lewin's theory highlighted the role of both rewards and punishment in the process of teaching and learning. It also warned against their excessive and improper use. According to Lewin a student tempted by the rewards may resort to improper methods like cheating in the examination. Therefore, he advocates placing some barriers over the reward situation for avoiding resort to such short-cuts. Punishment should also be carefully introduced as there is a likelihood of the individual withdrawing because of the unpleasantness introduced by the punishment. The activities controlled by the threat of punishment tend to become fearful and strongly disliked and therefore, it is the reward which should always be highlighted rather than the punishment.

Success and failure: What constitutes success or failure in a task for an individual can be explained properly in terms of *Lewin's field theory*. It says that success or failure, from the psychological angle, depends upon one's ego involvement, the level of aspiration and the psychological satisfaction and resolution of one's aroused tension. Accordingly, success in an easy task may not be a success experience since it does not involve the ego of the person. In the same manner, failure in a very difficult task may not be a failure experience. If we take a broader view, psychological analysis of success on the part of a learner may show the following varied possibilities:

1. Reaching a goal may constitute a success.
2. Getting within the region of the goal may constitute a success experience. For example, a person may lay emphasis on 'M.A. appeared' as by doing so he thinks himself to be within reach of the goal.
3. Making some progress in the direction of the goal may also constitute a success experience, e.g. if one clears the

preliminary examination for the IAS, it may bring one an intense success experience.

4. Selecting a socially approved goal may also constitute in itself a success experience irrespective of the progress and efforts made by the individual for reaching the goal.

The efforts and the results which provide a success experience to an individual thus vary in degree depending upon the psychological make-up of the individual.

Memory: Regarding memory and remembering, the *field theory* helps reach the following conclusions:

1. Tasks which do not serve any worthwhile purpose in their completion are not remembered.
2. Ego-involved tasks are retained better than those tasks where ego is not involved.
3. Unsatisfied tasks are remembered better than the finished tasks because of the psychological tensions.
4. Tasks which are linked with the satisfaction of many needs are remembered better than the tasks which lead to the satisfaction of only one need.

Conflicts: Arousal of various types of conflicts in the *field theory* has been explained with the help of the concepts of negative and positive valences in the form of opposite and almost equal forces operating at a time in the regions of one's life space. Mainly the theory has specified three types of conflicts.

1. *Approach–approach conflict:* This type of conflict is diagrammatically represented in Figure 4.4.

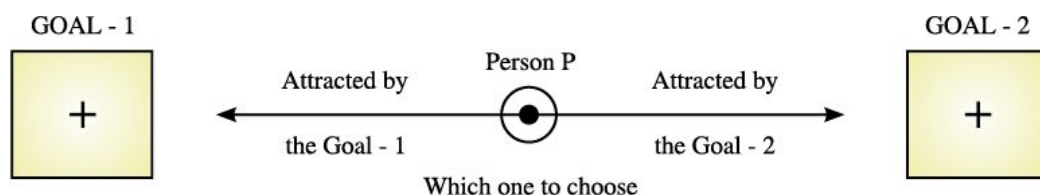


Figure 4.4 Approach-approach conflict.

Here almost equally strong and equidistant, two positive valences give rise to the approach-approach type of conflict. This type of conflict arises in situations like; the child having to choose between watching a movie of his choice or going for a picnic with his classmates.

2. *Avoidance-avoidance conflict*: In such conflicts, as depicted in Figure 4.5, almost equally strong and equidistant, two negative valences work to force the individual to leave the field or escape from the situation. An example of such a conflict is the avoidance of homework as well as of punishment by a child.

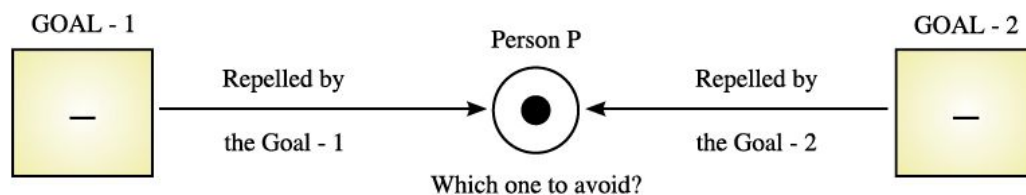


Figure 4.5 Avoidance-avoidance conflict.

3. *Approach-avoidance conflict*: Here as depicted in Figure 4.6, the person is equally attracted and repelled by the same goal for the desire to attain some object. This type of conflict may arise in the case of a child who is attracted to run a sack race due to the announced prize against his not wanting to participate for the fear of spoiling his new dress.

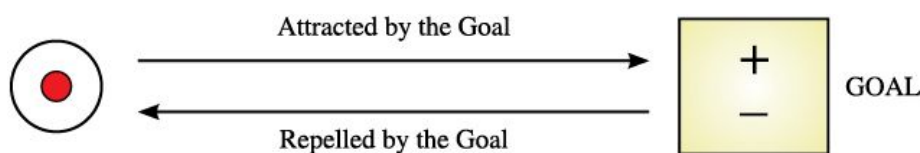


Figure 4.6 Approach-avoidance conflict.

Salient features

Curt Lewin theory of learning is named as *cognitive field theory of learning*. It differs from other theories like *behaviouristic* and *psychoanalytical* theories of learning. Its main distinguished features may be summarised as follows:

1. *Lewin's field theory* does not believe that human learning is pushed and pulled by mechanical forces either of stimuli

and reinforcement (as advocated by behaviourists) or of unconscious instructional impulses (as advocated by psychoanalysts).

2. This theory represents a realistic (as opposed to an absolutistic or mechanistic) way of viewing the learner and his learning process. Like S-R associationists and psychoanalyst, it does not consider the learner as a biological organism who learns some or the other thing lying in his environment at present. Rather it has a strong belief that nothing is perceivable or conceivable as a thing in itself and therefore everything needs to be perceived or conceived in relation to other things lying in one's perceptual field.
3. In the field of psychology, the learner is termed as a psychological person instead of being considered as a biological organism. He has a definite purpose, a goal for his behaviour and learning. He reaches his goal neither through a series of machine-like events/stimulus response, chain reaction, through banking upon his past experiences/habits, etc. nor is he driven by his instinctive actions, unconscious motivation, etc. He definitely acts purposely by bringing desirable changes in the cognitive structure of his life space, i.e. using needed insight for perceiving things with the right approach and choosing the right available alternative for reaching the goal.
4. Reality in the language of field psychology is not defined in absolute terms as happens in the case of S-R theorists and scientists. Here reality is the one that is perceived by the person himself in relation to his environment at a particular time in a given situation. He perceives the things in his own ways and the meaning given to things through his own perception is the reality concerning those things. Therefore, the situations or environment, internal as well as external conditions, have a great significance in the teaching-learning process as they can make a psychological person to perceive the learning field in one or the other ways depending upon the inherent needs, incentives and barriers

for reaching the objectives of learning and getting desired success.

5. The term 'behaviour' has a unique meaning in the field of psychology. Here it is not described in physical terms (as done by behaviourists and psychologists) but in terms of what exists at a particular moment in a particular situation for the psychological person whose behaviour is under observation.
6. While S-R theorists and psychoanalysts tried to make generalised predictions about the learning and behaviour on the lines of what leads to what, Lewin concentrated on the prediction of behaviour of individual persons in their specific life spaces. According to him every learner has his own life space consisting of himself and his psychological environment, including foreign hull, the organisation or reorganisation of this life space, resulting in his learning or behaving in a particular way at a particular time. Since every learner has his own life space, his own ways of perception, i.e. interaction with the environment depending upon his own needs, values and behaviour for realising the goal and his own individuality as a psychological person, it is not feasible to have generalised prediction about the terms and conditions for learning and behaving in a particular way, in a particular teaching–learning situation.

Educational implications

The salient features so described and the understanding gained till this stage about *Lewin's field theory* may help us to draw the following educational implications for the teaching-learning process of our classrooms.

1. Every learner should be treated as a psychological person instead of a biological organism, having his unique life space at a particular time in a particular teaching–learning situation. In the light of his knowledge, a teacher should try to acquaint himself with the individuality of every child. The

needs, interests, attitudes, aptitudes, abilities and capacities of the learner should, therefore, be known to the teacher in order to understand the dynamism of their life space and accordingly they should be helped in developing desired cognitive strengths or insight for better learning and development.

2. For the proper organisation and restructuring of life space (with the use of proper insight), the learner should be well acquainted with the purpose and goal of their learning attempts in a particular teaching–learning situation. The goal should be made as attractive as possible and the barriers in reaching the goal should be so handled that it ensures proper success in the teaching–learning process. Both the teacher and the learners should remain motivated in their respective acts of teaching and learning for achieving desired outcomes.
3. Students should be helped in developing proper insight and understanding of the things, processes and events related to a particular teaching–learning situation. The repetition without understanding and relying on the past experiences instead of developing new insights in understanding and creating new things should be discouraged.
4. The teaching–learning environment is to be structured such as it provides maximum help to the learners in relation to their own life space and teaching–learning goals. The negative factors and unfavourable elements posing barriers in reaching the goals should be properly controlled so as to help in getting desired result in a teaching–learning situation.
5. A favourable group dynamics always facilitate the teaching–learning process. The teacher should, therefore, try to seek harmony through a smooth common intersection of the life space of individuals (learners and teacher) engaged in the process of teaching and learning. Each must have a proper understanding of the others. The ego clashes should be avoided as far as possible and every care should be taken to meet the individual choices and

tastes within the group dynamics of a particular teaching–learning situation.

6. For the better learning and development, the learners should be helped and trained in bringing desired changes in their cognitive structures by learning the art of differentiation, generalisation and restructuration of the regions and sub regions of their life space. Gradually they should be helped in acquiring various concepts and using them in their future learning and development.
7. A learner can be better understood by studying the structure of his space operative in a particular teaching–learning situation (in relation to his needs and abilities and barriers, boundary and foreign hull of his life space and goal). It can help the teacher to develop an accurate idea of what actually is going on in the minds' life spaces of the children in the class. There may be significant variations. For example, in a particular teaching–learning situation some students may have the teacher and classroom activities in the center of their life spaces and everything else lying in their room and outside environment in the foreign hull of their life spaces. Definitely, these students will be getting maximum benefits from the classroom teaching-learning activities. Some of the students of the class may have teacher and the classroom activities in their life spaces while a few may not have anything belonging to classroom activities in their life spaces. They may be mentally absent though physically present in the classroom. Seeing such variations in the structures of the life spaces of the students of the class, a teacher has to be very cautious about the dynamism and functioning of the life spaces of the students. Exclusively then he can be a better manager of the ongoing teaching–learning situation.

Tolman's Sign Learning

Edward Chace Tolman (1886–1959), an American psychologist, propounded a theory of learning in 1932 with the publication of his

work *Purposive behaviour in animals and men*. His theory is known as *Tolman's sign learning or Sign-Gestalt learning*.

Cognitive theorist Tolman has serious differences with the behaviorists on the simple ground of their machine-like approach to human behaviour. He compared the S-R learning system with the operational activities of a telephone exchange—*incoming calls from sense organs* and *outgoing messages to muscles*. However, learning according to him, is not so simple an activity undertaken through simple S-R connections of a telephone switch-board but involves complex cognitive activities helped by the brain processes. In his own words:

The brain is far more like a map control-room than it is like an old-fashioned telephone exchange. The stimuli, which are allowed in, are not connected by just simple one-to-one switches to the outgoing responses. Rather, the incoming impulses are usually worked over and elaborated in the central control room into a tentative, cognitive like map of the environment. And it is this tentative map, indicating routes and paths and environmental relationships, which finally determines what responses, if any, the animal will finally release (Tolman, 1948).

Main thoughts and concepts propagated by Tolman's sign theory

Molar vs. molecular approach: Tolman's theory adopted the molar approach in the systematic study of behaviour instead of the molecular approach adopted by the behaviourists like Watson, Skinner, Guthrie and Hull. The chief characteristics of molar behaviour are that (i) it is purposive, i.e. always directed toward a goal, (ii) it is not mechanical and stereotyped like a spinal reflex and (iii) it constitutes a gestalt (a whole or complete) instead of the mere parts or individual 'twitches' from which it is supposed to be built up. Consequently,

Tolman emphasised studying of behaviour as a complete purposeful exercise, i.e. achievement of the act like a rat running through a maze, a man driving to home for dinner, a child hiding from a stranger, etc. instead of studying these acts in the form of certain sequences of muscle twitches.

Presence of intervening variables: Tolman's theory in fact, for the first time in the history of psychology, introduced and highlighted the

role of intervening variables. These variables lie in between the independent variable (stimulus) and the dependent variable (response). Heredity, previous learning, age, special endocrine, drug or vitamin conditions, physiological drives and environmental stimuli, etc. are all examples of intervening variables which, although not objectively observed, are said to be the strong determinants of behaviour. Which type of intervening variable will prove more effective depends upon the individuality of the individual as well as his internal conditions and psychological state. Sometimes certain innate tendencies and motives like curiosity, exploration and manipulation prove stronger than the physiological drives like hunger. This fact was demonstrated by Tolman through his experiments in which hungry rats were found to take a longer journey through a maze to their food if the longer route happened to be more interesting.

Concept of cognitive maps and sign-gestalt: Tolman described his concept of map-making and sign-learning on the basis of experiments in which rats placed in a complicated maze with food at the end of it were able to find new routes when their initial routes were blocked. They did it not for making simple S.R. connections and repeating the stereotype responses as *turn left* or *turn right* but by constructing a mental map of their environment. Actually, what they did was to use their mental or cognitive abilities to lay out a mental map or picture of their environment to recognise what was available to them in a given situation for achieving their goal. Mental mapping, thus, constituted a sort of mental representation or the setting up of certain mental hypotheses in the search for new routes and ways and then testing these hypotheses through intelligent and purposeful behaviour.

In our day-to-day life, we also make use of such mental mapping to find new ways and solve problems in our daily life by demonstrating our ability to use any of the *many roads to Rome*.

In such mental mapping we certainly demonstrate that learning is not a simple routine type S-R mechanism but a process of discovering what leads to what in a given situation. By our own efforts and active exploration we try to discover the golden rule that one event leads to another event or that one sign leads to another

(capable of enabling the organism to reorder or reorganise its thinking). This explains why Tolman describes learning as sign learning or sign-gestalt learning.

Place learning versus response learning: According to Tolman, in the process of learning an individual does not learn specific responses to specific stimuli as mentioned by S-R theorists but tries to learn about the places, where things actually lie. He does not learn a fixed movement sequence but an overall path by visualising a total picture for the achievement of the stipulated target. He then tries to bring changes in his movements and style of functioning in accordance with the needs of the environment.

Tolman and his associates conducted certain experiments to demonstrate their conclusions about place learning ability. In one of the experiments, using a T maze, a rat was first trained to get its food by turning to right. The situation was changed by allowing its entry from the lower end. Consequently, it had to change its movements from right to left for getting food (Figure 4.7), proving that the animal learns places and not the fixed sequence of movements like turning right or left.

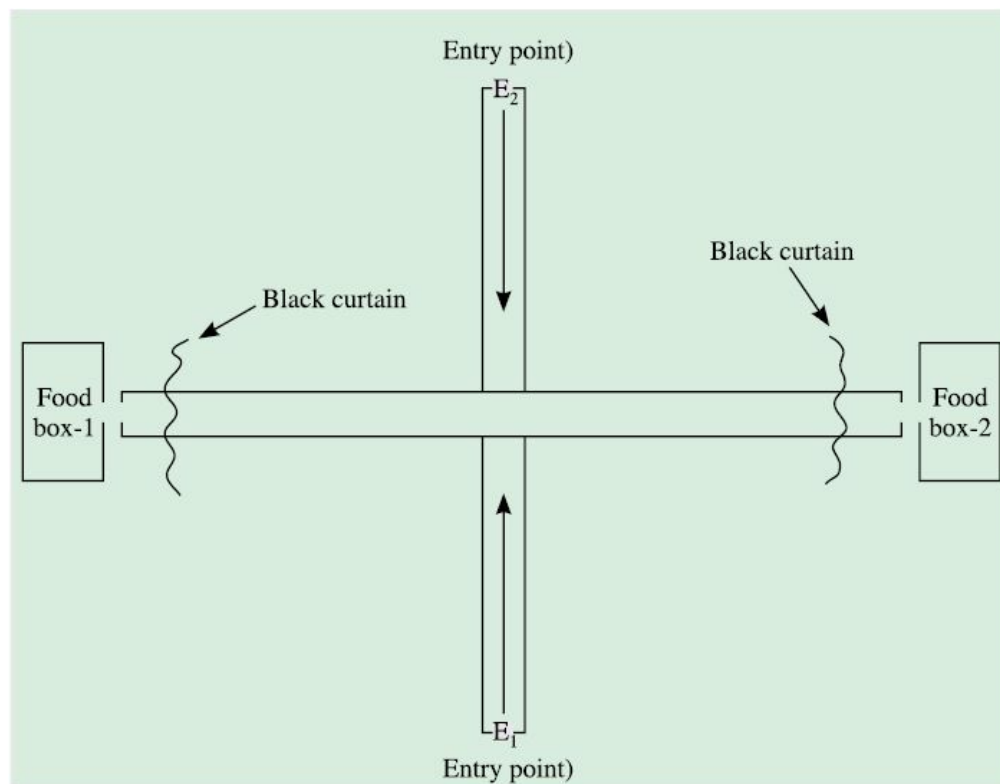


Figure 4.7 An experiment to demonstrate place-learning.

In another experiment, the maze in which the rat had learned to run along the correct path was flooded with water. Even when faced with this obstacle, the rat was able to reach its goal by swimming along the correct path. Both these experiments demonstrated the truth of Tolman's findings that it is the place not the fixed response that is learned by an individual as an outcome of his learning.

Reward expectancy: Tolman maintained that our learning behaviour is purposive. It is goal-oriented rather than response-oriented. We learn to expect or gain something as a result of our efforts. Consequently, we may have an expectation that if we go to a certain place or perform a certain act, we may get something, a 'reward' in the language of Tolman. Not getting or getting less than the expected reward may lead to disruption of behaviour, involving frustration. Tolman and his associates conducted a number of experiments to demonstrate the importance of reward expectancy in the process of learning.

In one of their experiments, a group of rats which was trained to run a maze for bran mash was found to show a considerable disruption in their behaviour (in terms of committing more errors) when sunflower seeds substituted the bran mash (which was less than the expected reward). In another experiment, a monkey was first allowed to see a banana being placed in one of the two containers. The monkey was quite able to pick up the right container in search of the banana demonstrating his memorisation ability. Later on, after removing the monkey from the scene, the experimenter placed a lettuce leaf (the food having less reward value) in one of the containers. When the monkey found the lettuce leaf in place of the expected banana, it exhibited signs of disrupted behaviour, surprise, anger, frustration; rejected the lettuce leaf and began to search vigorously for the expected reward, i.e. the banana.

Latent learning

Tolman also spoke of a type of learning that remains dormant for a considerable length of time in an individual before it is displayed in his behaviour. The individual is capable of demonstrating its existence when suitable motivation and opportunity arise. The

concept of latent learning leads helps us conclude that learning does not essentially require rewards or reinforcement. In a learning experiment, the rat in a maze may learn the correct path without getting food as a reward or reinforcement.

In 1930, Tolman with his associate *Charles Honzik* performed an experiment to demonstrate such learning. In this experiment, hungry rats learning to solve a maze were divided into three groups. The first group was always rewarded for correctly passing through the maze, the second group was never rewarded and the third was not rewarded until the eleventh day of the experiment. The rats of the third group did not demonstrate any signs of learning till the introduction of food as reward on the eleventh day. However, as soon as the food was introduced these rats improved their performance rapidly and soon caught up with the group that had been continuously rewarded. The results of this experiment thus demonstrated the existence of learning (although not translated into performance) prior to the introduction of reward in the form of food. The existence of such latent learning thus remains latent in the individual until a happening in the environment requires him to make use of hidden stores. In our day-to-day life, a person who is engrossed in his work may seem to pay no attention to the dialogue in the radio set playing in the background. A few days afterwards, however, he may be seen to employ much of the language and contents used in the presented programme. Which is quite surprising even for himself as to how he picked it up.

Types of learning

Tolman distinguished six types of learning:

Cathexis: In this type of learning, an association appears to be formed between certain objects and certain drive states. Persons belonging to cold countries where liquors are usually consumed for satisfying the thirst drive, will certainly tend to seek such drinks in preference to a simple glass of water mainly because water has not been associated with the satisfaction of the thirst drive for them.

Equivalence beliefs: Sometimes, a sub-goal like scoring of high grades provides the same motivation as might be provided by the main goal like winning love and appreciation etc. The learning

performed in such a condition is said to be the equivalence beliefs learning.

Field expectancy: In this type of learning, the learning takes place on account of the expectancy of something occurring in one's environment. Upon seeing a certain sign, for instance, one expects that a certain other sign will follow. The only reward in such a learning is the fulfilment of the expectation. Such learning as may be understood, is not the usual S-R learning but rather S-S or sign-sign learning based on the expectation of signs in one's environment.

Field cognition modes: This type of learning involves the learning of a strategy or a way of approaching a problem-solving situation by arranging the perceptual field in a specific way for application to each new field with which it is presented.

Drive discrimination: This type of learning requires the learner to identify and determine his own drive state and respond accordingly. The individual, therefore, has to learn the behaviour needed for satisfying his thirst drive quite differently from the learning of the behaviour needed to satisfy his drive for love and affection.

Motor patterns: In such learning, the motor patterns are associated with or conditioned by behaviour.

Summary of Tolman's theory

Tolman's theory truly represents an eclectic approach towards learning. The six kinds of learning that it advocated may be seen to have equations with the views of one or the other major theory of learning. The major contribution of this theory is its emphasis on the study of cognitive processes thus making the task of learning an intelligent task rather than a mere telephone like operation or some routine habit formation or conditioning. Tolman was the first to forcefully argue that all learning is purposeful and goal oriented rather than response oriented. According to him, understanding and map making rather than conditioning

or building up S-R connections is the essence of learning. With the number of trials in the way of learning, an individual develops cognitive maps or mental representations (also called sign gestalts) in perfect correlation with the goal he has to achieve and the environment in which he has to strive. These cognitive maps are like

various hypotheses the validity of which one has to test one by one to realise one's purpose. A cognitive map becomes effective in influencing one's behaviour only when it helps in meeting one's need or purpose or in getting reinforcement.

However, an organism may be able to learn even if it is not rewarded or its behaviour is not reinforced. This is an unobservable or latent learning which shows its existence in terms of good performance shortly after the introduction of the reward or recognition. Each individual act, according to his cognitive mapping of the environment to reach his goal. The attempts made by him in this direction become significant, showing positive or negative signs as, depending upon the type of reinforcement, each sign leads to another, giving a clear indication of what leads to what; thus, the individual ultimately learns to proceed along the correct path. The likelihood of reaching the goal by one of the many routes indicated by the mental mapping and the confirmation of such expectancy through the local signs (reinforcement of the behaviour) makes the individual strive for the new ways and means to proceed on his path to realise his ultimate goal and that is how he learns the ways to solve the problems he is confronted with in a given situation.

Educational implications: The educational implications of Tolman's theory can be outlined as:

1. This theory highlighted the role and importance of purpose in the task of learning. What is to be taught to the child, therefore, should be purposeful and should lead him towards some clear-cut goals and objectives.
2. Tolman's theory emphasised that no learning is wasteful. Attempts at learning are never in vain. Although no immediate purpose may appear to be served through such efforts, such unobservable learning proves beneficial because it surfaces when the need of such learning arises in the accomplishment of a task.
3. This theory clarified that learning is neither a simple straightforward connection between stimuli and responses nor so habitual as to be brought through repetition and conditioning. It is an intelligent task in which the organiser

has to draw a cognitive map of the environment to come up with a proper solution to a problem. Children while learning should not, therefore, be forced to follow a routine or obvious path but should be encouraged to explore as many paths as possible for solving the problems and performing the tasks.

4. A reward or reinforcement is not essential for every step taken towards reaching a goal or learning a particular behaviour. We learn so many things throughout our life for which we are reinforced by no other reward than the satisfaction of the learning itself. Therefore, it is the intrinsic motivation or value of the learning that should be emphasised in the process of teaching and learning rather than some outside reward or high expectation.
5. Since intervening variables like environmental surroundings, drives, previous learning, age, etc. play a major role in influencing the learning process, every effort should be made to take proper note of these variables in any teaching-learning situation to derive the maximum benefit.

INFORMATION PROCESSING THEORIES OF LEARNING

Information processing theories of learning represent the group of theories that make use of the concept of information processing for explaining the mechanism of learning. Let us, therefore try to understand the meaning and concept of information processing for gaining insight of the nature of these theories.

What is Information Processing?

Information processing stands for an act of processing the information, i.e. to analyse, employ or make use of information for gaining some knowledge or experience. In the words of Joyce and Weil—*Information processing refers to the ways people handle stimuli from the environment, organise data, sense problems, generate concepts and solutions to problems, and employ verbal and non-verbal symbols.* (1972, p. 9)

In this way, information processing deals with the ways and means an information (sensory input or data) is handled by an individual for deriving desired meaning for its further use. Consequently, the handling or processing of the information may help an individual in gaining new experiences and insight for the solution of felt problems or modification of his ways of behaving.

Information processing theories

The way people process the available information (resulting in gaining new experiences or bringing modification in their behaviour), may give rise to significant theories of learning. This very assumption has led to the formulation and establishment of some well-known learning theories termed as *Information processing theories of learning*. The key question answered by all these information processing theories of learning is: *Cognitively, what process are occurring in a person's brain when they are presented with a learning situation.* Consequently, they throw light on the mechanism how the human brain senses, processes and recalls information. The working of our brain, in terms of information processing, may be easily equated to the working of computers. Like computers, the

information processing in human brain may find its expression in the mechanism of input, processing and output. The brain receives sensory impulses from the environment and decides to process this input as warranted. Processing depends on the nature and complexity of the data as perceived by the learner. The way, information is received, processed and recalled by the learner, then decides the outcomes of his learning.

For gaining some idea about the nature and functioning of information processing theories of learning, we shall discuss here some of the popular theories and models of instruction developed by the eminent psychologists. In such description, we may easily notice a significant trend that all these Information processing theorists learning approach primarily through a study of memory and so you can find due mention of the terms related to the process of memorisation like temporary memory, short-term memory, long-term memory, recall, retrieval, etc. Let us begin with the description of these theories one by one.

Three stage information processing theory

This theory is the outcome of the ideas propagated by Atkinson and Shiffrin (1968, 1971). According to this theory, *learning* is the outcome of the processing of the information carried out by human brain at the following three stages:

1. Sensory register 2. Short-term memory and 3. Long-term memory.

1. The process of learning or memorisation thus starts with the interaction of one's sense organs with one's environment. The sensory information is first picked up by one or more sense organs, then it travels through the nervous system and reaches the brain for its interpretation. The sensory information stays in the nervous system (just to register its presence) briefly about a second or two, giving brain the time for its interpretation. After being registered in the *sensory register*, it can be responded immediately or may be transferred to the *short-term memory*. Usually, it depends upon the nature of sensory

information and its interpretation by the brain. The brain may interpret it as useless or of little significance and thus may order for its disappearance from the sensory register or it may be ordered for its monitoring at a low attention level. As an example of such type of information processing at the sensory register level, we can cite the driving of our car while carrying on a conversation. Here we can monitor and respond to driving conditions without transferring the information to short-term memory.

2. The information not processed or vanished at the level of sensory register then travels to short-term memory (STM) of our brain. It may automatically stay for up to 20 seconds here. However, it can be retained as long as an individual wants it in his short-term memory through rehearsal or repetition. *Short-term memory* is equivalent to one's working memory. It is here that the information is duly processed by the brain for its proper interpretation, assimilation and responding. There are usually three means employed for the information processing or handling of cognitive tasks in STM mentioned below:
 - i. Encoding the information in chunks.
 - ii. Breaking the information into sub parts and then processing them one at a time.
 - iii. Practicing skills until those become automatic.
3. The information unprocessed at the short-term memory stage is then transferred to the *long-term memory (LTM)*. LTM is believed to have unlimited capacity and duration. It is used for storing and procession of sensory information on a permanent basis. The stored as well as organised information in the *long-term memory (LTM)* in the coded form is transferred back to the short-term memory where it is decoded and employed for response as desired and ordered by our brain.

Levels of processing theory

The theory of information processing was proposed by Craik and

Lokhart (1972) as an alternative to the above discussed *Information processing theory* postulating three stages—sensory, working and long-term memory for the processing of information. The main ideas lying within this theory may be summarised as below:

1. Memory is of only one kind rather than of three types namely sensory, short term and long term.
2. Ability to learn or remember is dependent on how deeply information is processed by us.
3. Levels of such processing may range from very shallow to very deep.
4. The greater the depth of processing, the better can the material be learned or remembered. For example, information that involves strong visual images or many associations with existing knowledge will be processed at a deeper level. Similarly, information that suits our interests or serves our purposes well will be processed more than other stimuli events.
5. The things that are meaningful to us are processed quite deeply in comparison to the meaningless or less meaningful stimuli and are consequently learnt or remembered well.
6. Processing of information at different levels is carried out quite unconsciously and automatically unless we attend it to that level. For example, we are usually not aware of the sensory properties of stimuli, or what we have in own working memory, unless we are asked to specifically identify such information. From this, it follows that there is hardly any place for the mechanism of attention in the processing of information. It may thus be taken as an interruption in processing of information rather than a cognitive process.

Miller's information processing theory

This theory has been suggested by George A. Miller as an extension of the earlier approaches of cognitive psychologists expressing

learning primarily in terms of the study of the process of memorisation. The main ideas behind his theory may be summarised as below:

1. Information processing helps in acquiring new experiences and learning new ways of behaving.
2. Students learn better when they are actively processing, storing and retrieving information.
3. Information processing helps the students build desirable cognitive structures (structure of the subject matter) for the proper comprehension and understanding.
4. Successful encoding is essential for the proper processing of the received sensory information or data. Working memory (STM) also processes the information for being transferred to Long Term Memory (LTM) by encoding the information. Therefore, meaningful encoding is a must for the desired task of information processing.
5. Miller (1956) presented the concept of *Chunking* for the meaningful organisation or encoding of the subject matter at all levels of cognitive processing. Classical example of chunks is the ability to remember long sequences of binary numbers because they can be encoded into decimal form. For example, the sequence 10100 01001 11001 101 1010 could easily be remembered as 20 9 25 5 10. Of course, this would only work for someone who can convert binary to decimal numbers (i.e. the chunks are meaningful).
6. We can expand the capacity of a person holding information in his short-term memory by utilising the concept of chunking. It can hold 5–9 chunks of information (seven plus or minus two). Therefore, information should always be organised in the form of chunks (meaningful units) for its better processing and fruitful learning outcomes.
7. The second useful concept regarding information processing (other than chunking) propagated by Miller is concerned with his acceptance of the computer as a model

of human learning. Like the computer, the human mind takes in information, performs operations on it to change its forms and content, stores and locates it and generates responses to it. Thus information processing, according to Miller, involves (i) gathering and representing information, i.e. *encoding*, (ii) holding information, i.e. *retention* and (iii) getting the information when needed, i.e. *retrieval*.

8. The third useful concept emphasised in *Miller's information processing theory* is known by the term TOTE (Test Operate Test Exit). By introducing this concept, Miller et al. (1960) suggested that TOTE should replace the stimulus response mechanism as the basic unit of behaviour. In a TOTE unit, a goal is tested to see if it has been achieved through the mechanism of information processing. If not, an operation is performed to achieve the goal. This cycle of test-operate is repeated until the goal is eventually achieved or abandoned. By adopting this technique, an individual may be capable of finding the solution of his problem or learning the desired way of achieving his goal.

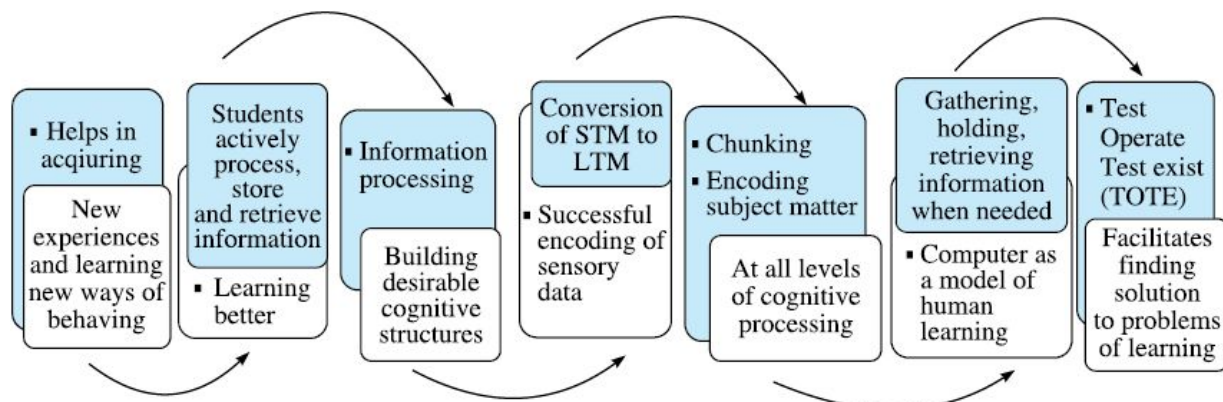


Figure 4.8 Miller's information processing theory.

Dual coding theory of information processing

This theory has been proposed by A. Paivio as an attempt to give equal weightage in the processing of verbal and non-verbal information in the task of learning. Due to its emphasis on the dual functionality of the verbal and non-verbal information, the theory has

been named as *Dual coding theory*. Initiating his theory Paivio (1986) writes: *Human cognition is unique in that it has become specialised for dealing simultaneously with language and with non-verbal objects and events. Moreover, the language system is peculiar in that it deals directly with linguistic input and output (in the form of speech or writing) while at the same time serving a symbolic function with respect to non-verbal objects, events, and behaviours. Any representational theory must accommodate this dual functionality.* (p. 53)

The chief characteristics and main ideas lying behind the *dual coding theory* of information processing may be summarised as below:

1. According to this theory, there are three types of processing namely representational, referential and associative. A given task may require any or all the three kinds of processing narrated as below:
 - i. In *Representational Information Processing*, there remains a direct activation of verbal and non-verbal representation.
 - ii. In *Referential Information Processing*, there remains an activation of the verbal system by the non-verbal system or vice-versa.
 - iii. In *Associative Information Processing*, there remains an activation of representation within the same verbal or non-verbal system.
2. The theory is based on the assumption that there lie two cognitive subsystems recognised as below.
 - i. One of these subsystems is specialised for the representation and processing of non-verbal objects or events. (i.e. imagery).
 - ii. The other subsystem is specialised for dealing with language.
3. Based on the above referred two cognitive subsystems, Paivio in his theory postulated two different types of representational units (Similar to *Chunks* as described by

Miller) as mentioned below.

- i. Representational units named as *imagens* for mental images (non-verbal information).
 - ii. Representation units named as *logogens* for verbal entities (verbal information).
4. According to Paivio, while logogens are organised in terms of associations and hierarchies, the imagens are organised in terms of part-whole relationships.
5. By following the above mentioned systems and pattern of organisation, the information (verbal and non-verbal) is processed appropriately by the individual learner for the desired learning outcomes.

Educational implication of the theories of information processing

All the theories of information processing described above may be said to have the following educational implications.

1. The information (verbal or non-verbal) should be organised in terms of meaningful units for its better processing and fruitful learning outcomes.
2. Students should be helped in focusing on the most important details and separating less vital information.
3. Students should be helped in making connection between new information and what they already know.
4. As far as it is adequate and possible, students should be provided for repetition and review of information.
5. The learning material experiences (Instruction) should be organised in a clear, systematic and organised way.
6. We must always focus on meaning and not the memorisation of information on the part of students.

SUMMARY

Cognitivism may be defined as one of the schools of psychology or doctrine that lays emphasis on the role of the cognitive structure and cognitive processes like thinking, memory, knowing and problem solving, etc. in one's learning or behaving in one way or the other. Cognitivism perspective is the best credited for its providing much importance to the role of intellect and insight instead of the mechanistic repetition of stimulus response mechanism of behaviorism in the process of one's learning and behaving.

Among the main propagators of the doctrine of cognitivism we may name the Gestaltists like Max Wertheimer, Kurt Koffka, Wolfgang Kohler and Kurt Lewin as well the other modern psychologists like Edward Chase Tolman, Jean Piaget, J.S. Bruner and a host of other Information Processing Theorists.

These various thinkers associated with the school of cognitivism have brought a number of theories mainly focusing on two different aspects namely (i) the course of cognitive development of the developing children and (ii) the way in which they learn or acquire one or the other things. On the first issue, we can very well mention the works done by Jean Piaget and Jerome Bruner in the name of *Piaget theory of cognitive development* and *Bruner's theory of cognitive development* on the second issue. We can here mention, the various theories of learning, based on cognitivism, named as *Cognitive theories of learning*. Some of these popular theories may be named as *Gestalt's theory of insight*, *Levin's field theory*, *Tolman's sign learning* and a host of *Information processing theories*.

Insightful learning as a theory of learning evolved out of the attempts of Gestalt psychologists. However, the main initiation in this direction was taken by Kohler. He, for the first time, used the term *insight* for describing the learning of his apes. Through his number of experiments, Kohler concluded that an individual does not resort to blind trial and error mechanism while learning a way to solve his problem rather he reacts intelligently by using his insight, i.e. perceiving the situation in a gestalt form (as a whole), evaluating all the possibilities of finding solution in the given confronting situation and then arriving at an insightful solution.

Lewin's field theory, propagated by Kurt Lewin, considers learning as a process of perceptual organisation or reorganisation of one's life space or field (the space in which one moves psychologically as a person and not biologically as an organism). In doing so, he definitely acts purposefully by bringing desirable changes in the cognitive structure of his life space, i.e. using needed insight for perceiving things in the right manner and choosing the right alternative for reaching the goal.

Tolman's theory of learning advocates that understanding and map-making, rather than conditioning or building up S-R connections, is the essence of learning. An individual does not learn specific response to specific stimuli but tries to learn about the places where things actually lie. Actually, in the path of learning one is always goal-oriented rather response-oriented. One constructs a mental map of the environment for reaching one's goal. This map-making ability is nothing but the ability to see and choose any one of the many alternative paths available. Tolman's theory also highlighted the existence of latent learning, i.e. learning which remains latent or unobservable in the individual until a happening in the environment requires him to make use of this hidden stockpile.

Information processing theories try to throw light on the mechanism, how the human brain senses, processes and recalls information and thus equate the information processing of our brain with the working of a computer (involving its three aspects—*input*, *processing* and *output*). *The three stages information processing theory* propagated by Atkinson and Shiffrin considers learning as the outcome of the information processing carried out by human brain at the subsequent three stages namely—sensory registry, short-term memory and long-term memory. *Levels of processing theory* propagated by Craik and Lockhart postulated three stages—sensory, working and long-term memory for the processing of information. *Miller's Information processing theory* suggested by George A Miller, while accepting computer as a model of human learning, emphasises on (i) gathering and representing information, i.e. (i) encoding in the form of chunks (ii) holding information, i.e. retention and (iii) getting the information when needed, i.e. retrieval. After going through these three stages of information processing, a goal is

tested to see if it has been achieved or not. If not, an operation (involving three stages) is performed to achieve the goal and this cycle of test-operate is repeated till the goal is achieved. *Dual coding theory of information processing* proposed by A. Paivio attempts to provide equal weightage to verbal and non-verbal information processing in the task of learning. Accordingly, this theory maintains that there lie two cognitive subsystems namely *imagery* for the representation and processing of non-verbal objects or events and *logogens* for dealing with verbal entities. In learning, we must take care of these two subsystems properly.

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Humanism and Humanistic Theories of Learning

WHAT IS HUMANISM AND HUMANISTIC PERSPECTIVE IN EDUCATION?

Humanism has been defined in the free[dictionary.com](https://www.dictionary.com) as a system of thought that focuses on humans and their values, capacities and worth.

Historically, however as a new perspective and paradigm in the field of education and human behaviour, humanism emerged in 1960s with the efforts and viewpoints of the psychologists like Abraham Maslow, Carl Rogers, Gordon Allport and Malcolm Knowles (a proponent of androgogy). Regarding the viewpoint, Humanism as a philosophy or new school of psychology provided more importance and value to the human being by not considering him merely as a sophisticated machine or a victim of the conflict between the Igo and Id as proposed by behaviourists like Skinner and psychoanalyst like Freud. Humanists also differed from the cognitivists who consider man merely as an intellectual or creator with no consideration for the voice of the heart, human values and dignity. In contrast to the other prevalent schools of psychology and perspectives in education, this new school and perspective in human behaviour and education may be found to be characterised with features and characteristics discussed ahead.

BASIC CHARACTERISTICS AND FEATURES OF HUMANISM AND HUMANISTIC LEARNING

1. Here due emphasis is laid on human freedom, values, dignity and potential.
2. People do not act as a mere machine or rational being but demonstrate a lot of intentionality and values in their behaviour and learning.
3. Human being should be considered as a purposeful being, capable of adapting himself to his environment and choosing his own course of action in order to achieve his own selected goals. These goals may be as simple as the satisfaction of a common physical need or as lofty as the attainment of self-realisation or personal fulfilment.
4. We must give due regard and weightage to the freedom of choice, expression and free will among the human beings in organising learning experiences and providing opportunities to them for their education and development.
5. It is essential to study the person as a whole for knowing and understanding him as a human being. The study of his goals, motives, interests and attitudes, values and ideals, ways of learning and behaving should be studied well for providing opportunities to him for his living and development.
6. Human nature, interests and values should not be sacrificed for the sake of following traditions, establishing cruel discipline and using rigid methods of instruction.
7. Humanistic viewpoint or perspective on learning advocates to adopt:
 - i. Reasonable flexibility in following curriculum, methods of teaching, behaviour modification, assessment of the learning and behavioural outcomes of the learners.
 - ii. Individualisation of the teaching-learning of the students in tune with their basic humane nature and

individuality.

- iii. Sympathetic treatment and patiently hearing about the needs and problems of the learners, care and attention to them for their wholesome development and well being.
- iv. “Child-centered” approach in place of “subject centered” and “teacher dominated” methodologies and approaches.
- v. The policy of laying emphasis on positive reinforcement (e.g., rewards and praise) over the negative and aversive means (e.g., punishment and blame).
- vi. The scheme of continuous and comprehensive evaluation, for helping the children in their wholesome development and purposeful learning.
- vii. The policy of laying emphasis over the experiences and activities for helping the learners in their purposeful learning.

Humanistic learning thus provides an altogether new perspective quite different from the behaviouristic, cognitive and constructive perspectives for the children’s learning by making the task of their learning as humane as possible in terms of adopting humanistic attitude and humane methods of teaching and dealing with the children. As an illustration of the application of humanistic approach or viewpoints in the field of human learning, given below is a brief description of three theories named as (i) Rogers’ theory of experimental learning, (ii) Maslow’s humanistic theory of learning and (iii) Bandura’s social learning theory.

Rogers’ Theory of Experiential Learning

Carl Rogers in his book *Freedom to Learn for the 80’s* (1963) presented his famous *Theory of experiential learning*. It throws light on how the learners are able to learn and construct their own knowledge with the experience gained in their socio-cultural

environment through their self-initiated efforts. Let us know how Rogers developed the ideas related to his *Theory of experiential learning*.

In his search of the basic nature of learning, Rogers tried to distinguish two types of learning—cognitive and experiential. He termed *cognitive learning* as meaningless in itself unless it is used. Such learning is knowledge-based and thus may include the learning of vocabulary, multiplication tables, mathematical formulae, historical events and geographical facts. The *experiential learning*, on the other hand, is quite vital for one's progress and welfare. It is associated with the application of the acquired knowledge such as learning about engines in order to repair a car, learning psychological principles and methods in order to help the children get rid of bad habits. Thus, experimental learning is learner centered. That means it cares for the needs and wants of the learner. Carl Rogers has tried to enumerate these qualities of experiential learning in the following ways (Figure 5.1):

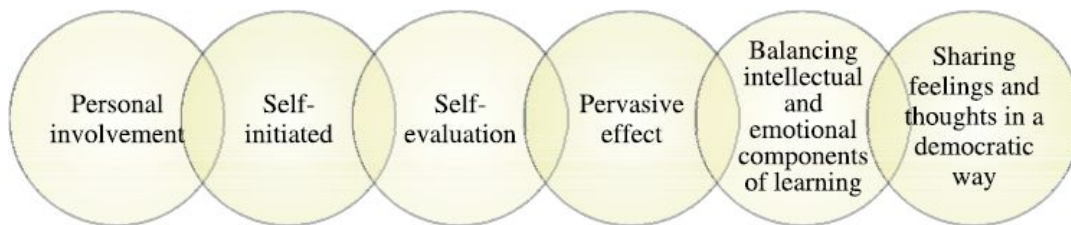


Figure 5.1 Rogers' theory of experiential learning.

1. Experimental learning is characterised by *personal involvement* of the learner.
2. It is *self-initiated*. The learner willingly takes initiative to engage in such type of learning.
3. It is characterised by *self-evaluation*. The learner himself is interested in evaluating the results and outcomes of such learning by applying it to the realisation of learning objectives, i.e. he wants to test his knowledge of repairing an electrical gadget by actually doing the repair.
4. It leaves a *pervasive effect* on the learner. Whatever is learned through this method can be made to use as and when he needs.

Rogers, as a humanist, believed in the strength and potentialities of human beings. According to him, all human beings have a natural inclination for learning and a desire to grow and progress. The role of teachers and parents is thus to help their children in their inherent desire for personal change and growth. Teachers as well as parents have to care for and facilitate such learning which helps children to grow and develop according to their requirements. The attempts of the teachers and the parents in realising the objectives of experiential learning may thus include the following provisions:

1. Arranging a favourable and positive climate for learning.
2. Helping learners to have clear-cut objectives and purpose of his learning.
3. Organising learning resources and making them available to learners.
4. Balancing intellectual and emotional components of learning.
5. Sharing feelings and thoughts with learners in a democratic way.

Thus, the primary responsibility of a teacher lies in his sincerity as a helper, a guide and a facilitator in the ongoing teaching–learning process. He is not there to provide mere information or demonstrate his skills in any area of information or fact-finding. Through many tools, materials and his own characteristic ways, a teacher has to play the role of a learning facilitator while following the doctrine of experiential learning. As Rogers points out, for realising this objective, a learner must at least take care of the basic conditions that facilitate learning. According to him, learning is well facilitated when:

1. Threat to the learner himself is minimum.
2. Learning resources and climate are in favour of the learner.
3. Learner fully participates in the learning process and has control over its nature and direction.
4. Learning process is primarily based on direct confrontation

with practical, social, personal or research areas.

5. Self-evaluation is the principal method of assessing progress or success, and
6. Learner realises the importance of learning and develops an openness as well as willingness to learn.

Thus experiential learning, in fact, is a learner-centered enterprise. Here the learner is the key figure in the ongoing teaching-learning process. The role of a teacher is to facilitate such learning. The primary responsibility of learning and change in behaviour of learner for his personal and social development lies on himself. However, he is to be properly helped, guided and kept on the proper track by the teacher as and when needed. It is important to help the learner realise the importance and significance of the learning task. If we could show him the benefit of learning a task, we can realise the objectives of learning. Therefore, according to Rogers, learning must be linked with the motives, goals and ideals of the learners. Accordingly, for a learner who is interested in becoming rich, learning of the subject and topics like economics, investment, financing, banking, etc., may be of great importance. Decidedly, he will take more interest in learning the topics and subjects that are helpful in realising his motives and ambitions, as compared to other students of his class who have significantly less interest in money matters.

So, it can be easily concluded that Carl Rogers, through his theory of experiential learning, advocates a humanistic and learner-centered approach to be adopted in classrooms by the teachers, with the sole purposes of making the learning process more humane and suitable to the needs and interest of the learners and turning it into more significant and purposeful events from the aspect of their personal and social growth and development by emphasising more on application than on theory.

Maslow's Humanistic Theory of Learning

Humanistic theory of learning propagated by Abraham Maslow owes its origin to his most famous concept of hierarchy of needs. While proposing this well-known concept, Abraham Maslow in 1954 stated

that human needs tend to arrange themselves in hierarchies of prepotency. In other words, the appearance of one need generally depends on the satisfaction of the others. They are closely related to each other and may be arranged from the lowest to the highest development of the personality. He proposed five sets of basic needs that can be arranged in a definite hierarchical order for understanding human motivation to learning and striving as shown in Figure 5.2.



Figure 5.2 Maslow's hierarchical structure of needs.

The needs shown in the above hierarchical structure may be briefly described level-wise as under.

- Level one: *Psychological needs* such as hunger, thirst, sex, sleep, relaxation and bodily integrity must be satisfied before the next level of needs.
- Level two: *Safety needs* call for a predictable and orderly world. If these are not satisfied, people will look out for the greatest degree of safety and security. If satisfied, people

will aspire to satisfy their needs of level three.

- Level three: *Belongingness and love needs* involve the desire for being affiliated, accepted, loved and getting affection from others especially by those who matters most in one's life.
- Level four: *Self-esteem needs* involve the desire for strength, achievement, adequacy, mastery and competence. They also involve confidence, independence, reputation and prestige.
- Level five: *Self-actualisation* is the full use and expression of talents, capacities and potentialities.

By putting the human needs in a hierarchical structure, Maslow tried to explain the mechanism of learning by concentrating on the problem of why and how we learn. He argued that needs determine the perception. One feels the need of learning or striving because he needs to satisfy his one or the other needs. In the process of satisfying of his needs, he may undergo experiences that may cause him to bring desired changes in his behaviour, i.e. causing him to learn one or the other ways of behaving or struggling for the satisfaction of his needs.

So, according to Maslow, *learning* may be termed as *the process of bringing desired changes in the behaviour of an individual for helping him to satisfy his one or the other needs depending upon his individuality and interaction with his environment.*

The nature and quality of the learning thus depends upon the nature and quality of the needs being satisfied and the resultant changes brought in the behaviour of the individual. While satisfying the lower order needs one may learn and acquire those behaviours that tend to satisfy his lower order needs, satisfying the higher order needs like belongingness and love, esteem and self-actualisation may help him imbibe and inculcate higher order values and qualities for the complete and overall development of his personality.

Maslow's theory of learning thus concentrates on the satisfaction of the needs of a learner, i.e. his natural desire and motivation to learn. This shows that Maslow's humanistic learning theory lays

more importance on the learner than the subject or the teacher. It helps in the development of individual tendencies and individualisation of education by aiming at development of the self-concept and self-esteem of the individual child for actualising his total self.

In this way, the theory ultimately aims at helping a child in his desired self-actualisation. Maslow considers it the supreme aim of human life and thus emphasises that a learning process, in any system of education, must always be directed to achieve its ultimate aim, i.e. to help the child in his self-actualisation. In the words of Maslow *A musician must make music, an artist must paint, a poet must write poetry, if he is to be ultimately at peace with himself. What a man can be, he must be. He must be true to his own nature. This need we may call self-actualisation.* This is why in Maslow's theory, learning is always aimed at and learning process is always designed for helping the child to become true to himself by developing himself according to his own nature, i.e. the self which he wants to be actualised.

Educational implications

The humanistic theory of learning proposed by Maslow may be attributed with the following educational implications.

1. In providing learning experiences, the children should be treated as human beings and not as a machine or objects for being run or moulded according to the wishes of the mechanists, i.e. the teacher.
2. Self is always great and hence due consideration should always be given for the development and actualisation of the self of the individual child. Therefore, due care should always be taken for the development of personal values like:
 - *Development of self-concept:* Child must know himself and as far as possible feel good about himself.
 - *Self-expression:* Child must be able to express himself fully in the manner he likes.

- *Self-actualisation*: Child must progress towards the pinnacle of self-development which Maslow terms as self-actualisation.
3. A child's learning behaviour must be guided through intrinsic motives, i.e. the satisfaction of his inner felt needs. A child learns better when his learning behaviour is inwardly driven and derives his reward from the sense of achievement or satisfaction after getting his one or the other needs satisfied through the outcomes of his learning.
 4. Child should never be given positive reinforcement, such as praise, or punishment in the form of criticism. Both praise and blame were rejected by Maslow simply due to adverse effects on the proper development of children. Children may get addicted to praise or any positive reinforcement and thereby may put their efforts only for receiving such positive reinforcements from their teachers instead of striving properly for their actualisation/development.
 5. Children should be moved towards self-government, self-regulations and autonomy, simply for the reason that informal control and self-discipline proves much better than the control by external forces.
 6. Teacher must pay due respect to the self of the children. They must help the children in the development of their self-esteem. It would be important for an individual child to feel good about himself (high self-esteem) and to feel that he can set and achieve appropriate goals (the satisfaction of his lower as well as higher order needs).
 7. Education must be made child-centered by giving the child a unique position according to his nature, i.e. the self. He must be made to feel responsible for his education and his own learning. The role of a teacher in any process of learning must be that of a good facilitator and not a disseminator of knowledge and therefore participatory and discovery methods should be followed instead of traditional didacticism (i.e. learn everything in parrot fashion teacher says).
 8. Humanistic touch should be essentially given to the

processes of education and learning. The learning environment and the behaviour of the teacher must be quite humane to the children. It should cater to the satisfaction of children's basic needs particularly for the children's affective (or emotional) needs. The children should be made to feel positive about themselves.

9. Development of human potential and higher values of life should always be paid due consideration in any scheme of education and learning. The attainment of material goals (satisfaction of lower order needs) should not be over emphasised. The development of the values and qualities essential for the satisfaction of the need of belongingness and love, self-esteem and self-actualisation, etc. should always be aimed at and given due recognition as the higher goals of human learning and education.

Bandura's Social Learning Theory

Observation of other's behaviour may play a leading role in learning and acquiring various things concerning one's environment. The cognitive psychologists who appreciate the role of observation in learning are termed as *social psychologists* and the theory of learning they propagate is known as the *social learning theory*. Albert Bandura was a prominent American social learning theorist and the social learning theory is often designated as *Bandura's social learning theory*.

Introducing his theory Bandura (Lewin, 1978) writes:

We do not blindly respond to environmental stimuli. Rather, we pick and choose from many environmental options, basing our decisions on our own insights and past experiences. This we do through vicarious or observational learning, by incorporating and imitating the behaviour of those around us.

Observational or vicarious learning (learning through indirect experiences) rather than the learning based on direct experiences is thus the base of the *social learning theory*. The advocates of this theory emphasise that most of what we learn is acquired through simply watching and listening to other people. The children from the

very beginning keenly observe the behaviour of others, most commonly of the people nearest to them like parents, members of the family, teachers, the older members of society, etc. In turn, they try to imitate and do what they observe. The power of observational learning can be confirmed through laboratory experiments as well as through observation in our daily life. A child who sees his father throwing utensils around because he has not been served food of his taste, learns such behaviour and reproduces it in similar circumstances. He may also incorporate and imitate the behaviour of the characters he reads about in novels, hears about on radio or sees on TV or in movies. The people whose behaviour he observes and often imitates are known as models and observational learning is referred to as modelling.

Direct experiences undoubtedly constitute the most effective and powerful sources of one's learning, but the role of indirect experiences leading to observational learning can also not be underestimated. In many cases, they prove more desirable, less expensive and more beneficial than the direct experiences. Commenting on this aspect Bandura (1977) writes:

One does not teach children to swim, adolescents to drive automobiles, and novice medical students to perform surgery by having them discover the appropriate behaviour through the consequences of their successes or failures. The more costly and hazardous the possible mistakes, the heavier is the reliance on observational learning from competent examples.

Observational learning can thus provide extra dimensions and opportunities for the learners in addition to their learning through self-experience and direct involvement with environmental consequences. It has certainly reduced the need of an individual going through every experience himself and thus helped him to learn from the examples of others.

How does learning take place? According to the *social learning theory*, one learns through observations by incorporating and imitating the behaviours of others perceived as models belonging to one's social environment. According to Bandura (1977), the following processes or steps are usually involved in this kind of learning:

1. *Attending to and perceiving the behaviour:* In this step the

learner is made to observe the behaviour of the person acting as a model. Here the total behaviour or a particular aspect of it may attract attention and become the subject of close attention.

2. *Remembering the behaviour:* In this step, what the learner observes is stored in his memory in the form of mental images.
3. *Converting the memory into action:* In this step, a behaviour observed and remembered by the learner is analysed in terms of its acceptability to the learner with reference to the demands of his self and his environment. It is transformed into action afterwards and thus the observed relevant and accepted features of the model's behaviour are imitated by the learner.
4. *Reinforcement of the imitated behaviour:* In this final step, the behaviour of the model imitated by the learner is reinforced for proper adoption and further continuance.

Let us see how these steps may work in one's learning. Suppose a young girl happens to watch a T.V. programme concerning the preparation of some new dishes. She takes keen interest and is greatly influenced by the demonstration on the T.V. screen. She tries to keep in her memory all that she has observed on the screen and then enters her kitchen to convert the remembered observation into action. The new dishes are thus prepared by her in accordance with her observation of the demonstration on T.V. by home science specialist. Her learning of the preparation of the new dishes may then be reinforced by the response she gets from the members of her family who taste the new dishes.

In this way, social learning, i.e. learning through observation and modelling proves to be an effective means of learning many things concerning one's behaviour. How one displays love and anger, shows sympathy and prejudices, speaks and writes, dresses and eats, takes initiative or shies away, all depend upon what has been observed, remembered, imitated and reinforced in context of the vicarious or model learning as propagated by the *social learning theory*.

SUMMARY

Humanism as a philosophy and doctrine stands for a system of thought focusing on humans and their values, capacities and worth. The psychologists like Abraham Maslow, Carl Rogers, Gordon Allport, Albert Bandura and Malcolm Knowles (a proponent of androgogy) are regarded as the main propagators and theorists in the field of humanism. Humanism credits more importance and value to human being by not considering him merely as a sophisticated machine or a victim of the conflict between the Igo and Id as proposed by behaviourists like Skinner and psychoanalyst like Freud. Humanists also differed from the cognitivists who consider man merely as an intellectual or creator with no consideration for the voice of the heart, human values and dignity.

With regard to the application of humanism in the field of learning, Humanistic learning may be seen to provide an all together new perspective, quite different from the behaviouristic, cognitive and constructive perspectives for the children's learning by making the task of their learning as humane as possible in terms of adopting humanistic attitude, humane methods of teaching, dealing with the children. As examples of the theories of humanistic learning we may mainly quote the names of the theories propagated by Carl Rogers, Abraham Maslow, and Albert Bandura.

Experiential learning propagated by Rogers tried to emphasise on the application of knowledge instead of a mere knowledge-acquiring learning known as *cognitive learning*. The application of knowledge is more significant from the viewpoints of a learner than merely the acquisition of knowledge. Experiential learning is designated as learner-centered and is more famous for its humanistic touch among the theories of learning.

Humanistic theory of learning propagated by Abraham Maslow owes its origin to his most famous concept of hierarchy of needs. According to him the needs of human being may be arranged from the lowest to the highest development of the personality. They are closely related to each other and the appearance of one need generally depends on the satisfaction of the others. Learning, according to him, may be termed as a process of bringing needed

behavioural change in the pursuit of the satisfaction of one or the other needs of individual depending upon his individuality and interaction with his environment. This is why through humanistic approach, this theory of learning is always aimed at arranging the learning process in a way to help a child become true to himself by developing him according to his own nature.

Humanistic theory of learning brought by Albert Bandura is known as *social learning or observational learning theory*. According to him learning is very much helped by experiences available in one's environment. It starts with the observation of one's behaviour perceived as model on the part of an individual. The observed behaviour is well imitated and then get practiced and reinforced for being learned by him for his use needed in future.

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Constructivism and Constructivist Learning

INTRODUCTION

Constructivism is relatively a modern viewpoint or new philosophy emerged in the field of education and psychology. It has provided an altogether new direction for our understanding to how a child learns and develops intellectually. The philosophy of constructivism has been responsible for giving rise to the concept of constructivist learning. Actually, what we term as *constructivism* may be found to represent a paradigm shift from education based on behaviourism to education based on cognitivism. Behaviourism and behaviouristic theories of learning have been responsible for giving rise to our traditional system of education, instruction and learning. In this system, knowledge or skill is directly stored in the minds of the students through lecture or demonstration. Most of the time, students remain passive listeners or silent spectators. They are later required to reproduce or re-represent the reality of the facts communicated to them by the teacher. Learner in this system is the least bothered about where the knowledge has been communicated from. He has to simply receive, revise, practice and then reproduce it in the form and shape it is communicated to him. Constructivism as a philosophy and ways of learning is totally opposed to the system propagated by behaviourism. It assumes and pleads that the learners should play an active role in the process of learning or cognitive development by constructing their own knowledge on the basis of their past experiences and their present interaction with the environment. The belief that a learner can learn only when he is able to construct the required knowledge by himself individually or socially is thus the main focal point of the philosophy of constructivism.

HISTORICAL EVOLUTION OF CONSTRUCTIVISM AND ITS TYPES

As a basic philosophy underlying human learning, the roots of constructivism may be traced to the philosopher Giambattista Vico belonging to 18th century, who emphasised that humans can understand only what themselves have constructed or learned. Later on, John Dewey, the famous educational practitioner and philosopher, emphasised the role of experience in education by asserting that *Education is a process involving continuous reconstruction and reorganisation of experiences*. The process of such continuous reconstruction and reorganisation of experiences needed for the development of a child later on paved the way for Jean Piaget (the famous child and cognitive psychologist) to propose his theory of cognitive development and constructivist learning by coining the notions like cognitive structure, assimilation, accommodation and equilibrium, etc. Later on, the psychologists and scholars like Lev Vygotsky (the famous Russian psychologist), Jerome Bruner (the famous American cognitive psychologist), and Ernest Von Glaserfeld (a German psychologist), provided their own viewpoints and explanation for the development of ideas related to constructivism and constructivist learning. The approaches adopted for propagating their constructivism have given rise to a number of types of constructivism known as below:

1. Individual constructivism propagated by Swiss psychologist Jean Piaget.
2. Social constructivism propagated by Russian psychologist Lev Vygotsky.
3. Radical constructivism propagated by German psychologist Von Glaserfeld.
4. Cognitive constructivism (A blend of individual and social constructivism) propagated by American psychologist Jerome Bruner.

Let us try to know about them one by one.

JEAN PIAGET'S INDIVIDUAL CONSTRUCTIVISM

Before Piaget, a few cognitive psychologists proposed their information processing approach for explaining the mechanism of knowledge construction by the individual minds. They argued that knowledge construction begins with the sensory input of information or knowledge in the human mind. The human mind as information processing system converts sensory input into symbol structures (propositions, images or schemas), and then processes (rehearses or elaborates) those symbol structures so that knowledge can be held in memory and retrieval. In such a way, according to information processing theorists, individuals try to reconstruct outside reality by building accurate mental representations (within their minds) that usually reflect *the way things really are*.

Piaget raised his voice against such non-constructive and non-creative aspect of constructivism by asserting and proving that knowledge is not a mirror of reality but rather an abstraction that grows and develops with cognitive activity. He emphasised his views on this account in the following words.

Knowledge is not a copy of reality. To know an object, to know an event is not simply to look at it and make a mental copy or image of it. To know an object is to act on it. To know is to modify, to transform the object, and to understand the process of transformation, and as a consequence to understand the way the object is constructed. (Piaget, 2003, p. 5).

In this way, Piaget successfully argued that knowledge acquisition occurs through knowledge construction. But knowledge construction is not so simple or automatic process as said by information processing theorists. It is true that the task of knowledge construction is executed in the minds of the individuals but it is not done by passive reception of transmitted information (sensory input), but by the active interaction with objects and ideas. The nature of this interaction, according to Piaget is an adaptation involving three mental processes named as *assimilation*, *accommodation* and *equilibration*.

In understanding a new thing, the child first attempts to know about it with the help of his past experiences (assimilation) but when he fails to do so, it creates a stage of dis-equilibration in his mind. As

a result, he tries to learn new ways of understanding and doing this (accommodation). It makes him seek equilibration or adjustment in terms of knowing the new thing or doing new task by constructing knowledge himself through the cognitive processes involving, assimilation, accommodation and equilibration.

According to Piaget, therefore, learning occurs as a product of the knowledge construction process carried out internally in the minds of individual through dynamic interaction of the individual and the environment by means of the process called self-regulation or equilibration (helped by assimilation and accommodation to bring needed changes in the cognitive structure of the individual).

It may be noted here clearly that Piaget's constructivism is less concerned with *correct* representation and more interested in meaning as individual constructs for his adaptation. It may be much clear to you through the following example taken from Woolfolk (2004, p. 222).

A young child who has never been to the hospital is in her bed in the paediatric wing. The nurse at the station down the hall calls over the intercom above the bed, "Hi Chelsea, how are you doing? Do you need anything?" The girl looks puzzled and does not answer. The nurse repeats the question with the same result. Finally, the nurse says emphatically, "Chelsea, are you there? Say something!" The little girl responds tentatively, "Hello Wall-I'm here".

In this example, as Woolfolk comments *Chelsea*, the small girl, encountered a new puzzling situation — a talking wall. She has no prior experience as such and her existing cognitive structure does not permit her to derive the correct representation of the reality. She tries to construct her own knowledge based upon her prior knowledge and existing cognitive structure. The sound is coming from a particular side, the wall is persistent and she now makes sure that the wall is talking to her. In this way, *Chelsea*, makes use of what she knows and what the situation permits her for constructing her own knowledge by least caring whether it is the representation of the reality or not.

Accordingly, in Piaget's constructivism, knowledge is constructed by reflecting on and coordinating one's own conditions or thoughts, not from mapping external reality. In addition, the constructivism

propagated by Piaget, focuses on individual knowledge, beliefs, self-concept, or identity, that is why it is referred to as individual constructivism. Here the knowledge is constructed by the individual himself quite independently without seeking help from others (like *Chelsea* in our example) purely based on the self-perception and prior knowledge or experiences. It is also sometimes called as psychological constructivism simply on the basis that construction of knowledge is purely the matter of one's psyche and psychological life. The mental and emotional state as well as the available cognitive structure helps the individual to construct the knowledge himself. In addition to Piaget's approach naming to construct knowledge as individual constructivism and psychological constructivism, some psychologists have also named it as *First wave constructivism* or *Solo constructivism* with the due emphasis that Piaget was the first to be credited for laying foundation for the constructivism and constructivist views of learning.

VYGOTSKY'S SOCIAL CONSTRUCTIVISM

Lev Vygotsky (1896–1934), the famous Russian psychologist, brought a type of constructivism known as *social constructivism* quite distinctive from the *individual constructivism* of Piaget. Piaget's constructivism was merely the handy work of individual's independent efforts for constructing knowledge by himself without providing any significance to the social interaction and activities. Vygotsky, on the other hand, in his approach to constructing knowledge, provided immense weightage to social interaction, cultural tools and activity by accepting them as the main instruments for shaping individual development and learning. Because of relying heavily on social interactions and the cultural contacts to explain learning, Vygotsky constructivism is usually referred to as *social constructivism* and the viewpoint he emphasised for such constructivist learning. Let us try to highlight the main ideas and essence propagated by him in his theory with the help of Figure 6.1 below:

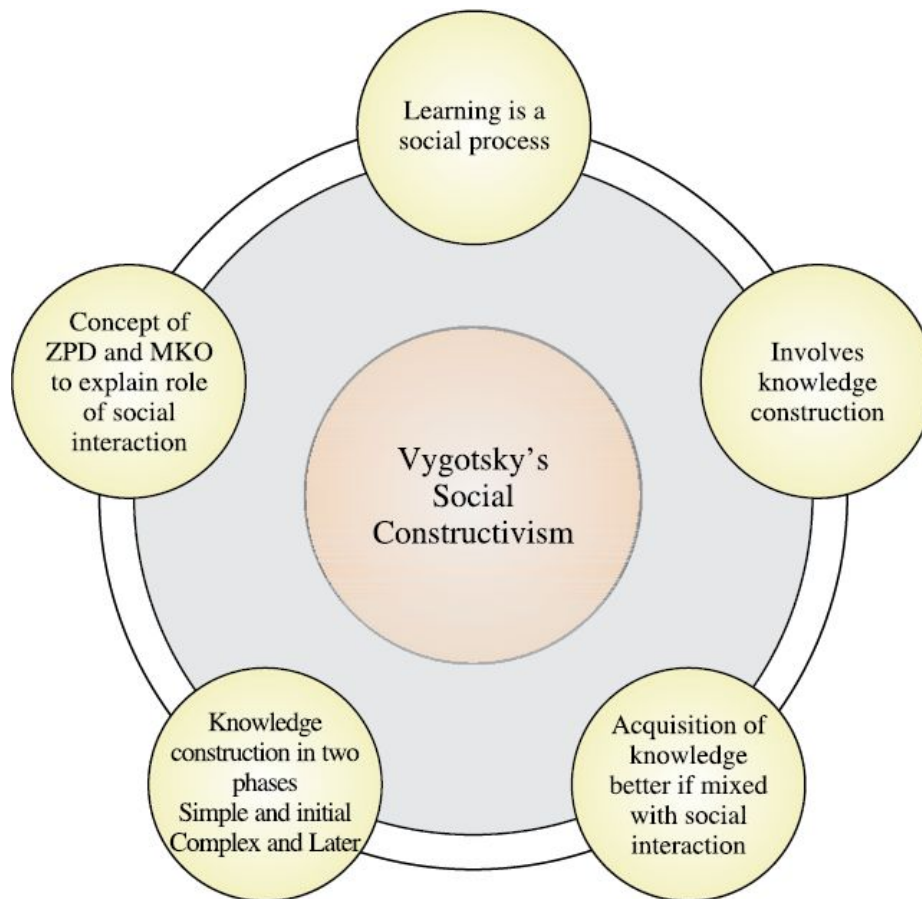


Figure 6.1 Vygotsky's social constructivism.

1. Learning is a social process and it can be carried out the best in a social environment.
2. Learning involves knowledge construction and this knowledge construction task should be essentially carried out on a 'social plane'?
3. Knowledge building or acquisition on the part of an individual is helped much if it involves his interaction with two or more people, his elders or peers, by making use of the social interaction tools like language discourse and social context.
4. Knowledge construction task may be viewed completely in terms of its two phases—(i) Simple and initial phase and (ii) Complex and later phase.
In its first phase, the experiences a child encounters

spontaneously in his day-to-day life, social interaction and cultural exchanges, help him to construct knowledge involving essential simple spontaneous concepts. The construction of knowledge on his part here is absolutely based on his own reflections on everyday experience. It is thus his own effort for understanding his world.

In the second phase, the knowledge construction task is carried out on a relatively high level. The simple spontaneous concepts developed by the individual can provide him as an essential base in the form of pre-existing conceptions for the acquisition of higher order concepts and knowledge. The task here is not executed independently by the individual but he is helped and guided by an adult or experienced peer to construct knowledge for the development and progress of himself. Vygotsky in this way was not against the struggling on the part of an individual to construct knowledge independently without expecting any help from his elders or peers. But he was of the opinion that individual constructivism can only help an individual in building some preliminary or simple concepts and the higher concepts needed for his proper development can only be resulted through social constructivism-interaction and guidance from the adults and peers.

For explaining the role of social interaction, culture and guidance of the elders in the construction of knowledge on the part of a child Vygotsky, coined two terms namely ZPD and MKO. Let us try to know what Vygotsky meant by these terms:

More knowledgeable other (MKO): The term more knowledgeable other (MKO) is somewhat self-explanatory; it refers to someone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. Although the implication is that the MKO is a teacher or an older adult, this is not necessarily the case. Many times, a child's peers or an adult's children may be the individuals with more knowledge or experience. For example, who is more likely to know more about the diversified application of a mobile

phone, tablet or recently loaded video game between the children and their parents?

Zone of proximal development (ZPD): A second aspect of Vygotsky's theory is the idea that the potential for cognitive development depends upon the *zone of proximal development (ZPD)*. This is an important concept that relates to the difference between what a child can achieve independently and what a child can achieve with guidance and encouragement from a skilled or more knowledgeable partner. (Figure 6.2)

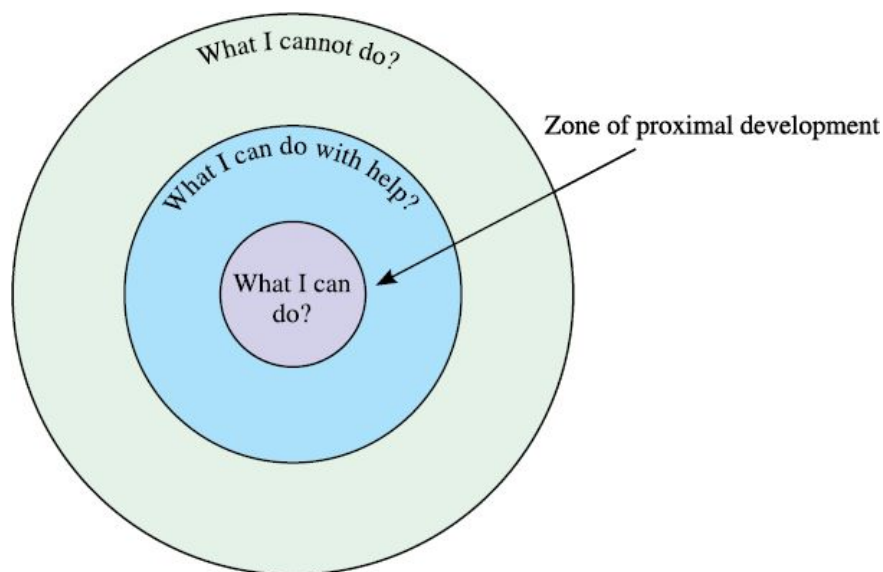


Figure 6.2 Zone of proximal development.

In this way, *Zone of proximal development (ZPD)* actually represents that zone or area where a child can solve a problem with the assistance (scaffolding) of some other more knowledgeable individual (an adult or more able peer). Proximal simply means 'Next'. It carries two meanings. The one is for the child in his task of problem solving or behaviour modification. The person lying next to him in knowledge and experience (superior) thus may help a lot. He can learn and develop himself intellectually and socially more in supervision or collaboration with the adults or peers. In its second meaning, the term *proximal* or *next* conveys that the key to taking the learner on the path of cognitive and social development on the part of we adults is to know well in advance what lies in that person's

ZPD—to what extent he can be helped to go ahead on the path of his cognitive and social development depending on his existing potential. The ZPD of children according to Vygotsky depends on a number of factors like age, their individuality, the differing nature of the impact of home and family, society and culture in which they are brought up, etc. The circumference of the children gets widened as they advance in their age, get opportunities for learning and are exposed to wider social and cultural experiences. Taken together, the MKO and the ZPD form the basis of the scaffolding component of the cognitive apprenticeship model of instruction. In this regard, Vygotsky explained that when a student is at the ZPD for a particular task, providing the appropriate assistance (scaffolding) will give the student enough of a “boost” to achieve the task. Once the student, with the benefit of scaffolding, masters the task, the scaffolding can then be removed and the student will then be able to complete the task again on his own.

In this connection, Shaffer (1996) has provided an illustration of a young girl who is given her first jigsaw. She alone performs poorly in attempting to solve the puzzle. Her father then sits with her and describes or demonstrates some basic strategies such as finding all the corner/edge pieces and provides a couple of pieces for the child to put together herself and offers encouragement when she so does. As the child becomes more competent, the father allows the child to work independently. It is called social learning, learning through cooperative or collaborate dialogue between a child and the more knowledgeable others, that accounts for most of the cognitive and social development of the children.

In this way, Vygotsky, while propagating his theory of social constructivism clearly emphasised that knowledge construction is an active process of deriving meaning from the variety of experiences lying in one's social and cultural environment and the children learn the best by taking sense of something on their own with the adults (or more able peers) as a guide to help them along the way.

VON GLASERFELD'S RADICAL CONSTRUCTIVISM

Von Glaserfeld (born in 1917 in Munich, Germany, and later on settled in USA) propagated a kind of constructivism known as *radical constructivism*. He coined the term 'radical constructivism' in 1974 using it to imply *going to the roots* or *uncompromising*. In his approach to constructivism, he was more influenced by Jean Piaget (the Swiss child psychologist) by crediting him as the real inventor of constructivism. He very much appreciated the Piaget's concept of adaptation or equilibration (involving assimilation and accommodation) for helping the child to construct his own reality of the world.

In propagating his theory, he introduced his radicalism (strong views and convictions) quite uncompromising with the contemporary approach for understanding the reality. He was quite opposed to the existing *realist approach* to knowledge construction on the part of students. The *realist approach* was concerned to present the content or communicate the knowledge to the student which he is supposed to receive (know or learn), process and retrieve the way it was communicated to him by the teacher or elders (through its construction in his own way). Von Glaserfeld emphasised that it is nothing but simply a reproduction of what is being received by the child. There is nothing like active participation, or something like construction of knowledge by the child in such process of teaching and learning. Forwarding his theory of radical constructivism, Glaserfeld provided few basic principles stated below for the act of constructing knowledge by the children on their own.

1. The learner should actively construct the knowledge instead of receiving and reproducing it passively.
2. The child should try to organise his experiences for constructing knowledge with the help of his cognitive abilities required for the adoption and equilibration (Piaget's concept).

3. One's going to the roots is quite helpful in constructing new knowledge or learning a new concept conveying clearly that the child's existing ideas about a given subject greatly influence his subsequent learning about those subjects.
4. Child's belief about the things and events present in his environment are constructed rather than received.

In this way, Von Glaserfeld, through his theory of *radical constructivism* tried to point out that knowledge construction is individualistic; each individual interacts with his experiential world and, as a result, tries to construct knowledge within that world with his own way. Regarding the role of language and social environment in the knowledge construction, Glaserfeld pointed out that language and social environment cannot be given to the learner, but it must (like knowledge) be generated by the learner. However, the task of the construction of knowledge is better performed in a social environment because of its spontaneous impact on the learning process. Von Glaserfeld's approach to constructivism construction or learning on the part of children also carries out some rudiments of *social constructivism* as he accepts the impact of social environment and experiences on the child's knowledge construction process. He, therefore, emphasises that child can learn through the experiences given to him in the social environment of a class, but for the better execution of this task, he should be helped in his understanding of new things by constructing knowledge or gaining new ideas instead of pouring contents (already constructed knowledge) in his mind.

BRUNER'S COGNITIVE CONSTRUCTIVISM

Jerome Bruner, a cognitive psychologist, is also credited for propagating the views related to the philosophy of constructivism. His constructivism is considered a blend of both individual and social constructivism.

In his approach, Bruner asserts that a child can acquire useful knowledge only when he is provided with the opportunities of constructing or discovering it by himself through his independent interaction with the environment or assisted by some guided attention and attempt on the part of some elders. He named this type of learning as *discovery learning*. In such type of knowledge construction process or self-learning according to Bruner, the learner must be active, he must go ahead for identifying key principles for himself by playing the role of an independent enquirer and discoverer of the knowledge. He should refrain himself from accepting what is being told, presented and explained by the teacher unless he is convinced about the truth and existence of such knowledge.

Emphasising on the key role of learner for constructing and discovering the knowledge, Bruner does not forget at all, the role of parents, teachers, and elders in assisting the learner in his mission. According to him, learner is not always alone in the knowledge construction task. He may be usefully assisted and guided by those who are more knowledgeable. In his *discovery learning and concept attainment model*, Bruner expects from the teacher to present examples and the student to work with examples until students are able to discover meaning from the presented facts or gain useful knowledge. Bruner also points out that in the knowledge construction or discovery task the students may work in two different ways. In one, they work on their own to very great extent by interacting with their environment and manipulating things by themselves (a sort of individual approach to constructivism) and in the other named as *guided discovery* in which he is helped and guided by his teacher or elders in his mission.

Actually, while propagating his views about *discovery learning* (the process of constructing or discovering knowledge) by child, Bruner anticipated and realised a host of obstacles and difficulties felt on the part of learner in his self-discovery path specially in learning new and complex tasks or concepts. Moreover, unlike Piaget, he realised well the importance of social interaction, social experiences, and cultural influences on the knowledge construction task undertaken by an individual learner. He has highlighted such impact well in his book, *The Culture of Education* by emphasising that *culture shapes the mind, and it provides us with a tool kit by which we construct not only our worlds but our very conceptions of ourselves and our powers* (Bruner, 1996, p. X).

Further advancing his conviction about the role of culture in assisting one in his learning or knowledge construction process, he felt that the information processing view of the mind (for the construction of knowledge) was adequate to explain how the mind works. Consequently, he viewed the nature of the mind in cultural terms by pleading that although the meanings of the things or events are in our mind, the origins as well as their meanings are in fact lie in the culture and social experiences. We can very well realise that how Bruner's such ideas are speaking about the fundamental ideas and principles related to *social constructivism*.

In this way, the thinkers like Piaget, Vygotsky, Von Glaserfeld, and Bruner worked towards bringing their own ideas and theories propagating their own constructivism to explain the process of knowledge construction or learning on the part of the learners in an individualised or group learning situation. The differences between their approaches are more apparent than real. Actually, the knowledge belongs to the knower who owns it. He has to struggle for its acquisition. He can be more successful in terms of its useful gaining if he better understands its meaning for its grasping and application. He can be very good at it if he actively engages in knowledge gaining process. He can be helped in this task directly or indirectly by social and cultural forces/tools existing in his environment. For example, the language and guidance provided by the elders may prove quite valuable to him in his knowledge

construction or learning task. In this way, although the learning or knowledge construction task is individual phenomenon, yet it can be usefully organised and helped in the mission of knowledge construction task by the social and cultural experiences, influences, and guidance provided by the teachers and elders. The essence of constructiveness thus lies in arranging the social and cultural forces for helping the individual minds to remain usefully engaged in the knowledge construction task for their desired individual development and welfare of the society.

CONSTRUCTIVISM DEFINED

Constructivism as a philosophy and approach adopted for learning and gaining knowledge on the part of learners has been variously defined by authors and scholars. Let us discuss a few definitions in this respect.

1. **Bruning, Schraw and Ronning (1999):** The term constructivism more often emphasises *the learners contribution to meaning and learning though both individual and social activity*. (p. 215)
2. **Woolfolk (2004):** Constructivism represents ä view that emphasises *the active role of the learner in building, understanding and making sense of information*. (p. 323)
3. **Naylor and Keogh (1999):** Constructivism represents an approach embedded with the central principle that *learner can only make sense of new situations in terms of their existing understanding*.
4. **Jenkins (2000):** *Constructivism of different persuasions hold a commitment to the idea that the development of understanding requires active engagement on the part of the learner*.

IMPLICATIONS OF CONSTRUCTIVISM IN RELATION TO LEARNERS, TEACHER AND TEACHING–LEARNING PROCESS

A close analysis of the above-mentioned definitions and the discussions carried out earlier in this chapter may lead us to conclude about the implications of constructivism in relation to learners, teacher and teaching–learning process in the way outlined below:

1. Constructivism focuses on knowledge getting or knowledge construction process rather than the product of knowledge directly communicated to the learners as happens in traditional classroom teaching based on the theory of behaviourism.
2. It requires that the learners must take active part in the knowledge gaining process rather than being passive recipients of information or knowledge. The constructivism thus mainly concerns with shedding light on the learners as key figure in the learning process rather than in pulling the knowledge from the teacher.
3. As an active enquirer or discoverer of the knowledge, the students should try to infer their own meaning and construct their own knowledge while interacting within their classroom or social environment.
4. Constructivism argues and demonstrates that a learner better learns when he is given opportunities to construct or discover the knowledge by himself.
5. In deriving their own meanings and constructing their own knowledge at the time of their encounters in a particular teaching–learning situation, students may be generally found to make use of their prior knowledge and experiences as an essential tool for serving their purpose and since they differ in their stock of prior knowledge and experience as well as in its processing, it is not unusual on their part to demonstrate a wide variations in their output of

meaning derivation or knowledge construction.

6. Although constructivism puts much emphasis on constructing or discovering the knowledge by the child himself by recommending the methods like discovery learning, inquiry approach, social investigation, etc. yet it does not advocate to underestimate or deny the role of social interaction, cultural tools like language, assistance, and guidance from the elders for enlightening the path of learners in the accomplishment of his learning goals.
7. It recommends the guided discovery or construction of the knowledge on the part of the children not only for keeping them on the right track, getting them benefited for their rich stock of experiences and knowledge by putting illustrations or engaging them in useful enquiry based discussion, but also for protecting them from the danger of drawing false and erroneous conclusions during their knowledge construction based upon their prior experiences, attitudes and beliefs (that may be overloaded sometimes by misconceptions and wrong information).
8. Constructivism discourages the use of *teacher-centred or subject-centred approach* in the process of teaching–learning. It rather tries to encourage all the methods and techniques that are learner-centred and encourage understanding and particularly the reflective level of teaching–learning. It lays heavy emphasis on independent learning or solving the problems on the part of learner so that he may be able to construct or discover his own knowledge by his own efforts on an individual or group basis. That is why it is not unusual that constructivism is associated with the methods and strategies like *discovery learning, inquiry approach, cooperative* and *constructivist learning* and methods or strategies involving discussion, conversation, and brain storming, etc.

In the light of the aforesaid nature, meaning and features of constructivism, we may term it as *a teaching–learning approach or*

philosophy that is focussed on laying utmost responsibility on the shoulders of a learner in deriving his own meaning and constructing or discovering his own knowledge from the things available in the existing teaching–learning encounter on an individual or group basis quite independently or supported through timely guidance or help from the teacher or elders.

IMPLICATIONS OF CONSTRUCTIVISM IN RELATION TO PLANNING AND DEVELOPMENT OF LEARNING EXPERIENCES

Constructivism, as we have discussed, is mainly concerned with the construction or discovery of knowledge on the part of a learner in his own way, with his own efforts single-handed or underplanned guidance available from the teachers, elders, or even peers who know more than him. It asks for the planning and organisation of a teaching–learning process in a way which is predominantly learner-centred and content-driven. The question arises what type of learning experiences to be shared with the learner to help him to construct his knowledge in his own way independently all alone or in group situation? The following points are worth mentioning in response to the planning and development of learning experiences in a constructive approach adopted in the teaching–learning process.

1. In this approach, planning and development of the learning experiences is not the entire responsibility of a teacher as it usually happens in traditional teacher-centred and content-driven classroom situations.
2. In constructivist approach, the work of planning and development of the learning experiences is mutually shared and negotiated. The teachers and students together make decisions about content, activities and approaches associated with the teaching–learning process carried out in the classroom or outside the classroom in other learning environments (Woolfolk, 2004: 437).
3. For providing opportunities to self-work in constructing or discovering new facts and knowledge, on the part of the students, the needed flexibility is to be maintained in terms of the selection of content material and development of the learning experiences. No fixed curriculum or content course is advisable in the adoption of constructive approach.
4. Instead of having definite and pre-determined fixed teaching–learning objectives (in terms of bringing specific

behavioural changes in cognitive, conative or affective domains), cognitive approach advocates and expects from the teachers to have a broad vision by setting goals, big ideas that may work as a base and guiding factor for the planning and development of appropriate learning experiences fitted in the framework of the philosophy of constructivism.

5. Learning experiences or activities are so designed for the adoption of constructivism approach as to provide enough scope for the learner in constructing knowledge or discovering the facts by himself.
6. Constructivism in its 'Social constructivism' form lays great emphasis on the role of social interaction, encounter and cultural tools like language and social activities for helping the child in building his knowledge, understanding new things, concept formation and discovering the facts in the needed supervision, guidance, and assistance of the teachers, elders, and knowledgeable peers. Consequently, it asks for the planning and developing adequate learning experiences in the form of (i) conversation with the teachers, elders, and peers, (ii) interaction and group discussion, (iii) group project, (iv) participation in social and community activities, etc.
7. Constructivism expects the students to construct their own knowledge by themselves. For this purpose, learning experiences are so planned as to create a state of disequilibrium in the minds of children. They should be provided with the task or problems, a little difficult, new and complex than the prior knowledge, experience and skills, etc. possessed already by them. In such problematic and puzzling situations, they may try hard to understand and reflect the new facts and ways of doing things. It will help them to derive their meanings and sense out of the things and events lying in their environment or teaching-learning situations.
8. The learning experiences and activities while adopting constructivism approach are so planned and developed as

to help in making use of the methods like discovery method, inquiry training, concept attainment model, investigation method, dialogue method (also called Socrates' method), cooperative and constructivism learning, etc.

9. Since prior knowledge and experiences on the part of learner are quite helpful for him to go ahead on the path of constructing and discovering the knowledge in his own way, it is therefore quite imperative in adopting constructivism as a philosophy of imparting instruction that the learning experiences provided to the children should be customised to their prior knowledge and experiences. Besides that the level of the learning experiences or teaching–learning encounters should be kept a little above so that the students may feel the necessity of reconstruction of their prior knowledge and experiences independently or in supervision or guidance of the teachers and elders.

LEARNING IN CONSTRUCTIVIST PARADIGM OR CONSTRUCTIVIST LEARNING

In its simple meaning, *constructivist learning* is the learning based on the philosophy and approach of constructivism. Our traditional methods of learning, specially those dominated by teacher-centred and subjected-centred approach are based on behaviourism. The learning and training experiences, methods and practices here are all dependent upon the theories of learning such as *Thorndike's connectionism*, *classical conditioning* and *operant conditioning*. The cognitivism as a philosophy and approach opposed the learning methods propagated by behaviourists. It brought the role of one's mind in intellectual functioning and constructing knowledge, understanding new experience and then assimilating it in its existing cognitive structure. The Gestalt methods of insightful learning, and cognitive learning methods propagated by cognitive psychologists like Piaget and Bruner (discovery learning, concept attainment model and inquiry-based investigation, etc.) may be cited as the valid attempts for creating the learning methods and approaches associated with constructivism. Apart from the Gestalt psychologists and other cognitive psychologists, Piaget and Bruner, John Dewey (Staunch believer in the role of experience in the construction of knowledge), Vygotsky and Von Glaserfeld also provided a solid base for the origin of constructivism learning by propagating their own views about constructivism.

CONSTRUCTIVIST LEARNING DEFINED

Constructivist learning originated from the philosophy of *constructivism* is the learning (a step ahead from cognitive learning of cognitive psychologists) that assumes that learners construct their own knowledge on the basis of their prior knowledge and interaction with their environment alone or in a group quite independently or assisted and guided by their teachers, elders and knowledgeable peers for attaining the desired learning outcomes in a teaching–learning situation.

ASSUMPTIONS AND CHARACTERISTICS OF CONSTRUCTIVIST LEARNING

The assumptions and characteristics inherent in constructivist learning may be broadly outlined as below:

1. Set of theories known as constructivist theories of learning differs from the behaviouristic theories of learning in the sense that these do not consider learning as a machine-like stimulus response mechanism or treat the organism as a black box. These are also one step ahead to the cognitive theories of learning. Cognitive theories recognise the importance of mind in making sense of the material with which it is presented. Nevertheless, it still pre-supposes that the role of the learner is primarily to assimilate whatever the teacher presents. Constructivist learning in its individualistic as well as social form strongly asserts that the learner is the key figure and thus needs to be necessarily involved actively in making sense of the material to himself either single handed or in a joint enterprise with the teacher.
2. The term constructivist learning in its broad and comprehensive form includes all types of learning and approaches that help a learner to construct or discover the facts and things related to his knowledge. He can do it all alone by interacting with his environment or making sense of the content material. The knowledge construction task on his part may also be properly executed in social encounters or it may be helped and guided by the teachers, elders and knowledgeable peers. Consequently, the learning termed as discovery learning, learning incorporating inquiry approach, investigation method, problem solving (individualistic learning) as well as learning incorporating discussion method or entering into a dialogue on the part of the teacher with the learner, project or activity-centred learning, cooperative learning, etc. all may be adequately

covered in the term constructivist learning.

3. As a characteristic feature, constructivist learning may be attributed with the following main epistemological assumptions for guiding its planning and organisation:
 - a. Knowledge is physically constructed by learners who are involved in active learning.
 - b. Knowledge is symbolically constructed by learners who are making their own representations of action.
 - c. Knowledge is socially constructed by learners who convey their meaning to others.
 - d. Knowledge is theoretically constructed by learners who try to explain things they don't completely understand.
4. Knowledge construction task guided by a constructivist theory is more or less an individual phenomenon in the sense that it is the individual who has to come forward for constructing his own knowledge or make sense of what is presented or faced by him in his environment or teaching-learning encounters. There lies wide individual differences in relation to making a sense or derive some meaning of the presented material or demonstrated activities to a number of students in a class. For example, in case we ask the students of a class to read about some concept from their text for coming up with their meaning or understanding, it will not be unusual to find out that it may differ from student to student. Here we can conclude that what the students read does not produce a single meaning (in spite of the fact that reading material is the same). The meaning derived by each one of them is their own meaning constructed by their individual self mostly based on their prior knowledge and experience.
5. *Constructivist learning theory* has a strong belief and conviction, supported by the solid research findings and day-to-day observations, that the best way to learn is to allow students construct their own knowledge instead of having someone construct that for them. An example here

may be helpful in proving this underlying belief of the constructivist learning.

Think of the time when you as a student were taught something by your teacher in a lecture-type classroom situation. Then contrast it against the time when you had to prepare to teach that something to the students of your class as a teacher. I think most of the time you will agree that you learned and understood the material better when you were preparing to teach the material. This is because here in this situation, you have constructed the knowledge and made a sense out of it by yourself.

6. Constructivist learning does not focus on single response or single solution to a problem since such fixation and rigidity may prove a great hindrance in deriving their own meanings and suggesting their own solutions to the faced problems. It therefore advocates for a flexible curriculum, and wide varieties in the teacher-student interactions and ways of learning and doing on the part of students.
7. *Constructivist learning theory* expects from the teacher to facilitate the knowledge construction process of his students as properly as possible. For this purpose, he first tries to access the entire behaviour of his students with regard to knowledge or skill that the student is supposed to acquire. He then wisely assists or leads him to his learning path enabling him to a large extent to build his knowledge by himself for developing needed understanding and application of the learned things.

EDUCATIONAL IMPLICATIONS OF THE THEORY OF CONSTRUCTIVIST LEARNING

Educational implications of the constructivist theory of learning may be broadly discussed as below:

1. The learner must be given due responsibility of taking charge of his learning. He has to construct or discover knowledge and derive meaning of the obtained information through his own initiative and efforts. This fact should be very clearly told and instilled in his mind.
2. *Constructive theory of learning* conveys that the task of the teacher is not to feed the ready-made material in the minds of the students. Knowledge gaining or construction from one's own initiative and efforts is more important than the mere receiving of the knowledge prepared or constructed by others. Therefore, teachers should refrain themselves in providing direct instructions or content material to the students rather than motivating and helping them in their knowledge construction task.
3. Whenever a concept is taught, teacher must search out his students' understanding and prior experiences about the concept for the necessary planning of its learning (by constructing knowledge related to this concept) on the part of the students. First, the students should be made to grasp the understanding of the concept on the basis of their prior learning or experiences about the concept. After that the task of its understanding must be put before them as a challenge. They must be provided essential environment for the needed understanding and reflection on the materials and experiences available for their reading or doing. In no case teacher should be in hurry to communicate his understanding or conclusion about the concept. Whether it is an independent effort of the individual learner or cooperative venture in cooperative learning, in all cases, the students should be helped for

knowing and discovering the meanings by themselves.

4. For leading the students on the path of the acquisition of new learning, solving difficult and complex problem or discovering the facts related to a concept, it is quite advantageous to put students in situations that might challenge their previous conceptions and create contradictions to encourage them on discovery path for their individual efforts or engage in discussion with their peers, teacher or elders.
5. While interacting with the students for helping them in the construction of knowledge and deriving the meanings from the presented content material or demonstrated practical activities and experiments, the teacher should have enough patience in dealing with the students. He must try to inspire and motivate them to play their role in this direction as an active and independent enquirer or discoverer of the knowledge. For this purpose, it is advisable to (i) wait long enough after posing a question so that the students have time to think about their responses and be able to respond thoughtfully by deriving their own meanings, (ii) allow enough time for students to discover on their own or to construct their own knowledge and understanding while learning something new.
6. The task of construction or discovery of knowledge and derivation of own meanings on the part of students needs a lot of flexibility in terms of the planning and organisation of learning experiences. Therefore, the use of constructivist learning calls for the elimination of a standardised curriculum.
7. Constructivist learning demands teachers to focus on making connections between facts and fostering new understanding in students by allowing, inspiring and guiding their students on their learning path. It expects from the teacher to tailor their teaching strategies to students' needs and responses and encourage them for being active partner in the teaching-learning process to carry out the necessary processes of thinking, analysing, interpreting

and constructing knowledge. For encouraging reflective thinking, creativity and constructiveness on the part of their students, for being engaged in the knowledge construction process, it is advisable to have a proper democratisation of the teaching–learning process. Instead of asking a fixed response question the teacher should rely heavily on the holistic presentation of the content, putting the open ended questions, elaboration of the responses and use of divergent thinking on the part of student causing multiplicity of responses. Moreover, there must be a proper flow of communication between the teacher and student and among the students for the needed conversation, help and guidance to keep the students always on the track of the required knowledge gaining path.

8. Since, students have to construct their own meaning and discover the knowledge on their own, constructivist learning outcomes do not fit in the traditional evaluation patterns. It is, therefore, necessary to maintain continuity and comprehensiveness in the scheme of evaluating the constructivist learning outcomes. As far as possible, care should be taken to combine the needed evaluation programs with high performance standards and make it a subject that encourages and leads the learners on their learning paths instead of merely measuring their learning output and assigning them grades, etc. In constructivist learning, there is thus emphasis on the elimination of grades and standardised testing. It calls for the flexible, comprehensive and continuous program for the constructive and creative output of the learners by providing timely assessment, motivation and assistance. It helps get learners engaged in the task of constructing and discovering knowledge by themselves.

SUMMARY

1. *Constructivism* has emerged as a new philosophy and modern viewpoint in the field of psychology and educational psychology after behaviourism and *cognitivism*. In the context of teaching–learning set up, it represents an approach or philosophy that is focused on laying utmost responsibility on the shoulders of a learner in deriving his own meaning and constructing or discovering his own knowledge from the things available in the existing teaching–learning encounter on an individual or group basis quite independently or supported through timely guidance or help from the teachers or elders.
2. The scholars and psychologists like Jean Piaget, Lev Vygotsky, Jerome Bruner and Ernest Von, Glaserfeld are credited to provide their viewpoints and ideas related to constructivism and constructivist learning giving birth to one or the other types of constructivism quite special and unique in itself.
3. As a beginner of the constructivism movement, Jean Piaget, the famous Swiss psychologist, is credited to bring a type of constructivism known as *individual constructivism*. Here the knowledge is constructed by the individual himself, quite independently without seeking help from others, purely based on the self-perception and prior knowledge or experiences. According to Piaget, the task of knowledge construction is carried out by the children through the help of three mental/ cognitive processes named as assimilation, accommodation and equilibration. In the construction of his understanding and knowledge about a new thing, first the child attempts to know about it through the help of his past experiences (assimilation), but when he fails to do so, it creates a stage of disequilibrium in his mind. As a result, he tries to learn new ways of understanding and doing this (accommodation), It makes him seek equilibration or adjustment in terms of knowing the new thing or doing new

task by constructing knowledge by himself through the cognitive processes involving assimilation, accommodation and equilibration.

4. Lev Vygotsky, the famous Russian psychologist, brought a type of constructivism known as social constructivism somewhat different from Piaget's individual constructivism. In his approach to constructivism he provided an immense weightage to social interaction, cultural tools, including language and guidance of the elders by accepting them as the main instruments for the construction of knowledge on the part of a child. To explain their role he coined two terms, namely MKO (more knowledgeable other—one's having more knowledge than the individual learner such as parents, teachers, elders and peers) and ZPD (Zone of Proximal Development—relating to the difference between what a child can achieve independently and with guidance and encouragement from a skilled or more knowledgeable one).
5. Von Glaserfeld, the German scholar, propagated a kind of constructivism known as *radical-constructivism*. Due to radical, i.e. strong views and conviction for the construction of knowledge on the part of children, quite different from the existing approach to knowledge construction, it was referred to as *radical constructivism*. It clearly emphasised that although a child can learn through the experiences shared with him in a social environment, but for the better execution of the task he should be helped in his understanding of the new things by constructing knowledge (instead of feeding the already constructed knowledge) in his mind.
6. Bruner, the American cognitive psychologist, is credited to introduce a type of constructivism known as *cognitive constructivism*. It is known to be a blend of both *individual constructivism* (proposed by Piaget) and *social constructivism* (proposed by Vygotsky). Advancing his views related to individual constructivism, Bruner put up the idea of *discovery learning*, i.e. providing opportunities to the individual learners for constructing or discovering the knowledge with their own independent efforts. In his views

related to *social constructivism*, he clarified that although the child should be encouraged for putting independent efforts for his discovery learning but there also lies every possibility of obstacles and difficulties faced by the learners in their self-discovery path (especially for learning new and complex task or concept) needing timely help and assistance from the knowledgeable ones or use of cultural tools.

7. *Constructivist learning* is a type of learning that is based on the philosophy and viewpoints of constructivism. In such type of learning learners are supposed to construct their own knowledge on the basis of their prior knowledge and experience alone or in a group quite independently or assisted and guided by their teachers, elders and knowledgeable peers for attaining the desired learning outcomes in a teaching–learning situation.
8. Regarding the implications of the philosophy of constructivism and the learning based on constructivism for the classroom teaching–learning, it can be emphasised that as far as possible, the learners should be given due responsibility of constructing or discovering the knowledge through their own initiative and efforts. Instead of feeding knowledge in the mind of students, a teacher should provide the opportunities to discover or construct but at the same time should be ready to help or guide them at the time of their difficulties especially while learning new and difficult concepts or skills.

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Cognition and Learning

MEANING OF COGNITION

In terms of its etymological derivation, the word *cognition* comes from the Latin word 'Cognoscere' meaning the act of knowing or perceiving. In the available dictionaries, however, it has been defined and explained as below.

1. **Dictionary.com (online)** has defined and explained it as below:
 - i. The mental act or process by which knowledge is acquired, including perception, intuition and reasoning.
 - ii. The knowledge that results from such an act or process.
2. **Webster's Ninth New Collegiate Dictionary (1988 : 257)** has defined and explained it as below:
 - i. The act or process of knowing including both awareness and judgement.
 - ii. The product of this act.

Explained and defined in this way, *cognition* may be adjudged as a process as well as product of knowing about one thing or the other existing in one's environment.

The question here may arise when a student is provided information and knowledge directly by a teacher through lecture method, i.e. telling about something then the knowledge/information gained through this mode may be included in the definition of cognition or not. The answer is simply 'No'. A process of cognition essentially involves one's own experience carried out through the use of one's senses, intellect or brain. It makes use of the process of sensation, perception and construction of knowledge on the part of the learners instead of receiving it through the direct transmission on

the part of a source of knowledge. Direct transmission provides the students purely a memory level of learning and acquiring the new information without the involvement of their cognitive abilities like thinking and reasoning, analysing and synthesising, generalisation and inference drawing or critical evaluation, etc. We cannot term such knowledge gathering process a cognitive process and also the product of such learning or acquiring the information or knowledge cannot be termed as *cognition*.

The process of *cognition* always involves the use of one's sensory and perceptual abilities, cognitive capacities for getting aware as well as taking judgement about a thing sensed and perceived by him. The acquisition of information or knowledge here thus does not rest at the memory level alone, but is necessarily carried out at one's understanding and reflective level. The knowledge thus gained through the process of cognition is properly understood and grasped by an individual for its proper use on the part of the learner. He is in a position to take his own judgement about its use and worth and can reflect on it the way he likes.

Understood in this way now we can provide an operation definition of the term *cognition* in the following words:

Cognition is a process as well as product of knowing about one thing or the other existing in one's environment at the understanding and reflective level. In other words, we can also term it as a process or product of acquiring knowledge at the understanding and reflective level necessarily with the use of one's sensory, perceptual and mental abilities.

ROLE OF COGNITION IN LEARNING

Cognition, as we have defined it, essentially involves a process of acquiring knowledge through one's sensory, perceptual and mental abilities. In its true sense it is nothing but the process of learning carried out at the understanding and reflective level. It is why more often cognition and learning are taken as awfully similar in terms of their processing as well as product. Learning of a thing in a useful way always requires cognition and taking cognisance of a thing involves the process or product of learning.

School of behaviourism and learning theories propounded on the philosophy of behaviourism, such as *trial and error theory*, *classical and operant conditioning*, etc. do not assign any substantial role for the cognition or mental abilities in the acquisition of knowledge or learning on the part of human beings. They consider learning either as a machine like stimulus-response mechanism or habit formation function. Such type of learning usually operates at the memory level and thus cannot be adjudged appropriate for its proper grasping and use in the desired way. As we know, this type of knowledge gathering or learning does not fit into our definition of cognition. It is also openly criticised, opposed and decried in the world of teaching-learning. Gathering knowledge in the absence of cognitive processing serves no useful purpose for the learner. It is a useless burden on the part of the learner. Knowledge is useful for the knowledge seeker only when he is fully capable of making its proper use. However it can be useful or serviceable only when it is acquired by the learner through his own efforts with the use of his own sensory, perceptual and mental abilities, i.e. through cognition input and processing. The cognitive theories of learning like *theory of insight* or *Gestalt learning*, as well as *theories involving information processing*, *constructivist learning* all support the notion that the true and proper learning in the human beings always involves one's cognition. The points mentioned below support this assertion:

1. According to Gestalt or insightful approach, one is helped

by his insightful thinking (cognition) in learning the solution to a problem similarly as Kohler's apes learned to pick up the bananas hanging on the top of the cage or lying outside the cage. A student's cognition in the form of perceiving the situation as a whole supported by his intellectual abilities helps him in finding the solution of a mathematical problem.

2. According to information processing approach we learn or gain understanding of a number of things lying in our environment by a particular cognitive process named as *information processing*. When one sees or hears something new, such input provided through his sense of sight and hearing travels to his mind/brain where it is being processed for its clear perception, i.e. deriving proper meaning. In this way, a cognitive process in the shape of information processing helps one in acquiring proper knowledge (learning) about a thing seen or heard by him.
3. According to constructive approach one can acquire knowledge or is helped in the learning of one or the other things by constructing knowledge through his own efforts (guided or supported by his cognitive abilities). Let us illustrate this viewpoint of constructivist learning in the light of the theoretical notions of constructivist

Jean Piaget. According to Piaget knowledge or cognition about one or the other things lying in one's environment, rests in the child in the form of one or the other schemas. In this way, he may have some funds of knowledge already lying with him in the form of previous knowledge (cognition) at the time of learning a new thing. This previous knowledge (existing schemas) helps him in the proper assimilation (acquisition) of the related new knowledge. However, when he encounters a totally new information for the learning for which he has no previous knowledge (schema in which new information can be assimilated) he gets engaged in constructing a new schema for its accommodation or understanding with the use of his cognitive abilities (the abilities related to cognition). In this way, the task of acquiring and understanding the new

information, i.e. learning according to Piaget is always facilitated and helped by one's own cognition and cognitive abilities. The more a child gets cognitively mature the more capacity and abilities he accumulates for understanding and learning new things.

Such assertion about the role of *cognition learning* may be clearly visible in our life when we find that whatever we want to learn in terms of knowledge, skills, and applications are always helped by the power of cognition (knowledge we already possess) as well as cognitive processes supported by our sensory, perceptual and mental abilities. Hence in the end we can conclude that cognition as a process or product always works for bringing positive results or outcomes for our learning.

SOCIO-CULTURAL FACTORS AFFECTING COGNITION AND LEARNING

Cognition (knowing and understanding about a thing) and learning (acquiring knowledge through experience or training) as we have seen are found to co-exist. Cognition, i.e. cognisance of a thing helps in its learning and learning adds to one's cognition. Both are also found to be a function of one's experience (direct or indirect) and social exposure (experience gained by a developing child through his interaction with the socio-cultural forces present in his environment) help him much in the task of cognition and learning. He understands and gains knowledge about the things, ideas and processes going on around him through the interaction and experience available to him in his socio-cultural environment. As a result, the processes and product of his cognition and learning are very much affected and influenced by a number of socio-cultural factors like home and family, school, community, mass media, cultural diversities and religion, etc. Let us see how such socio-cultural forces are responsible for affecting the cognition and learning of the developing children (Figure 7.1).

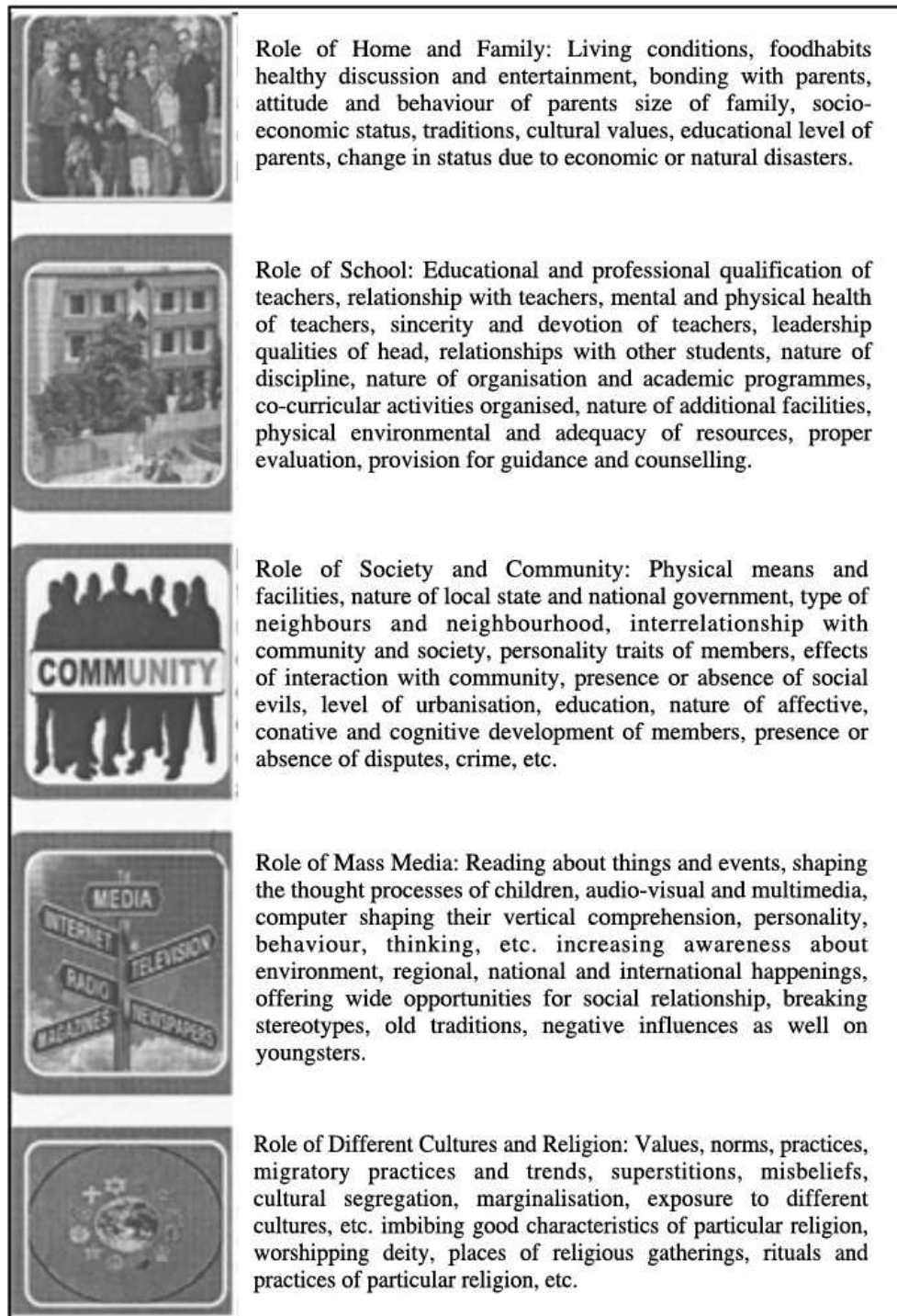


Figure 7.1 Socio-cultural factors affecting cognition and learning.

Role of Home and Family

Mother, father, siblings and other members of the family may be found to exercise great influence over shaping the cognitive structure and ways of behaving and learning of the developing children. This

influence casts a significant impact over their development in a positive or negative way depending upon the personality characteristic, behaviour and nature of interaction or relationships existing among the members of the family among themselves as well as with the other segments of the society. All the previous lessons regarding the shaping of behaviour and development of personality are well learned on the part of developing children in the company and direction of their parents, caretakers, siblings and other members of the family. How well a child grows and develops in the form of his physical, motor, mental/cognitive, emotional, social or moral development depends upon the type of favourable or unfavourable environment available for his living and developing at his home. The things and factors like below, present in one's home and family environment may play a quite decisive role in setting the course of child's cognitive, affective and conative development.

- The healthy or unhealthy living conditions, food habits, availability of nutritious and balanced diet, play and healthy entertainment facilities at home.
- Type of bond and relationship existing between parents.
- The attitude and behaviour of the parents and members of the family towards the child showing over-affection, partiality, neglect, hatred, prejudices, over-anxiety and over-security, strictness or carelessness, etc.
- The size of the family and birth order of the child.
- Relationships among the members of the family.
- Socio-economic status and position of the family in the society.
- The traditions, cultural values and ideals of the family.
- The education level of the parents, their interest and attention in bringing up of the children and their abilities and capacity for this purpose.
- The organised or broken homes.
- The individual behaviour, habits, temperament and other personality characteristics of the parents and other members of the family.
- The attitudes and ideals of the parents and members of the

family towards social norms, ethical, moral and human values.

- The changes introduced in the set up and status of the family on account of the extreme variations of the conditions like sudden losses in terms of human lives, natural calamities, economic disasters, etc. or gain in positive side like increase in wealth, social status and power equations, etc.

All of the above things and situations prevalent in the home and family environment cast a considerable impact in influencing and providing a definite direction to the growth and development of the child including his personality make-up and behavioural traits.

In homes, where the children get a desired stimulating and enriched environment for the development of their linguistic ability, communication skills, creative potential and mental faculties, they may be found proceeding well on the path of their proper language and cognitive development in comparison to those who are deprived with such facilities and congenial home conditions. Similarly, the children who are privileged to have conditions at their home quite congenial to their physical or motor development may be found to go far ahead in terms of the acquisition of motor skills and physical development in comparison to the children being deprived of such congenial conditions. Actually every child learns and acts what is observed and imitated by him through the behaviour of his parents, elders, siblings and other members of the family. Therefore, all what is there in child's behaviour and development with respect to his habits, temperament, emotional expressions, social traits, morality, etc. are mostly learned and reflected in his behaviour through the impact or influence of the home and family environment. The satisfaction of basic needs—physical and socio-psychological is very much essential for the proper cognitive, conative and affective development and adjustment of a child. As far as the home and family environment remains congenial and helpful for the child in the realisation of his desired needs, the child may remain on a proper track of his adequate adjustment and development but as soon as things drift on the other side the child begins to feel despair and

frustration, become maladjusted to his self and the environment and consequently may lag behind in his cognitive, conative and affective development or may learn maladapted or socially undesirable behaviour in the chain of his doomed future. In this way, the uncongenial or defective home and family environment may prove not only a great obstacle in the proper development of children but it may also provide all what is needed for the full growth and nourishment of unsocial or immoral behaviour. The development of proper or improper and good or bad behaviour thus may have its origin as well as its further stimulation and reinforcement from what is available to it from the family and home environment.

Role of School

The other most important social agency to influence the development and behaviour of the adolescents after the home and family is the school. It is the centre of learning for the child, and therefore the learning experiences (formal or informal) he gets inside the school that control and shape his behaviour. There is no exaggeration in saying that a man can be identified and known through the names of the institutions from where he gets his education. It is also true that every institution or school has its own impression or reputation for being relatively good and bad. These are labeled so on account of what is being done there through their curricular and co-curricular activities and the ways of administration for the growth and development of the personality of their students making them to acquire the desired or undesired behaviour and styles of living. Then the head of the institution, teachers, employees and the fellow students play their roles in influencing the development pattern and behaviour of the students in the same way as played by the parents and members of the family in the home and family set-up.

Apart from the human factors, the nature and quality of the material resources, psychological, social and cultural environment of the school also work as a great deciding factor in influencing and controlling the developmental direction and behaviour of the students. Some of the things, situations and factors inherent in the overall environment of the school which work as the determinants of

the students' cognitive, affective and conative behavioural development, may be named as follows:

- The educational and professional qualifications of the teachers, their teaching experience, personality and behavioural make-up.
- The sweetness or bitterness in the relationships among the teachers and other employees.
- The mental and physical health of the teachers.
- The sincerity and devotion of the teachers towards their duties and profession.
- The abilities and competencies of the head of the institution, his personality and behavioural traits, his relationship with the fellow teachers, students, employees of the institution and parents of the students.
- The nature of the relationship between the teachers and students.
- The nature of the relationship existing among the students of a particular class or the school in general.
- The nature of the discipline and administrative arrangements prevalent in the school.
- The nature of the organisation of the academic programmes and the educational standards maintained by the school.
- The provision for co-curricular activities and the nature of their organisation.
- The examination results of the school.
- The place, status, name and fame of the school with respect to the achievements in games and other co-curricular activities.
- The nature of the facilities available in the school for the organisation of various co-curricular activities, hobbies and other talent development programmes.
- The nature of the facilities regarding library, reading room, museum, laboratories, work places, etc. available in the school.

- The nature of the arrangement for mid-day meal, canteen, common-room, drinking water, laboratories, etc.
- The appropriateness or inappropriateness of the things and situations related to the physical environment of the school like adequacy of the school building, sanitation, pollution free environment, seating arrangement, proper ventilation and lighting, etc.
- The provision and adequate arrangement for the education and adjustment of the gifted, the creative, the backward, the problematic and the handicapped children with their special problems.
- The nature of the provision and arrangement for guidance and counselling services to the students.
- The adequate arrangement with regard to the evaluation of the progress of the children in quite an objective and impartial way.

Besides the things pointed out above, we may include many other things, attributes or factors related with the physical, educational, administrative, social or cultural environment of the school in this list which may directly or indirectly influence and control the cognitive, affective and conative development of the students including their learning potential and ways of behaving. In fact, what we appreciate in our children and adolescents with regard to their good habits, temperament, desirable personality traits and ways of behaving, to a large extent, is the sole product of the school environment. The students learn and grow in the way they are shaped and moulded by the presence and interaction of the various things, situations and factors present in their school environment. A single factor, incident or accident may make and mar the whole life of an innocent child. A sympathetic, affectionate and inspiring behaviour of a teacher may bring in the child the needed enthusiasm, motivation, confidence and will power to develop in a desired way. On the other hand, the partiality shown and injustice done to the child may vitiate his mind to such an extent that he may be forced to adopt reactive and maladapted behaviour patterns first by developing hate towards the teacher and his subject and then by isolating himself completely from

the class and the school for playing truancy and engaging in other deviant behaviour.

In this way what goes inside the school and how the students react to the school environment may definitely work as a potent determinant of their present and future development with respect to their cognitive, affective and conative behaviour.

Role of Society or Community

Apart from home and school, society/community through its various institutions, components or instruments like neighbourhood, social clubs, religious institutions, means of transport, means of communication and entertainment, newspapers and reading literature, the type of Government ruling state, country or local machinery, social, cultural and community fairs and festivals, etc. may play a quite decisive role in providing direction and magnitude to the cognitive, affective and conative behavioural development of the children. Here the things and features like below, present in the available social/community environment may be found to mould the adolescents' development in a particular way:

- Nature of the physical means and facilities related to transport and communication, sanitation and cleanliness, level of pollution, medical facilities, electricity facilities, means of entertainment, social company and interaction, etc.
- Nature of the local, state and national level of Government and its functioning for the welfare of the citizens.
- The type of neighbours and neighbourhood influences available to the developing children.
- The nature of the interrelationships carried out with the members of the community and society.
- The nature of personality traits and behaviour patterns of the members of the society/community—children as well as adults.
- The socio-economic states, cultural traditions and religious faiths of the community and society to which the child and

his family belongs.

- The good and evil effects of the company and interaction with the members of the community/society on the child and his family.
- Nature of the role played by religious institutions and social organisation in the development and welfare of the developing children and community as a whole.
- The presence or absence of stereotyping, social evils, traditions, practices and restrictions affecting the cognitive, conative and affective development of children.
- The attitude of the society/community towards children with special needs or different abilities and facilities available for inclusive setup.
- The level of education, thinking and outlook of the society/community to which the child belongs.
- The level of urbanisation, industrialisation or ruralisation of the society or community.
- The nature of conative, affective and conative development of the peers and older children of the community/society in which child is developing.
- The presence or absence of the disputes and conflicts, fear and phobias, crimes, terror activities and war like situation in the community/society.

The favourable impact of the positive factors or things available in the form of human capital and resources of the society helps much in shaping the children's cognitive, affective and conative development in a healthy and desired way. Contrary to this, the negativity breeds negative and damaging effect to their development and well-being. Similarly, where the favourable factors help in the healthy well-being of the developing children; the unfavourable one's lead them to the deficiency, ailment and impairment in the motor, physical, emotional social and moral development. The society or community ridden with superstitious, stereotypes, rigidity, and social evil is bound to imbibe the developing children with closed thinking, mis-beliefs, emotional instability and a variety of educational, and socio-psychological

deprivation or behavioural problems while a progressive democratic society may help the children to grow in a useful way contributing towards their healthy and desirable well-being.

Role of Mass Media

Meaning of the term mass media

In its word meaning, the term *mass media* stands for the media (means and mode of communication) for the masses. It can thus represent all channels, means and modes that can be used for conveying information, messages or appeal simultaneously to a number of people breaking the barrier of location, places and timings. It can exist in audio, video or multisensory forms and thus may appeal a number of senses for producing lasting effects or impressions on the minds and hearts of the individuals. The means and modes as mentioned below may be properly included in the term mass media.

1. Newspapers and magazines
2. Books (printed and e-form)
3. Advertisement
4. Radio broadcast
5. Telecasts
6. Films and movies
7. Internet and web material
8. The modern communication means like messages and audio-video material loaded on smart phones, facebook, blogs, twitter, etc.

Role of mass media in influencing behaviour and development

Mass media play a quite dominant role in influencing behaviour and development of the children and adolescents in a number of ways and forms. What they read, listen and watch through the mass media appeals to their senses and goes deeply in the minds and hearts in a great way and as a result they may learn and imbibe so many things

in their habits, ways of behaving and doing that may go to shape the events of their life in a particular way. Let us see how it happens:

1. When the children and adolescents read about the things and events in newspapers, pamphlets, magazines and books, etc. it may catch their attention and get them acquainted with so many things—positive as well as negative. It can add to broaden their mental horizon and learn so many things. Learning, as you know, can result in the development of desired or undesired interests, attitudes, habits, temperament and many other personality traits. It also happens in case of the children's exposure to reading material. They may not only get acquainted with the goods and evils, virtues and vices but also consciously and unconsciously try to imbibe them in their behaviour.
2. The audio-visual and multi-media means like radio and television, films and movies and what is available to them on their computer and mobiles screen, exercise much greater influences in shaping their behaviour and personality than their verbal comprehension of the material available in the newspapers, magazines and books. Here the learning takes place in a more organised way. It is multisensory and observational learning much superior to the verbal. When a child observes his most liked actor or actress to perform or do certain types of acts or behaviour, he cannot resist the desire to get that copied in his behaviour. It is nothing but hero worship that is most common among children and especially in adolescents. As a part of social learning as advocated by Bandura (1977), all such observations on their part are imitated, practiced and assimilated in their behaviour on the part of children and adolescents who get exposed to such type of mass media experiences. The easy and unlimited availability of such multimedia exposure to the youngsters through the developed electronic and computer means has almost revolutionised such type of social learning. As a result we may find tremendous changes in the interests, attitudes,

ways of thinking, feeling and behaving of the youngsters— affecting the task of shaping and developing their personality in a positive or negative way. The much observed and talked influences of the mass media (including printed material and multimedia) as a whole may be summarised as below.

- i. The available exposure of mass media resources has resulted in increasing awareness towards the things and events concerning one's environment. The children and adolescents of today have many opportunities to get exposure of their physical, social and cultural environment— local, regional, national and international in comparison to a few decades ago. Hence much credit for the development in the cognitive behaviour of the children goes to the mass media.
- ii. Mass media is also credited for bringing rapid changes in social, emotional, language, communication and aesthetic development of the youngsters. Today they enjoy more opportunities for developing social relationships with each other and getting better connected in comparison to the early days. Mass media have given them enough opportunities for getting acquainted with the social and cultural life of their own and others. They may know how people behave and live in their own region, country, or other parts of the globe. It has thus contributed to understanding the people living on this earth, developing global understanding, cooperation and collaboration.
- iii. Mass media is also credited for removing a number of social barriers, stereotypes, social evils, discriminations, marginalisation and misunderstandings among the members of a community, regions and nations. Children and youths of today are proceeding towards a global society or

community having less rigidity and bondage of caste, colour, religion, language, nationality, etc. They are having interaction, interrelation and international relationships, friendships and marriages. It is all happening with the services of the developed mass media platforms and related technologies.

- iv. The available exposure of mass media in contrast to its valuable advantages and contributions is also decried and criticised for a number of its negative influences on the behaviour and development of the youngsters. In this concern, we note that particularly mass media are held responsible for giving youngsters the exposure of the world of crime, hate, violence and sexual exploitation. There is too much violence, sex and other type of immoral, illegal and unhuman behaviour reported in the newspapers, shown in the news channels and episodes of television serials and movies. The internet, web and other sources of social media are also loaded with such evil as influencing material, adult and child porn is freely available on the internet.

Children and adolescents here have many chances to get drifted from their welfare path. Many of them can waste their time, money, energy and mar their future for indulging in socially undesirable acts, violence and crime. They may also be victimised by hands of culprits, criminals, terrorist groups and sexual offenders since the mass media many times are used by notorious people for serving their vested interests.

In this way, it can be observed that mass media has a powerful capacity to influence the development of the children and adolescents in a positive as well as negative way.

Role of Different Cultures

Culture of a society or community reflects the mode of living and behaving of the members of that community prevailed in the community for a number of decades or centuries. The community or

people belonging to a particular culture may be found to adopt uniqueness in their dress, make up, food choices, social and cultural values, ethics, ideas, religious beliefs, social norms, moves, rituals, stereotypes, celebration of festivals and philosophy of life. Each culture has a great potential to cast a strong impact over the growth and development of the children.

Adolescents and youths adopt the ways of living and behaving of their culture from the quite early age. They have proper respect for their cultural and social values, traditions and practices.

Influenced by the culture of their community, they may be found to be a great fan and devotee of their cultural norms, values and practices and the way they are developed in physical, mental, emotional, social, moral, linguistic and aesthetic dimensions of their personality, really matters. However, in a multi-cultural society, there comes a great change. The children and adolescents are exposed to the ways of behaving and living of the persons belonging to other cultures. It may bring a great change in their life styles, ways of behaving and living. The task of their growth and development and shaping of their personality is also greatly affected by their exposure to the world of multiculturalism or the culture of the place and community to which they have migrated.

For example, when a child and his family migrate from a rural area to urban one his growth and development is very much affected by coming into the urban culture of the migrated place. As Bruner (1996) says *culture shapes the mind and it provides us with a tool kit by which we construct not only our worlds, but our very conceptions of ourselves and our powers.*

The overall development and progress of a migrated child or adolescent is thus very much affected when he comes into contact of a particular culture or different cultures prevailing at migrated place. He gets more opportunities for the cognitive, social, emotional and linguistic development. He may be helped to get rid of many superstitions, misbeliefs, stereotypes coming in the way of his development and progress. It is why we may see a lot of overall improvement in the rate of growth and development when they migrate to a privileged social or multi-cultured environment. However, it is not be understood that exposure to different cultures

always brings positive results. The wind may blow both ways. In brief their exposure to different cultures may be found to affect their growth and development in the ways given below:

- It may affect their physical growth and development, health status and conditions as and when they pick up the healthy or unhealthy habits of eating and drinking and living, inherent in other cultures.
- It may affect their social and cultural development by breaking the barriers related to gender, race, caste and cultural segregation or marginalisation and get better opportunity for their overall growth and development.
- The cultural integration may affect their moral and ethical development in a great way. However, it may drift them in both ways. They may get imbibed with desirable values or may get lost in the blind race of individualism, fashion and exhibitionism and pleasure seeking motives. It is where a little precaution and guidance is needed for them on the part of elders, teachers and parents.
- The exposure of multi-cultures may help the children to get in touch with the goodness of other cultures and develop closeness to the followers of different cultures. It may help in seeking unity in diversity and learn the lesson of *peaceful coexistence* with others. The imbibing of such virtue may prove helpful to the children and adolescents in a great way in the task of their overall development and well-being.

Role of Religion in the Cognition and Development of Children

Religion occupies a quite significant place in the life of human beings. It is enshrined deeply in their culture and day-to-day functioning. By virtue of our living in a society, every one of us is a devotee and follower of one or the other religion. Whatever religion, Hinduism, Islam, Christianity, Jainism, Buddhism, Sikhism we follow, every religion is engrained with the virtues and ethics helpful in the well-being of its followers, society and humanity at large. It shows us

a way of life and helps us leading our life in a balanced way. Its impact on our behaviour and personality is also quite impressible. Whenever, one visits a place of worship (temple, masjid, church or gurudwara) he or she feels a unique sense of inner satisfaction and mental peace. All the evil feelings and negative thoughts just pump out from one's inner self and the mind and heart begin to get fresh air of positive thoughts and divine feelings. Moreover, the rituals and ceremonies performed, rules and regulations observed, code of ethics and conduct followed, religious practices adopted, may prove a quite decisive force in moulding and shaping the behaviour and personality of the individuals.

Adolescence in human beings is marked as the age of intensive growth and development in all the personality dimensions. Here one learns and develops maximum for attaining maturity in every aspect. By coincidence this age is not only marked as the age of friendship and social relationships but also dominated with intensive flow of emotions. The adolescents due to too much physical energy and almost uncontrollable flowing of the emotional current seriously need some ways for the channelisation and redirection of their energies to the constructive, healthy and socially desirable outlets. Religion with all its formalities may come here to their help in a suitable way as laid down below:

1. A religion helps the children and adolescents to learn a number of good habits leading to get imbibed with good physical health involving cleanliness, consumption of uncontaminated hygienic sativic food, healthy sleeping and awakening habits, maintaining fitness of the body and health by keeping fasts and rosas, and practising asanas, pranayama, suryanamaskar, namaz postures, ardas, etc.
2. It can help the children to learn a number of good habits and engage in healthy practices helpful for their needed cognitive development and contributing towards their mental health.
3. Religion in its all shades and forms teaches us to have a considerable faith in the absolute power of Almighty (God). Such perception as God is watching, saves children from

being socially or morally deviant.

4. The religious belief that 'God, Allah or Guru is with me' fills a child with an unquestionable sense of self-confidence. It makes them fearless and courageous to face any eventualities in life and engage in challenging and risk-taking behaviour.
5. The visit to the places of worships, participation in religious gatherings, festivals and rituals provides enough opportunities to the children for the social contacts and interaction, cooperation and collaboration leading to get imbibed with appropriate social manners, habits and virtues.
6. A number of rituals and practices (e.g., meditation, worship rituals, etc.), adopted in religions, help children in learning the ways and means of getting focused on the target, sustaining their attention over the focused objects, and performing their tasks in a quite systematic and desired way.
7. The religion provides them enough support for getting relaxed and enjoying required mental peace helpful in staying away from day-to-day anxieties, worries and stresses. It also provides a healing touch to the wounds of their failures and frustrations, miseries and sorrows of life.
8. More often, children may also be benefited by seeking assistance and guidance from the religious figures in relation to their educational, personal and career building problems. They may learn many things helpful for their future life in the company and guidance of the knowledgeable saints, gurus and mahatmas.

SUMMARY

The term *cognition* stands for a process or product of acquiring knowledge at the understanding and reflective level necessarily with the use of one's sensory, perceptual and mental abilities.

Regarding the role of cognition in learning it can be properly asserted that one's cognitive abilities and capacities play a quite crucial role in one's learning of a thing or acquisition of a certain behavior in a proper and desired way. The learning process without involving one's cognition (not carried out at the understanding or reflective levels) results in the learning product that is found to serve no useful purpose for the learner. Its outcomes in the form of *memory level learning* are judged quite inferior and worthless in comparison to the *understanding and reflective level learning* outcomes resulted through the involvement of cognition in one's learning.

In fact, both the phenomena, i.e. *cognition and learning* are found to co-exist. *Cognition*, i.e. cognisance of a thing helps in its learning and learning adds to one's cognition. Both are also found to be greatly affected and influenced by a number of socio-cultural factors like home and family, school, community, mass media, cultural diversities and religion, etc.

The home and family environment cast a quite forceful impact over the cognition and learning of the developing children. They are found to take cognisance of the things and events in the way as being learned and practiced in the family environment. It affects their learning and development in a positive as well as negative way depending on the experiences acquired and facilities available to them for their development and learning in the company and interaction with the members of the family at the home. The nature of their adjustment depends on the type of environment available to them at their homes. What we see in terms of their adjustment and maladjustment or development of proper or improper behaviour or personality traits, progress and development in fact thus may be found to have its origin as well as its further stimulation and

reinforcement from what is available to it from the family and home environment.

School is another powerful social agency after the home and family that is found to cast a quite sizable impact over the processes and products of cognition and learning among the children. The things and factors belonging to a school in terms of its human resources (the type of company, interaction and help available from the teachers, other school personnel and peers) and material resources (in terms of material facilities, physical surroundings, the assistive aids and facilities available for the acquisition of learning experiences) greatly affect and influence the learning and development of the children in a positive and negative way in relation to what is available to the children in the schools.

Apart from home and school, society/community through its various institutions, and components like neighbourhood, social clubs, religious institutions, means of transport, means of communication and entertainment, newspapers and reading literature, the type of government ruling state, country or local machinery, social, cultural and community fairs and festivals, etc. may play a quite decisive role in the development of cognitive abilities and acquisition of the learning experiences on the part of developing children. They may acquire varying types of experiences, positive and negative affecting their development and well-being in the positive or adverse way as a result of their exposure to the experiences available to them in their community or society.

Mass media as a great influencing social agency may be seen to play a quite dominant role in influencing cognition and learning of the children helpful in their development and progress in a number of ways and forms. The term *mass media* here stands for the media (means and mode of communication) for the masses. It can exist in audio, video or multi-sensory forms and may thus appeal a number of senses for producing lasting effects or impressions on the minds and hearts of the individuals. Newspapers, books, radio and telecast, films and videos, internet and social networking means may all be termed as the examples of *multi-media* or *mass media*. What the children read, listen and watch through the *mass media* appeals to

their senses and goes deeply in the minds and hearts in a great way and as a result they may learn and imbibe so many things in their habits, ways of behaving and doing that may shape the events of their life in a particular way.

Culture of a society or community (visible in the shape of mode of living and behaving of its members) has a great potential to cast a strong impact over the growth and development of the children in a number of ways. In practice, they may be found to adopt the ways of living and behaving of their culture from the quite early age affecting their ways of thinking, feeling and acting in a particular way. However, something different comes in their way when they are exposed to multi-cultural society. Here, the ways of behaving and living of the persons belonging to other cultures may bring a great change in their life styles, ways of behaving and living. They are found to pick up a number of things from their interaction with the people belonging to other cultures affecting their development and progress in a variety of ways—positive or negative.

Religion occupies a quite significant place in our life as it is enshrined deeply in our culture and day-to-day functioning. The religion we follow shows us a way of life and helps us lead our life in a balanced way. Its impact on our behaviour and personality is also quite impressible. The children and adolescents, on account their tender mind and emotional make up are greatly influenced with the impact and impressions of the rituals and ceremonies performed, rules and regulations observed, code of ethics and conduct followed, and religious practices adopted by them as a follower of a particular religion. Such impact and impression are then found to affect their cognition (ways of understanding and reflecting) and learning in a variety of ways.

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Learning as Construction of Knowledge

INTRODUCTION

Learning in constructivist's perspective or constructivist learning as discussed in the sixth chapter lays emphasis over the type of learning that is based on the philosophy of constructivism. This type of learning is totally opposed to the traditional system of learning propagated by behaviourism. Here in this type of learning, the needed knowledge is acquired by the learner through his own efforts, i.e. the task of knowledge acquisition is carried out by the learner through an active process of knowledge construction. What is this knowledge construction task? How does it add to one's learning or acquisition of one or the other type of knowledge or experience? How is the learning as construction of knowledge different from the learning as transmission and reception of knowledge? What is the exact nature of the knowledge construction process and how is it facilitated by certain known elements such as *experienced learning, reflection, social mediation, cognitive negotiability, situated learning, cognitive apprenticeship* and *meta-cognition*? In the following lines of the chapter we would try to know about all these.

LEARNING AS CONSTRUCTION OF KNOWLEDGE VERSUS LEARNING AS TRANSMISSION AND RECEPTION OF KNOWLEDGE

The philosophy and viewpoint that holds learning as *construction of knowledge* is relatively quite a new and modern one than the age-old prevailing notion considering learning as *transmission and reception of knowledge*. Therefore, let us start our task of knowing about these two quite opposite and contradictory notions in order of their historical existence.

Learning as Transmission and Reception of Knowledge

In view of the propagators of our age-old traditional system of teaching–learning, the child’s mind is like a blank slate. We as the elders, parents and teachers through our guidance, teaching and training try to write on this slate and as a result child learns new things, acquires new knowledge and gain new experience through a deliberate process involving transmission of knowledge by the elders and reception of the knowledge on the part of children as learners. Here in this system knowledgeable people like parents, teachers and elders work as a transmitter (transmitting knowledge to receiving end). On the receiving end, there lie the children/students in the capacity of the learners. Knowledge getting task, in this way, in a teaching–learning process formally organised in a classroom, is just confined to the transmission and reception of knowledge as shown in Figure 8.1.

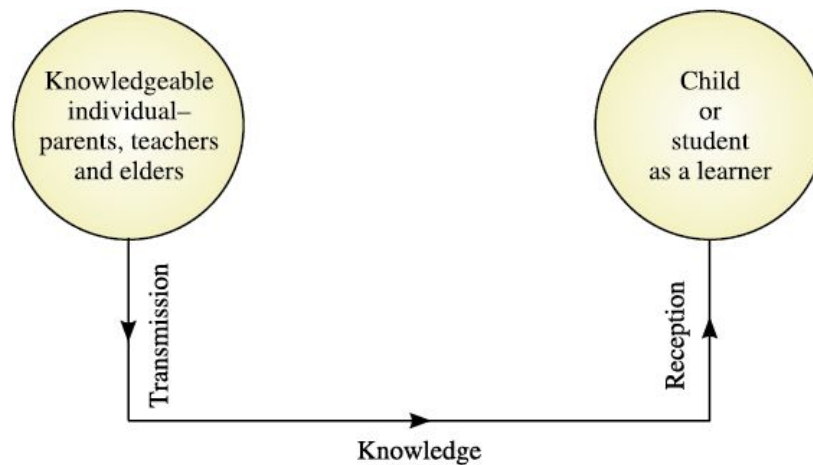


Figure 8.1 Learning as transmission and reception of knowledge.

As a result, in the classroom situation, the teacher or trainer who has knowledge and skills (gained through his own day-to-day experiences, study or professional training) tries to transmit it to the learners present in a particular teaching–learning set up through lecture or demonstration. They have to remain active for performing their *transmission* job. While learners have no role to play in the knowledge transmission work, they have to remain most of the time as the passive listeners or silent spectators. Their role is merely to remain alert and attentive for grasping or receiving what is being told or exhibited by their teachers or trainers in the name of imparting knowledge or teaching skills.

The task of transmission and reception of knowledge may thus be well equated with the task of transmission of electric or sound energy from the transmitters (transmitting instruments) to the receivers (receiving instruments). The receiving instruments at their ends receive or get the same message (in original) as being transmitted from the transmitting instruments. If the current/signal supplied is low or weak, there will be a quite dim light or inaudible sound to receive and if it is a normal or above, then the intensity of light or sound will be found increased in the same proportion. Here in classroom situation, the quality of acquisition of knowledge and skills on average will surely lie on the quality of knowledge and skill transmitted and grasped by the learners. Since learners have no role in creating, constructing or understanding the things to be transmitted to them by their teachers in their own ways, their quality

as a learner needs to be acknowledged, ascertained or evaluated through the quality of the reproduction or re-representation of the reality of the facts being communicated/transmitted to them by the teacher. The one who reproduces well what is transmitted to him is termed as bright by scoring high marks and the one who is unable to reproduce well the transmitted message is said to score low or declared as a failure.

In this way, the whole teaching–learning process in our existing system of school education has been confined to the transmission of the already constructed knowledge by the teachers, and reception as well as reproduction of the knowledge on the part of the learners strictly in the way and form transmitted to them by the teachers. As a learner, one is least bothered here about the original source of knowledge, its construction and evolution. He is to simply receive, memorise, revise, practice and reproduce it as and when where needed to do so.

The such type of learning as performed by following the method or principle of transmission and reception of knowledge, suffers from the disadvantages and shortcomings outlined as below:

- Learner has no direct access to the source of knowledge he is acquainted with through its transmission—on the part of parents, teachers and elders.
- The knowledge he gets is constructed and compiled by those who are going to transmit it to him. He has no role in the construction, compiling or pooling the knowledge for his learning. He is completely dependent on others for the acquisition of the desired knowledge and skills and cannot ever learn to acquire the same through his independent efforts.
- The teaching–learning process becomes a purely one sided affair. Teacher as a knowledgeable person tries to transmit the required information/knowledge/skill to the learners without taking any note of their interests and abilities. The learners here usually remain quite passive and inactive by simply listening and watching the things by the teacher that may give many learners in the class, time

and opportunity for getting bored or getting inattentive to the extent of getting drowsy and going to sleep.

- Knowledge is transmitted here by the teacher without caring for being understood or grasped properly on the part of the learners. Moreover, since it is not generated or constructed through their own experiences and not based on their needs and requirements, it is neither motivating for them at all nor comprehensible and graspable to them. It can only be memorised or crammed with least consideration of its meaning and application. Such meaningless acquisition of knowledge becomes a useless burden, hardly to prove any worth for them in their future life activities.
- Memorisation of the received transmitted facts also itself becomes a problem and nuisance to them. The memorised facts may easily vanish from the memory of the learners and they may feel a great difficulty in recalling them at the time of their use. This usually happens with the learners in writing the answers at the time of their examinations or responding at the time of interviews. In this way, the short-term gain of reproducing the received knowledge on the part of the learners through the mode of one sided transmission by the teachers may not be realised at all by the learners and hence the learning through the mode of transmission and reception of knowledge becomes totally redundant to the learners in all its ways and means turning the efforts of teaching–learning process as waste and futile.

In view of the defects and deficiencies pointed out above, the learning acquired through the mode of transmission and reception of knowledge, has come under severe attack of criticism. The whole system and philosophy associated with this mode of learning has also been subjected to severe criticism. As an alternative, it has been recommended by the modern psychologists and educationists to replace it with the philosophy of *constructivism* practising construction of knowledge by the learner himself for the acquisition

of knowledge in a proper way. Let us throw light on this new concept of learning.

Learning as Construction of Knowledge

Constructivism as a philosophy and approach to education believes that any worthwhile learning involving necessary acquisition of a piece of knowledge can properly take place only by getting into the knowledge construction task on the part of a learner. Therefore, it advocates that nothing should be directly told or poured in the minds of children through mere lecturing or demonstrating one or the other things by a teacher or trainer. Such transmission of the already constructed knowledge in which learners remain as passive listeners and silent spectators in the teaching–learning process, does not serve any useful purpose in terms of yielding proper learning output. It may only encourage spoon feeding, mechanised rote memorisation and misdirected teaching–learning act resulting in loading the minds of the learners with the knowledge that carries no useful meaning and application to them in their real life. Therefore, it asserts that in the process of teaching–learning (self or guided), the learner should be allowed to play key role. He is to decide what to learn and how. His interests, motivation, needs and individual worth should be properly taken into account while interacting with him in the classroom or making him engaged in the self or guided discovery task. Therefore the main task before we elders, parents or teachers is to arrange for such learning situations and environmental facilities as to help the children to construct or discover the knowledge they need by their own efforts. They should be allowed to remain continuously busy in such knowledge construction or reconstruction of the previously earned knowledge that is required by them for their gradual step-by-step development and progress in their life. Such learning based on the construction of the needed knowledge by their own attempts, thus emphasises on learning by doing and experiencing the things and facts of life by themselves. Let us see how.

The early experiences of a child by getting burning sensation from the hot objects like flame of a candle, burner, hot plate, chapati, hot

milk, etc. may help him to construct his own knowledge regarding the hot objects and in the light of this knowledge he learns to take precaution while touching and using these hot objects.

In this way, right from the days of infancy, one tries to learn by constructing his knowledge regarding various things and events related to his environment. His first hand experiences may help him much in his knowledge construction task. The subsequent experiences further in this regard may help him bring modification/alteration or addition in the type of knowledge or information held by him so far. For example, the knowledge construction arrived at first hand experiences make him fearful about a thing, the subsequent reconstruction of knowledge (through pleasant or un-fearful experiences about the thing) may help him to face that thing with no fear or hesitation of any sort.

The task of constructing the knowledge for learning one or the other things for one's needed adjustment to the self and the environment may be adjudged as a quite natural phenomenon for the developing child. It is based on his own reflections and drawing inferences from his personal day-to-day encounters or first-hand experiences. Since there may be wide variations among the learners in terms of having reflections and drawing inferences from a particular experience (depending upon one's individuality, previous experience and knowledge), the nature of the learning arrived through the knowledge construction phenomena may also differ from individual to individual. It is why there may exist wide individual differences among the learners with respect to the type of knowledge acquired by them through the *knowledge construction mechanism* in the similar learning situations.

Moreover, while engaging in the knowledge construction task and deriving their own meaning and inferences from their experience of the things and events, children may go wrong by learning faulty concepts, and acquiring undesirable habits and skills. It is where the need of a proper elderly guidance and assistance arises. This need is also felt by the developing children when they are required to carry out their knowledge construction tasks on a higher level for learning relatively the high-level concepts, skills and applications than the

simple ones carried out easily through their own reflections on day-to-day experiences.

At this level, the parents, teachers and elders are required to help the developing children to engage in the knowledge construction task by providing the needed opportunities, experiences and timely assistance to them. In no case, the already constructed knowledge should be directly poured in the minds of the children by making them a passive recipient of the knowledge.

As emphasised by Bruner, a prominent constructivist, in every teaching–learning situation earnest efforts should be made to make the child an independent and active enquirer and discoverer of the knowledge. He should be properly helped and guided in remaining engaged in the knowledge construction process till he arrives at the desired solution of the problem through his own, independent efforts. Here it is to be seen and watched by the elders that although the meaning derived and inferences reached through his knowledge construction efforts may be his own, yet the solution arrived or knowledge gained must be a representation of reality so that the knowledge construction efforts may always remain on track, proving their worth by being helpful in his proper education and development.

It has been arrived through experiences and established through researches in applied behavioural sciences that the learning reached through the mechanism of the *construction of knowledge*, i.e. independent efforts of the learners to take stock of the situation and derive their own meaning is a real learning. It remains with them for encountering the similar situations in their future life. They can rely on their self-constructed knowledge and the habits of engaging in such independent or guided discovery pursuits may help them in gaining self-sufficiency for their adequate adjustment, development and progress in life.

In the end we may conclude the following things about the nature and advantages of the learning designed on the footpath of the construction of knowledge:

- In this mode of teaching–learning the learner plays a key role. He tries to learn what he needs through his own

independent efforts (although guided and supervised by the elders as the need may be).

- It is based on the principle that a learner learns the best if he is provided proper opportunities, environment, timely help and needed guidance for the construction of knowledge he needs for adjustment, education and development.
- The beginning should be made to allow the child to construct or discover the knowledge by himself through his own independent efforts. He can take the help of the prior experiences and stock of the previous knowledge for facing the present realities and by reflecting over them can arrive at his own decision for learning something new to meet the present situation and also get equipped for facing similar situations in life.
- Although, the knowledge construction is an individual phenomenon for an individual learner and one should go ahead for it single handed through his own independent efforts, yet there are occasions where everything cannot be discovered or known through own efforts. There are possibilities of drawing wrong conclusions, inferences and deductions from the first hand experiences, independent study and self pursuits. In such a situation, no time and energy should be unnecessarily wasted and efforts should be made by the parents, teachers, elders and also knowledgeable peers to make themselves available for the timely assistance and guidance to the struggling learners in their knowledge construction or reconstruction pursuits.
- The knowledge and skills so acquired and habits and interests so developed through one's own pursuit of knowledge construction task are selectively quite stable, enduring, effective and helpful to a learner in his further learning pursuits along with needed adjustment and development in his life. He can own this knowledge, by deriving his own meaning and purposes. It is not vanished from his mind like the memorised stock of the transmitted knowledge from the elders.

- It helps the learner to develop the ability of independent problem solving—an essential ability to face the necessities and eventuality of life.
- It helps the learners to provide needed opportunities and environment for expressing themselves, opening up their inherent abilities and creative talents.
- Here the learning becomes a joyful activity, a purposeful event and useful outcome for the learner as the command of his learning comes in his own hands rather than being driven by others.
- In this mode of learning, teaching–learning process may be organised on the understanding and reflective level rather than merely on the knowledge level characterised with a one sided flow of communication and transmission of knowledge from the teacher or trainer.

With the discussions arrived at about the nature, significance and merits/demerits of both the learning modes—Learning as a Construction of Knowledge and Learning as Transmission and Reception of Knowledge, one can easily conclude that learning as a construction of knowledge is advantageous to the learners in many ways in addition to being quite in tune with the need of the time. Therefore, all efforts should be made to incorporate it in the teaching–learning process going on in schools.

PROCESSES FACILITATING CONSTRUCTION OF KNOWLEDGE

As discussed above knowledge acquisition on the part of a learner, if to be proved fruitful, worthy and applicable, should essentially involve and demand from the learner to perform the task of constructing the needed knowledge by his own independent efforts. However, the task of constructing the knowledge for the learning or acquisition of one or the other thing is not so simple and easy as it may appear otherwise to those who have never put themselves through such task. The researchers and scholars have tried to think over the issue of suggesting some ways and means for facilitating the construction of knowledge on the part of learners. As a result, they have named a few, proving quite useful for the 'construction of knowledge' on the part of the interested learners named as below:

1. Experiential learning and reflection
2. Social mediation
3. Cognitive negotiability
4. Situated learning and cognitive apprenticeship
5. Meta cognition

Let us know about these processes with their respective roles in one's efforts in the knowledge construction task.

Experiential Learning and Reflection

What is experiential learning?

In its word meaning, *experiential learning* stands for that type of learning which is based on the experiences (individual or in collaboration), i.e. observing, doing and drawing inferences by getting actively involved in the learning process. For knowing more about its meaning and nature let us concentrate on some of the following definitions and viewpoints expressed by various authorities in this connection:

Association of experimental education (1995): Experiential learning is learning through doing. It is a process through which individuals construct knowledge, acquire skills and values from direct experience.

Viljo Kohonen (2001): The experiential learning is an educational orientation which aims at integrating theoretical and practical elements of learning for a whole-person approach, emphasising the significance of experience for learning.

Kolb (1984): Experiential learning involves observing the phenomenon and doing something meaningful with it through an active participation. It emphasises learning in which the learner is directly in touch with the phenomenon being studied, rather than just watching it or reading, hearing or thinking about it.

Karl Rogers (1969): Experiential learning is characterised by personal involvement of the learner. This is self-initiated, self-directed and leaves a pervasive effect on the learner, i.e. whatever is learned can be used by him when and wherever needed.

Woolfe (1992): *Experiential learning* consists of the following four components:

1. Awareness of the learning processes (The learner is aware of the processes which are taking place, and which are enabling learning to occur).
2. Involvement in a reflective experience (The learner is involved in a reflective experience enabling him to relate current learning to past, present and future, even if these relationships are felt rather than thought).
3. Personal significance (What is being learned and how it is being learned have a special significance for the learner)
4. Involvement of the whole self (The learner is engaged as a whole person in the process of learning with his body, thoughts, feelings and actions, not just along with mind)

Nature and characteristics of experiential learning

The viewpoints of the different scholars outlined above may help us to derive following conclusions about the meaning and nature of the concept *experiential learning*.

Based on the personal experiences: Experiential learning is based upon the personal experiences of the learners (individually or in a group situation). Actually here the learning process is woven around an immediate personal experience in such a way as to help the learner to construct the needed knowledge through his own efforts.

Total involvement of the learners: Experiential learning requires on the part of the learner to have his total involvement (both intellectually and emotionally) in the process of learning rather than just watching it or reading, hearing or thinking about it.

Awareness of what, why and how of the learning: For such involvement, it emphasises that a learner should be quite conscious or aware of what and how of his learning along with its relevance and significance to his further learning development and progress.

Learner centered approach: Experiential learning is learner centered rather than the subject or teacher centered. Here the learner has to take decision about the type of experiences he wants to acquire along with the way of their acquiring. For this purpose, he has to take charge of his learning, take all initiative and remain actively involved for creating the needed knowledge for his actual use and application.

Integration of theory with practice: Experiential learning lays much emphasis over the integration of the theoretical and practical elements associated with a learning situation by believing that theory without practice is lame and practice without theory is blind.

Due emphasis over reflection: In Experiential learning, the task of reflection performed by the learner for examining and studying one's own experiences carries a lot of significance.

Experience alone cannot yield the knowledge construction task and hence cannot be considered as a sufficient condition for learning. For the acquisition of something new, the experiences

related to it must be processed consciously through a deliberate mechanism of reflection.

Usefulness of the end result: The outcomes of experiential learning process carry a lot of significance and importance for the learners by enabling them to have a proper insight into the theory and practice of the things being learned. It helps them to construct the needed knowledge through their own efforts. As an owner of such self created knowledge they are fully powered to use and apply it in all possible ways for their further learning, adjustment and development.

The things pointed out above about the meaning, nature and characteristics of experiential learning may lead us to realise that experience alone does not constitute experiential learning. It is just the beginning. It should be followed by reflection and conclusion as well as acting upon the findings of the reflection that can help in selecting the outcomes of experiential learning. Such thinking on the point of scholars has made them to consider experiential learning as a four-stage cyclic process. Let us have an idea about it.

Four-stage cycle of experiential learning

Experiential learning in its practical use and application may be termed as a continuously evolving process consisting of a four-stage cycle named as shown in Figure 8.2 and explained below:

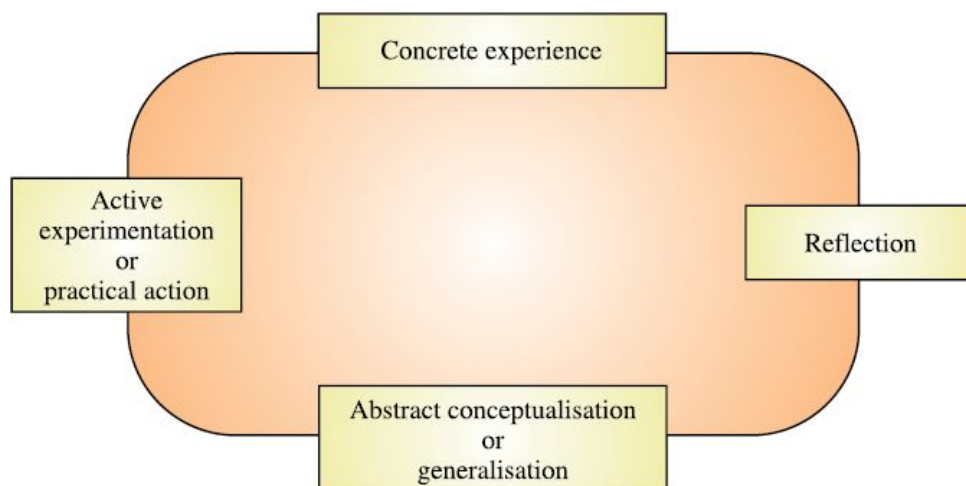


Figure 8.2 Four-stage cycle of experiential learning.

(i) Concrete experience (ii) Reflection (iii) Abstract conceptualisation or generalisation and (iv) Active experimentation or practical action.

1. **Concrete experience stage:** It is the beginning stage of one's experiential learning that is focused on gaining direct personal experiences about the things and phenomena to be studied. Here the learner is exposed to the phenomenon being studied by coming into its direct contact. He is required to gain direct concrete experiences about the phenomenon (things, events or processes) through his own independent efforts. The principle of learning by doing, experiencing and natural observation are kept into consideration by the learners for gaining such concrete experiences about the things and phenomena being studied. The learner is expected to involve his whole self, intellectually as well as emotionally, in the task of gaining the needed concrete experiences. In the classroom teaching-learning situations, we can make use of the activities like use of audio-visual aids and equipment, verbal examples and stories, small group discussions simulation and dramatic and play way activities, visits and excursions, etc. for helping the students to gain useful concrete experiences related to the content material of their syllabus.
2. **Reflection stage:** Experience gives food for reflective thinking. Therefore, in this second stage of experiential learning, what is gained in the form of concrete experiences is put under deep thought, observation and consideration for deriving meaning and creating new information and knowledge from the concrete experiential material. Here the learner is mainly concerned in judging and knowing how the things actually happen by attempting to see them from different perspectives and for this purpose usually relies on his own thoughts, feelings and judgement by getting involved fully as a whole person (intellectually as well as emotionally). In subjecting the gained concrete

experiences to the close scrutiny of one's own reflection (a sort of introspective observation and evaluation), one may be seen to take a solid step for converting his experiences about the things or phenomena to be studied in experiential learning. It may lead him to the next step of the cyclic process of his experiential learning, named as abstract conceptualisation.

3. **Abstract conceptualisation or generalisation:** In this third stage of experiential learning process, the output received from the second stage of reflecting thinking is utilised for arriving at the abstract conceptualisations and developing working hypothesis to be tested in the next stage of the experiential learning. Practical experiences like feeling burning sensation while touching the burning flames or hot objects after being subjected to reflection (deep thoughts and considerations) may help the child to build an abstract conceptualisation in the form of keeping distance from the burning flames and hot objects. Similarly, the reflections on the experiences regarding the proper handling of the hot objects without getting harmed or getting cured after being harmed by them may help the individuals to develop the relevant conceptualisation regarding the precautions taken first aid and treatment given to burning victims. For example *the use of iced water works as an effective first aid for burns*, such abstract conceptualisation may be arrived at as the product of one's reflective thinking on the concrete experiences gained by the learner in one or the other learning situations.
4. **Active experimentation or practical action:** At this fourth and final stage of experiential learning the abstract conceptualisation made or workable hypothesis developed at the third stage are put to test through active experimentation, i.e. what is generalised or concluded at the third stage is subjected to practical action at this stage. This practical action in turn yields concrete experimental material for further reflection and acceptance of the constructed knowledge or new learning (referred to as

experienced leaning) as the new base for further learning, adjustment and progress in one's life

Experiential learning and reflection

Reflection involves deep sense of thought, understanding, involvement and insight about the things or phenomena observed or experienced by the individual concerned. It helps to give meaning to what has been experienced or being experienced by the learners in a particular learning situation. However, the process of reflection comes into picture only when something is perceived or experienced by the learner. Experience provides food for reflection which in turn (as explained above in the cyclic process of experiential learning) leads to abstract conceptualisations or theoretical generalisations. In this way, reflection may be found to play an important role in the process of experiential learning by providing a connecting link or bridge, as it were, between experience and theoretical conceptualisation. There is total involvement of the learner in experiencing and arriving at theoretical conceptualisation through reflection of his own experiences. It is to be carried out on both the intellectual and emotional platforms.

In the traditional teacher-centred teaching-learning process the students' learning is carried out mainly at an intellectual level. There is no involvement of the learners on emotional level. Therefore, they usually remain personally unaware of the results of their response (emotional reaction) to the subject matter on themselves or on other people and also intensity of such responses. This can lead to an inadequate application of knowledge in the use of the subject material in authentic real-life occasions (Kohonen, 2001).

On the other hand, experiential learning accompanied with a proper sense of reflection on the experienced objects or phenomena is likely to prove necessarily meaningful to the learner. The learner can derive his own meaning from such learning for enabling him to use it in his own ways in the real-life situations.

Role of experiential learning in knowledge construction

The *experiential learning* enables the learner to learn the art of creating or constructing the needed knowledge for using in his life. In fact, it is an essential component of knowledge construction task. Let us see how.

The whole structure of an experiential learning lies on the two solid pillars known as experience and reflection. Experience provides starting base for an *experiential learning*. Afterward, what is being experienced or observed by the learner about an object or phenomenon is put through close scrutiny, self examination and introspection through a useful mechanism known as *reflection*. It is this reflection that helps in the transformation of the experiences gained into some useful theoretical concepts readily available for use in one's real-life situations.

Knowledge construction task also begins with initiation and keenness on the part of the learner to have his own experience about the object, event or phenomenon to be studied. For drawing valid inferences from the experiences gained, he needs the help of a proper *reflection mechanism*. What he gets as a result of the reflection on the experienced concrete material helps him to arrive at a new knowledge constructed or created through his own efforts. In this way, the processes employed for the knowledge construction task and experiential learning are almost identical in their nature and purposes served. In both of these mechanisms, learner or knowledge constructor is well aware of the need to learn or discover the knowledge. He is the in-charge of the self-discovering or acquisition of knowledge gained through his self-efforts. Knowledge or learning he acquires, proves quite understandable and handy for him for the needed practical applications in his life. In view of such similarities shown in the acts of experiential learning and knowledge construction it can be safely concluded that art and skill learned in practising experiential learning may prove a quite significant facilitating factor in promoting the habits of knowledge construction on the part of learners through their own independent efforts.

Social Mediation

The task of knowledge construction on the part of an individual is very much facilitated by a popular mechanism known as *social mediation*. Historically, in constructivism this concept was introduced by the famous Russian constructive psychologist Lev Vygotsky. Actually, the key premise of Vygotskian constructivism is often referred to as cultural or social mediation. In simple words it means that the cultural or social factors present in the child's environment play a role of an effective mediator between himself and the knowledge construction. His knowledge and development is always guided by the social and cultural factors present in his environment. The child becomes capable of constructing the knowledge needed for his desired adjustment and development with the active support and influences of the cultural and social factors present in his environment. Without such social and cultural mediation, he may remain handicapped in acquiring and using the needed knowledge and skills for his adequate adjustment development and progress in his life.

Piaget, a popular name in constructivism perspective, is known for his individual version of constructivism, i.e. assigning no role to social mediation or interaction in the process of knowledge construction on the part of a developing child. He emphasised that a child constructs the knowledge needed by him single handedly with no outside help. Vygotsky opposed this notion by saying that child cannot be deprived or alienated from his social or cultural environment. The social or cultural forces, directly or indirectly leave their impact and help for the knowledge construction on his part. Although he may try himself to construct some knowledge in one way or the other with his independent efforts and in some cases of language and skill acquisition he may get partial success, but the acquisition and construction of knowledge and skills at proper higher level may only be possible through social mediation—help and guidance from the parents, teachers, and elders. For example, consider the case of the art of riding a bicycle or pouring a cup of milk. The child cannot acquire/construct such knowledge or skills without the help of social mediation. First he needs somebody as a role model for observing and imitating these behaviours and then practising these skills himself. However, at each stage there must be

active support, assistance and guidance from the peers, parents or elders in helping the child to construct or acquire necessary knowledge and skills for doing these tasks. The mastery of such skills is achieved through the activity of the child within the society under social mediation. Cultural or social mediation thus may be taken as a type of social interaction (available in the form of socio-cultural environment and interpersonal communication) the presence of which, in view of Vygotsky and other social constructivists, is very much essential for allowing the children to construct or acquire the necessary knowledge for their needed adjustment, development and progress in their own ways.

The task of social mediation or social interaction is very much facilitated by the use of mediating tools and cultural artifacts such as ways and means of communicating and interacting with each other. Acquisition of language on the part of children here now can play a major role in the art of interacting with their social and cultural environment, people and social institutions. He can now very well interact with his peers and elders including parents, teachers and other responsible members of the community. It can open a new dimension for the needed social mediation for his adequate adjustment, education and development. The communication and interaction with the elders and peers may now help him to get the needed timely help and guidance from the peers and elders to construct his own knowledge, understand and apply it in his own ways and reflect upon that for its further creative and constructive output.

Social mediation-interaction with his social environment, peers and elders not only helps him to construct and acquire the knowledge and skills within the parameter or paradigm of the shared knowledge of the society or culture, but also help him in constructing and using his knowledge in his own unique way. For example, helped in this way, a child does not confine the use of pencil to the way as used by others in his social and cultural environment but may go far beyond in using it very much till his own limits. The social mediation, thus here only plays the role of a necessary mediator or facilitator for helping the child in his knowledge acquisition or construction task.

Cognitive Negotiability

The term cognitive negotiability is composed of two separate terms or words *cognitive and negotiability*. Therefore, to know about the meaning and concept of the term 'Cognitive negotiability', we will have to know the meaning of the words/terms *cognitive and negotiability*.

Cognitive: The term cognitive as an adjective according to *Merrian Webster Dictionary* (1988 : 257) stands for "relating to or involving cognition" and cognition is here defined as an act or process of knowing, including both awareness and judgement. In this way, we can take one's cognitive abilities as the capacities or abilities related to one's knowing about something.

Negotiability: In its dictionary meaning the term *negotiability* stands for one's ability to negotiate (to manage, to deal with some matter or attain something that requires ability for its successful handling)—Merriam Webster, 1988 : 791.

By understanding the meaning of the terms *cognitive and negotiability* now we can define the term *cognitive negotiability* in the manner given below:

Cognitive negotiability may be defined as the ability to negotiate or seek negotiations for knowing or searching about something. In making such negotiations one has to seek or discover the suitable alternatives getting success in finding the solution to a problem, handling of a situation or execution of a task in the most satisfactory way.

Nature and characteristics of cognitive negotiability

Cognitive negotiability as one of the important cognitive and constructivistic ability of an individual is characterised as below:

- It essentially falls in the cognitive domain of one's behaviour.
- It helps an individual to think about alternative ways and

means by substituting one technique with the other for knowing and discovering one or the other thing as per requirement of a particular situation.

- It represents a type of cognitive strategy that facilitates the process of knowledge construction by enabling the learner to replace one way or means of knowing the other.
- It helps a learner to construct his knowledge about a thing, person, idea or phenomenon by himself on the basis of his own cognitive abilities, competencies, and motivation for doing so.

Relationship between cognitive negotiability and knowledge construction

Cognitive negotiability works as a bridge between one's knowing about a thing and his motivation for doing so for facilitating the task of knowledge construction by smoothening the way as under:

- It makes the learner realise that the way of knowing about a thing is negotiable meaning that one should always try other ways for knowing or discovering a thing.
- The use of cognitive negotiability on the part of the learner makes his thinking divergent. He can think out in many different ways for adopting work strategy by negotiating one with the other suitable one for arriving at the proper solution to his problem or adding something new to the stock of his knowledge.

Situated Learning and Cognitive Apprenticeship

Situated learning in its word meaning is the type of learning that is situation based or the learning that is undertaken or performed in the situations or contexts in which it is likely to be applied or being applied.

In such learning, the learners are made to learn and acquire the necessary knowledge and skills in the real-life situations in the same way as being used and practised by the real-life users and practitioners in their usual ways. In this sense, if one has to acquire

the knowledge and skills regarding agriculture and gardening, he has to learn the art of agriculture and gardening by learning it in the real-life situations in the company, under the guidance and apprenticeship of those who are actually doing this task in their real life or are experts to teach it through modelling in real world situations. A tailor thus, while working in his tailor shop may provide lessons on *situated learning* to a learner interested in learning the knowledge and skills related to tailoring and a carpenter may provide valuable lesson on the trade of carpentry to the learner interested in carpentry which allow him to observe, imitate and practice the carpentry skills in his workshop or real-life situations.

Situated learning may thus provide the learners, appropriate opportunities to learn and acquire knowledge and skills under the guidance and supervision of the experts/real-life users in the real-life situations. The practice of apprenticeship employed for helping the learners to learn the art and skill of a profession or trade represents a good working example of the *situated learning*.

The *situated learning* perspective asks students to carry out tasks and solve problems in an environment that reflects the multiple uses to which their knowledge will be put in the future. As a whole, the situated learning here may be found to serve several purposes as mentioned below:

1. Students are able to understand the purposes or uses of the knowledge they are learning.
2. They learn by actively using knowledge rather than passively receiving it.
3. They learn the different conditions under which their knowledge can be applied.
4. Learning in multiple contexts induces the abstraction of knowledge so that students acquire knowledge in a dual form, both tied to the contexts of its uses and independent of any particular context. This unbinding of knowledge from a specific context fosters its transfer to new problems and new domains.
5. Teaching–learning carried out in the *situated learning*

perspective becomes quite useful, purposeful and motivating for the teacher as well as students. It helps in their proper interaction, making the teaching–learning process quite lively and enjoyable.

6. In the context of *situated learning* perspective, the students find appropriate opportunities and conducive environment for engaging in the task of knowledge construction due to finding reasons for getting engaged in the learning pursuit.

Cognitive apprenticeship

What is apprenticeship?: We all are quite familiar with the term apprenticeship. In this practice of learning or training a learner is required to learn the knowledge and skills associated with a particular vocation, profession or work area under the guidance and supervision of an expert or master of that profession or work area in a situational learning paradigm.

Apprenticeship was a quite popular way of teaching and learning in ancient times. Apprenticeship was the vehicle for transmitting the knowledge and teaching the skills needed for doing a number of tasks related to the fields from painting and sculpture to medicine and law. In fact, it was the natural way to learn for a learner interested in one or the other type of learning. In this type of teaching and learning, the learner in the capacity of an apprentice required: (i) to observe the processes of a task performed by the experts/masters in the execution of that task, (ii) perform the task himself exactly in the way as observed, (iii) allow the intervention of the expert or master for keenly observing his performance, and (iv) receiving direction and guidance from the expert/master for improving his performance until he becomes proficient enough to accomplish the task independently. The basic notion of apprenticeship thus lies in showing the apprentice how to do a task and then helping him to do it.

What is cognitive apprenticeship?: Cognitive apprenticeship in its word meaning stands for the apprenticeship carried out in cognitive perspective: it allows the teacher/master to teach in a *situated*

learning setup (real-life situations) the needed knowledge and skills for performing a task independently. Historically, the constructivist approaches especially related to social constructivism have led to the development of the notion of cognitive apprenticeship. It holds that masters of a skill often fail to take into account the implicit processes involved in teaching complex skills when they are teaching novices. As an apprentice, they can thus imitate the model behaviour of their masters without taking proper cognition of why and how of this behaviour. For example, while solving mathematics problems, they may try to copy the model of problem solving on the part of their teachers/standard textbooks rather than getting acquainted with the actual task of learning *problem solving strategies or intrinsic principles* of the problems themselves. As a result when they encounter problems that fall outside these patterns (modelled behaviour), students are often unable to understand what to do.

To combat these tendencies, cognitive apprenticeships “*. . . are designed, among other things, to bring these tacit processes into the open, where students, can observe, exact, and practice them with help from the teacher*” (Collins, Brown and Newman, 1987). The underlying video of cognitive apprenticeship is well in tune with Albert Bandura (1977), theory of modelling, which posts that in order for modelling to be successful, the learner must be attentive, must have access to and retain the information presented, must be motivated to learn, and must be able to accurately reproduce the desired skill.

Main features and characteristics of cognitive apprenticeship:

Cognitive apprenticeship is said to be characterised with the features like below:

1. Cognitive apprenticeship represents one of the types and forms of situated learning. As a result it may be found to strive, first and foremost, to place teaching and learning practices within a rich and varied context that is meaningful and authentic to students. In cognitive apprenticeship, the

activity being taught or experiences being gained are modelled in real-life situations.

2. Cognitive apprenticeship emphasised on the learning and cognition that is situation or context based. It assumes that the context in which learning takes place is critical, the outcomes of the cognitive apprenticeship are therefore less effective when skill and concepts are taught independent of their real-world context and situation (Collins, Dugind and Brown, 1989).
3. By using processes such as modelling and coaching, cognitive apprenticeships also support the three stages of skill acquisition described in the expertise literature: *the cognitive stage, the associative stage, and the autonomous stage*. In the cognitive stage, learners develop declarative understanding of the skill. In the associative stage, mistakes and misinterpretations learned in the cognitive stage are detected and eliminated while associations between the critical elements involved in the skill are strengthened. Finally, in the autonomous stage, the learner's skill becomes honed and perfected until it is executed at an expert level. (Anderson, 2000)
4. Cognitive apprenticeship employs cognitive modelling in its execution. Here an apprentice is required to listen and watch the behaviour of the master/teacher very carefully. It may make him to conceptualise exactly what his master is doing and thinking. The apprentice then attempts to imitate those behaviours with the master observing and providing coaching.
5. Coaching provides the needed assistance to an apprentice at the most critical level—the skill level just beyond what the apprentice could accomplish by himself. Vygotsky (1978) referred to this as the Zone of Proximate Development and believed that fostering development within this zone leads to the most rapid development. The coaching process includes additional modelling as necessary, corrective feedback, and reminders, all intended to bring the apprentice's performance closer to that of the

master's. As the apprentice becomes more skilled through the repetition of this process, the feedback and instruction provided by the master 'fades' until the apprentice is 'ideally' performing the skill at a close approximation of the master level. (Driscoll, 2000)

6. Cognitive apprenticeship, although, has its origin in the concept of traditional apprenticeship, yet it differs from the same due to its cognitive perspective. In cognitive apprenticeship, one needs to deliberately bring the thinking to the surface to make it visible. There is no blind imitation or perfection of the skill on the part of the apprentice/learners. He must have needed cognition of the how and why of the processes involved in the performance of the skill. As a result in cognitive apprenticeship, the goal is not to acquire the knowledge, but one must know the way of acquiring the knowledge. The student not only should produce the solution of a problem but should be able to know the very how and why of solving such problems for getting him fully equipped for solving any such problems belonging to the prescribed and other texts including the real-life situations.
7. Cognitive apprenticeship for its execution in a proper way requires from the teachers (or coaches) to constantly attend to students' difficulties and problems. However, it does not require that the teachers permanently assume the role of an expert. The goal here is to help the students in becoming independent by getting expertise in a field. In the tune of social constructivism, cognitive apprenticeship is thus aimed to facilitate the process of knowledge and skill acquisition/construction on the part of the intended learners.

Benefits of cognitive apprenticeship: Cognitive apprenticeship practices can benefit learning in many ways summarised as below:

1. *Cognitive apprenticeship encourages authentic activity and*

assessment: The most important emphases of the learning environment in cognitive apprenticeship are situated learning and the culture of expert practice (Collins, Brown, and Newman, 1989). Learners are engaged in learning activities that are similar to the practices of real-world experts.

2. *Practices of cognitive apprenticeship are motivating and engaging for learners:* Cognitive apprenticeship provides students with authentic tasks; it encourages them to think like and to be treated as experts (Collins, 1991). When students are actively engaged in authentic tasks and make discoveries on their own, they are motivated and experience a sense of ownership of their knowledge and tasks.
3. *Cognitive apprenticeship may encourage greater levels of retention and transfer:* Learning within the cognitive apprenticeship framework is situated in a context similar to that in which experts actually practice (Resnick, 1989). Situated, contextualised learning enables students to retain their knowledge until they encounter similar situations in the future.
4. *Cognitive apprenticeship may facilitate higher order reasoning:* In cognitive apprenticeship practices, students work with teachers and experts who use higher-level thinking processes; they are exposed to those processes through cognitive modelling (Hogan and Tudge, 1999). After receiving initial stages of support from teacher and experts, students actually explore new ideas and make discoveries using advanced reasoning processes.

Cognitive apprenticeship and knowledge construction: Cognitive apprenticeship may prove quite helping hand to the students in facilitating the task of knowledge construction and skill acquisition under the guidance and supervision of a master/teacher in the situated learning and social constructivist paradigm.

Collins, Brown, and Newman (1987) have developed six teaching methods rooted in cognitive apprenticeship theory and claim these methods help students attain cognitive and meta-cognitive strategies for *using, managing, and discovering knowledge*. Among these six methods the first three (modelling, coaching, scaffolding) are at the core of cognitive apprenticeship and help with cognitive and meta-cognitive development. The next two (articulation and reflection) are designed to help novices with awareness of problem-solving strategies and execution similar to that of an expert. The final step (exploration) intends to guide the novice towards independence and the ability to solve and identify problems within the domain in their own. Let us try to know about them in brief.

1. *Modelling*: While using this method/technique in cognitive apprenticeship, the expert/ teacher acts as a model to demonstrate a task (falling within the cognitive domain or subject area) to the learner for allowing him to experience and build a conceptual model of the task in hand. For example, a language teacher while making use of the modelling technique may try to model the reading process by reading aloud in one voice, while verbalising his thought process in another voice (Collins and Smith, 1982) or a mathematics teacher may write out explicit steps and work through a problem aloud, demonstrating his heuristics and procedural knowledge.
2. *Coaching*: While using this method/technique in cognitive apprenticeship, the teacher is supposed to carry out his assistance/guidance task with his student on a little more proximity level for helping him to seek mastery over the task. For this purpose he keenly observes the task performed by the student as a result of the modelling and in doing so, offers him the needed feedback and hints to do the task as masterly as possible. If required, he may again arrange for the demonstration of the performance of the task, observe the student's task and may structure the task accordingly as to help the student in learning and acquiring it in a proper way closer to expert performance. Specifically,

coaching is immediately related to specific attempts to accomplish the target task by the hands of the learners.

3. *Scaffolding*: Scaffolding is based on Vygotsky's (1978) concept of the zone of proximal development (ZPD), which he defined as the distance between the *actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers* (p. 86). Vygotsky believed that when a student is at the ZPD for a particular task, providing the appropriate scaffolding would give the student enough 'boost' to complete it. Further, once the student masters the task with the benefit of scaffolding, the scaffolding can be removed. Just as a building remains erect after its scaffolding is removed, a student should be able to achieve the task again without the aid of scaffolding.

Thus, scaffolding, as a method or technique utilised in cognitive apprenticeship, refers to the help and support provided by the teacher/expert for assisting the student in carrying out the task. It can be provided in the form of suggestions, guidance verbal directions or may take the form of physical supports. It is always provided at the time when it is needed most on the part of the student, i.e. he is feeling difficulty in the execution of a skill or executing a particular part of a task such as committing error in putting decimal at a proper place. The use of scaffolding thus requires from the teacher, first to have an accurate diagnosis of the student's difficulty/his current skill level and then adopt the proper ways and means for guiding and helping the student in carrying out the target activity. In the learning of skills, such as riding a cycle or driving a car, the learner, thus, with the utilisation of scaffolding technique, may be provided the needed verbal and physical support as and when required by the learner for taking subsequent steps in the learning of the skill. This support should always be intended to remove the barriers and should be quite

temporary in its shape and direction. It should be gradually removed as and when the learner shows symptoms of doing it on his own.

4. *Articulation*: Articulation is defined as *the act of giving utterance or expression* (Merriam Webster's, 2001). In reference to cognitive apprenticeship, articulation as pointed out by Collin, Brown and Newmen (1987 : 482) involves any method of getting students to articulate their knowledge, reasoning, or problem-solving process in a domain, particular field or subject area. Collins and Stevens (1982) have provided three distinct methods or forms of articulation namely enquiry teaching, thinking aloud, and critical student role.

Enquiry teaching refers to a strategy of questioning students to lead them to articulate and refine their understanding of concepts and procedures in different domains or area of the subjects. For example, while making use of the device enquiry teaching, a language teacher may systematically question students about one summary of the text is good but another is poor, to get the students formulate an explicit model of a good summary.

The use of *thinking aloud strategy* demands students to articulate their thoughts while solving problems. The critical student role, on the other hand, demands students to assume the critic or monitor role in group or cooperative activities/projects for articulating their ideas to other students.

5. *Reflection*: Merriam Webster's (2001) defines reflection as *consideration of some subject matter, idea or purpose*. In reference to cognitive apprenticeship, reflection as described by Collins, Brown and Newman (1987 : 483) refers to a process that allows students to compare their own problem-solving processes with those of an expert/master; another student and ultimately an internal cognitive model of expertise. It may be carried out by the use of various techniques for reproducing or 'replaying' the performances of both expert and novice for comparison.

For example, reading or writing, methods of utilising reflection strategy may consists of recording students as they think loud and replaying their tape for comparison with the thinking of experts and other students. Whatever means may be applied, the goal of reflection ultimately lies in making the students look back and analyse their performance with a desire for understanding and improvement towards the behaviour of an expert.

6. *Exploration*: Exploration involves: (i) pushing students into a mode of becoming self dependent in the problem solving or knowledge, construction task, and (ii) teaching students exploration strategies. In cognitive apprenticeship, to become independent problem solver on the part of the students is quite essential as without reaching it the true objective of cognitive apprenticeship cannot be realised. One can be said to be the master of a skill or field only when he is able to perform and execute it on his own. Besides this, he should also be capable of thinking and employing noble ways and means of improving the task performance and excelling in the exhibition of variety of improved skills in the performance of that task. For this purpose, the students should be made not only an independent problem solver by withdrawing the use of supports and scaffolds but should also be taught the way of exploring, researching and developing hypotheses for knowing the novel ways of performing the task and solving the problems.

In fact features of exploration are similar to those found in *discovery learning* and *inquiry-based approaches*. Exploration is not merely reading or listening to a teacher's presentation but obtaining knowledge for oneself. Nor it is students simply doing what they want to do; they perform directed and guided activities suggested by the teacher. The teacher poses general problems and allows students to move into specific problems of their own instead of teaching how to solve a problem and providing material to help students explore. Through exploration and other similar approaches, students discover

new knowledge and learn general problem-solving skills (Bruner, 1961; Shunk, 2000).

Exploration in cognitive apprenticeship is pushing students to try out their hypotheses, methods and strategies with processes similar to those that experts use to solve problems (Collins, 1991). For this purpose students are usually engaged in two kinds of exploration:

- i. *Exploration of the world*: Students explore and even play with facts, problems, phenomena, and properties of our world in a less structured learning environment (Rose, 1995).
- ii. *Exploration of problem-solving processes*: When novel problems that require adjustment of pre-existing cognitive processes are presented to the students, the learners try different problem-solving processes.

The responsibilities of the teacher to foster students' explorations include gradual fading of support, encouraging students' autonomy, and transferring responsibility to students (Rogoff, 1990). The goal of the students is actually to use their mental model of experts' cognitive processes on their own or as a group to find and solve problems, set achievable goals, test hypotheses, and make their own discoveries (Collins, 1991).

Conclusion about cognitive apprenticeship: Cognitive apprenticeship practices may prove a quite effective device, means and ways of helping the novice/students or learners to acquire the necessary knowledge and skills regarding the execution of a task, or subject areas. Their ultimate goal is to make the learner quite independent in the problem-solving task or acquisition of mastery over the use of a skill. They become quite aware of how and why of the task performance. Moreover it helps them in learning the ways of learning the task, i.e. constructing the needed knowledge by their own independent efforts, exploring the novel ways of solving the problems and doing the task as proficiently as possible. In this way, while following the footsteps of Vygotski social constructivism and Piaget individual constructivism cognitive apprenticeship may be

seen to play the role of an effective facilitator in the knowledge construction and knowledge discovery task of a conscious and motivated learner.

Meta-cognition

Meta-cognition as a concept and terminology used in the cognitive and constructivist perspectives of psychology of learning and living has been defined in a number of ways by the scholars and authors. Let us reproduce a few of these definitions for knowing about the meaning and nature of meta-cognition.

Collins English Dictionary (2009): Meta-cognition refers to “the process of one’s thinking about one’s own mental processes.”

Flavell (1976 : 232): Meta-cognition refers to one’s knowledge concerning one’s own cognitive processes or anything related to them, e.g. the learning-relevant properties of information or data. For example, I am engaging in meta-cognition if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact.

Livingston (1977): Meta-cognition refers to higher order of thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress towards the completion of a task are meta-cognitive in nature.

Metealfe and Shimamura (1994): Meta-cognition is defined as *cognitive about cognition*, or *knowing about knowing*. It can take many forms; it includes knowledge about when and how to use particular strategy for learning or for problem-solving.

Hacker (1997): Meta-cognitive is often referred to as *thinking about thinking* and can be used to help students “learn how to learn.”

The definitions of the term meta-cognition cited above may help us to know about the meaning, nature and characteristics of the concept *meta-cognition* in the manner given below:

- *Meta-cognition* is relatively a much higher and deeper concept than the cognition. *Cognition* in simple words stands for awareness or knowing. Meta-cognition as a higher concept stands for *knowing about knowing* or *cognition about cognition*. It tells us that merely knowing or getting acquainted with a piece of knowledge somehow is not sufficient. One should know the *why* and *how* of the acquired knowledge, experience or skill. One should therefore be fully acquainted with the knowledge getting process and should be equipped with the skill of knowledge construction through his own independent efforts.
- Meta-cognition helps one to have the desired cognition about his own cognitive functioning, i.e., subject of his cognition or thinking; the tools or strategies applied in carrying out this thinking; the direction of the present thinking; the help received from the present thinking in achieving the target (such as problem-solving, acquisition of certain knowledge or skill, etc.); desirability or non-desirability of bringing change in plan of action, learning or problem solving strategies, etc.
- Meta-cognition helps in seeking full awareness and self-regulation of one's own thinking and learning. It represents a system of active monitoring and regulation of the cognitive processes. In other words, it helps us to exercise active control over our process of thinking and cognition that we make use for our new learning, construction of knowledge or ways of discovering the solution of our problems.
- Meta-cognition as a higher order thinking skills are very much utilised by us in the execution of our tasks and solving of our problems involving complex cognitive abilities. The planning, execution, monitoring and evaluation of the strategies used for carrying out such higher order mental tasks are very much regulated through the variety of meta-cognition skills possessed by us as the human beings.

Knowing in this way, we can now functionally define the term meta-cognition as a process or ability possessed by us in the form of self awareness and self-regulation of our thinking and cognitive functioning for helping us to know or discover the way of acquiring or constructing a piece of knowledge or solving a particular type of problem in the most effective way.

Components or elements of meta-cognition

According to Flavell (1987), meta-cognition is said to involve the following constituents or elements in its functioning.

1. Meta-cognitive knowledge or meta-cognitive awareness
2. Meta-cognitive experiences or regulation.

Let us know about these components of our meta-cognition.

Meta-cognitive knowledge or meta-cognitive awareness

It is concerned with what an individual knows about himself and others as cognitive processors. Such meta-cognitive knowledge, according to Flavell (1987) may be further divided into three categories: knowledge of person variables, task variables and strategy variables.

Stated very briefly, knowledge of person variables refers to general knowledge about how human beings learn and process information as well as individual knowledge of one's own learning processes. For example, you may be aware that your study session will be more productive if you work in the quiet library rather than at home where there are many distractions. Knowledge of task variables includes knowledge about the nature of the task as well as the type of processing demands that it will place upon the individual. For example, you may be aware that it will take more time for you to read and comprehend a science text than it will take for you to read and comprehend a novel.

Finally, knowledge about strategy variables include knowledge about both cognitive and metacognitive strategies, as well as conditional knowledge about when and where it is appropriate to use such strategies.

Meta-cognitive regulation or experiences

Meta-cognitive experiences involve the use of meta-cognitive strategies or meta-cognitive regulation (Brown, 1987). Meta-cognitive strategies are sequential processes that one uses to control cognitive activities, and to ensure that a cognitive goal (e.g., understanding a text) has been met. These processes help to regulate and oversee learning, and consist of planning and monitoring cognitive activities, as well as checking the outcomes of those activities. For example, after reading a paragraph in a text a learner may question himself about the concepts discussed in the paragraph. His cognitive goal is to understand the text. Self-questioning is a common meta-cognitive comprehension monitoring strategy. If he finds that he cannot answer his own questions, or that he does not understand the material discussed, he must then determine what needs to be done to ensure that he meets the cognitive goal of understanding the text. He may decide to go back and re-read the paragraph with the goal of being able to answer the questions he had generated. If, after re-reading through the text he can answer the questions, he may determine that he understands the material. Thus, the meta-cognitive strategy of self-questioning is used to ensure that the cognitive goal of comprehension is met.

Meta-cognitive skills

Meta-cognition, the process of *knowing about knowing* is said to involve a number of specific skills named as meta-cognitive skills. A few of these skills may be outlined as below:

- Skill of planning a cognitive task.
- Skill approaching or executing a cognitive task.
- Skill of monitoring, comprehension and evaluating the progress towards the completion of a cognitive task.
- Skill associated with the maintenance of motivation to see a cognitive task to completion.
- Skill of identifying blocks to learning or problem solving as early as possible.
- Skill of changing tools or strategies to ensure goal

attainment.

- Skill of being aware or conscious of one's own strengths and weaknesses in relation to the execution of a cognitive task.
- Skill of being above the nature of the cognitive task.
- Skill of being aware of the 'tools' or skills needed for the execution of the task in hand.
- Skill of self-regulating one's own thinking and learning.
- Skill of bringing learning from off-the-situational learning to on-the-situational learning.

Meta-cognition and intelligence

Meta-cognition enables us to be successful learners and problem solvers, and therefore is essentially associated with our cognitive abilities and intelligence. Robert Sternberg (1985), propagator of the *Information processing or triarchic theory of intelligence*, refers to the executive processes related to the controlling of one's cognitive processes (self regulation) involved in meta-cognition as meta-components. In his theory, Sternberg treats meta-components as the executive processes that control other cognitive components as well as receive feedback from these components. According to Sternberg, meta-components are responsible for "figuring out how to do a particular task or set of tasks, and then making sure that the task or set of tasks are done correctly" (Sternberg, 1986b, p. 24). These executive processes involve planning, evaluating and monitoring problem-solving activities. Sternberg maintains that the ability to appropriately allocate cognitive resources such as deciding how and when a given task should be accomplished is central to intelligence. It can be seen here that ability to appropriately allocate cognitive resources is nothing but the process of self-regulation or exercising proper control over one's thinking process. Therefore, it can be safely concluded that meta-cognition is essentially linked with one's cognitive potential and intelligence.

Cognitive versus meta-cognitive strategies

The question here may arise what is the difference between the term cognition and meta-cognition or what is the difference between a

cognitive and meta-cognitive strategy?

Can declarative knowledge be meta-cognitive in nature? For example let us take the knowledge regarding the quite abstract and difficult concept of the subject bio-chemistry or philosophy. Should we term it as cognitive or meta-cognitive? In this connection, Flavell himself has acknowledged that meta-cognitive knowledge may not be different from cognitive knowledge (Flavell, 1979). The distinction lies in how the information is used. Recall that meta-cognition is referred to as *thinking about thinking* and involves overseeing whether a cognitive goal has been met. This should be the defining criterion for determining what is meta-cognitive. Cognitive strategies are used to help an individual achieve a particular goal (e.g., understanding a text) while meta-cognitive strategies are used to ensure that the goal has been reached (e.g., quizzing on self to evaluate one's understanding of that text). Meta-cognitive experiences usually precede or follow a cognitive activity. They often occur when cognitions fail such as the recognition that one did not understand what one just read. Such an impasse is believed to activate meta-cognitive processes as the learner attempts to rectify the situation (Roberts and Erdos, 1993).

Meta-cognitive and cognitive strategies may overlap in the same strategy, such as questioning, could be regarded as either a cognitive or a meta-cognitive strategy depending on what the purpose for using that strategy may be. For example, you may use a self-questioning strategy while reading as a means of obtaining knowledge (cognitive), or as a way of monitoring what you have read (meta-cognitive). Because cognitive and meta-cognitive strategies are closely inter-wined and dependent upon each other, any attempt to examine one without acknowledging the other would not provide an adequate picture.

Knowledge is considered to be meta-cognitive if it is actively used in a strategic manner to ensure that a goal is met. For example, a student may use knowledge in planning how to approach a math exam: *I know what difficulty I (person variable) have with word problems (task variable), so I will answer the computational problems first and save the word problems for last (strategy*

variable). Simply possessing knowledge about one's cognitive strengths or weaknesses and the nature of the task without actively utilising this information to oversee learning is not meta-cognitive.

Meta-cognition as facilitator of knowledge construction task

Meta-cognition defined as *cognition about cognition* and *thinking about thinking* is given credit for paving a smooth road for the knowledge construction on the part of an intended learner. Meta-cognition processing aided by one's meta-cognitive skills helps him:

- to become aware of his thinking processes being employed in his learning or problem- solving acts.
- to take needed control of his cognitive process for planning, executing, evaluating and bringing changes in his cognitive strategies for accomplishing the desired end.
- to strive for learning the way of acquiring or constructing the knowledge rather than merely acquiring knowledge.
- some how to make use of his cognitive abilities and intelligence at his disposal for discovering the solution to the problem and construction of knowledge by himself as needed in one or the other situations of learning or problem solving.

SUMMARY

There may be two different and opposite ways of learning or acquiring knowledge on the part of learners namely (i) construction of knowledge and (ii) transmission and reception of the knowledge.

For a long time in the past, learners have been using the second mode for their learning and acquiring the knowledge. In this mode the already constructed knowledge is directly transmitted to the learners through lecturing, demonstrating or using multi-media by the teachers, elders, and other knowledge givers to the intended learners with an intention of its reception on the part of learners in the way and form it is being transmitted to them. Here thus the role of the learner is strictly limited to the reception of the knowledge transmitted to him by a knowledge giver. He may also receive it through some other direct knowledge supplier source such as text books, reading literature or mass/multi-media. Here the knowledge is received or acquired by the learner through the courtesy and help of others and he is not involved in its construction by himself in any way.

On the other hand in the use of the first mode, the learner is interested in the learning (acquisition of knowledge) where the task of the knowledge acquisition is carried out by the learner himself quite independently by constructing the needed knowledge through his own efforts or with the assistance/guidance of the teacher, elder or knowledgeable peers. Here he does not engage himself in the learning of that knowledge (lying in the form of already constructed by the knowledge constructors) which is transferred by the knowledge givers directly to the receivers of that knowledge. Here the tasks of knowledge construction is well carried out by the learners themselves and they are found to learn and acquire what is being needed to them for their adjustment, development and progress. In the case wherein they feel difficulty in doing this with their own efforts, the assistance and guidance may be secured by them for helping their task of knowledge construction in a proper way.

Learners need to construct the knowledge by themselves, needed for them, for their adjustment, development and progress. But the

task of knowledge construction is not so simple. It needs to be passed through a few important processes for facilitating the construction of knowledge on their part. These processes may be named as (i) Experiential learning and reflection, (ii) Social mediation, (iii) Cognitive negotiability, (iv) Situated learning and cognitive apprenticeship and (v) Meta-cognition.

Experiential learning stands for that type of learning which is based on the experiences (individual or in collaboration), i.e. observing, doing and drawing inferences by getting actively involved in the learning process. *Experiential learning* in its practical use and application may be termed as a continuously evolving process consisting of a four-stage cycle named as (i) Concrete experience (ii) Reflection (iii) Abstract conceptualisation or generalisation and (iv) Active experimentation or practical action.

The art of *experiential learning* is an essential component of a knowledge construction task. Equipping of the learner with the art and skill of experiential learning may help the learner in a desired way to construct the knowledge by his own efforts for his needed learning.

The other useful process for helping and facilitating the task of knowledge construction on the part of an individual is *social mediation*. In simple words it means that the cultural or social factors present in the child's environment play a role of an effective mediator between himself and the knowledge construction. The child becomes capable of constructing the knowledge needed for his desired adjustment and development with the active support and influences of the cultural and social factors present in his environment. It is true that he may learn many things by attempting to interact with the available environment and construct the needed knowledge with his own efforts. But as the level of the acquisition of such knowledge is heightened he may feel handicapped to do so without the help rendered by the social and cultural mediation such as assistance and guidance from the teachers, parents, elders and knowledgeable peers. The social and cultural tools available in his social and cultural environment such as language for interaction and communication with people, mass media, including social networking

and internet and mobile services may also help him much in his knowledge construction by playing their role as *social mediators*.

The third notable facilitating process for the knowledge construction is *cognitive negotiability*. We may define it as the ability to negotiate or seek negotiations for knowing or searching about something. In making such negotiations one has to seek or discover the suitable alternatives for getting success in finding the solution of a problem, handling of a situation or execution of a task in the most satisfactory way.

The fourth process adjudged as a big facilitator in the knowledge construction task is found to involve the concepts named as *Situated learning and cognitive apprenticeship*. In situated learning the learners are seen to learn and acquire the necessary knowledge and skills in the real-life situations in the same way as being used and practised by the real-life users and practitioners in their usual ways. The practice of apprenticeship (learning the art and skill of a trade or profession under the guidance and supervision of an expert or master) employed for helping the learners to learn the art and skill of a profession or trade represents a good working example of the *situated learning*. *Cognitive apprenticeship* in its word meaning stands for the *apprenticeship carried out in cognitive perspective*. It allows the teacher/master to teach in a situated learning setup (real-life situations) the needed knowledge and skills for helping the apprentice to perform a task independently.

The fifth and last factor associated with the task of helping and facilitating the task of knowledge construction is *meta-cognition*. The term meta-cognition may be defined as a *process or ability possessed by the child in the form of self awareness and self-regulation of his thinking and cognitive functioning for helping him to know or discover the way of acquiring or constructing a piece of knowledge or solving a particular type of problems in a most effective way*. Known as *cognition about cognition and thinking about thinking*, thus the term meta-cognition stands for a quite raised level of one's cognitive functioning where one can use his intellect

for knowing and discovering the knowledge with his own efforts. Its use implies that we must try to make the children learn and engage in the knowledge construction task by exercising needed control over their cognitive process for planning, executing, evaluating and bringing changes in their cognitive strategies for accomplishing the desired end.

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Learning Strategies

WHAT ARE LEARNING STRATEGIES?

In simple words, the term learning strategy stands for the type of strategy employed by the learner in carrying out his learning task in a way which is most helpful for him to attain the desired learning objectives. The term *strategy* in its own way slightly differs from the commonly used terms, methods and devices employed by a learner for his learning. It stands for specific plans and ways desired and employed by the learner for attaining his learning goals or objectives much in the same way as used by a chessplayer or operation in-charge of a warfare. A learning strategy is so planned and designed as to provide maximum help to the learner in getting engaged in a learning task as effectively as possible for the realisation of the set learning goals. The strategy used must help a learner (i) in remaining motivated, interested and absorbed in the process of learning (ii) to acquire necessary knowledge, skill, attitude, etc. for bringing desired changes in his behaviour (iii) to discover or construct the knowledge with his own independent efforts, guided learning or cooperative and group learning. Whatever strategies may be employed by the learner for his learning in a particular learning environment the goal is to seek best learning output through the creative and meaningful learning efforts and endeavours. There are number of learning strategies available for the learners for their learning which can help them to learn (i) in an independent way with no outside help and assistance (ii) with the assistance of a teacher or peer-tutor or (iii) in a group involving cooperative and collaborative spirit. In the present chapter, here we would specifically focus our discussion on the strategies known by the terms *cooperative learning*, *peer tutoring*, *collaborative and group learning*.

COOPERATIVE LEARNING

Concept of Cooperative Learning

Cooperative learning as the name suggests stands for a learning process or learning strategy in which students are provided opportunities to learn by themselves in a group in a quite cooperative way. They share each and every information among themselves and help each other for having required knowledge, understanding and application of one or the other aspects of the content material or course units included in their syllabus. It seems quite contrary to the practice of teaching–learning prevalent in our current education system. Our ongoing classroom teaching is totally teacher dominated and content centered. Here teachers are regarded as the repositories of subject knowledge and their role is simply to pour into the open, empty and willing (or non-willing) minds of students, their vast reservoir of knowledge. They do not trust their students to learn. They think that they must tell them what to learn and provide all the structure for the learning to take place. This structure of learning provided by them to their students is highly individualistic. It encourages individual as well as competitive learning in place of group and cooperative learning. Here students are tempted to learn more and more in order to gain good grades, divisions, certificates, appreciation or attractive prizes, etc., by excelling their own peers or reaching the set target of excellence. *Cooperative learning* says no to such practices. It advocates *cooperative learning* (i.e., the learning in group by cooperating with one another) in place of the competitive and individualistic approach (encouraging cut throat competition and immoral practices of getting ahead) prevalent in our education system. For the differentiation between *individualistic, competitive and cooperative approaches to learning*, let us make it clear with the help of some concrete teaching–learning situations.

Illustration

Here we present three classroom situations each representing a particular learning setup. Just read and analyse their nature and name them accordingly.

1st Situation: A teacher announces: “In this week we will have a discussion concerning the unit ‘Our Earth and Its Rotation’. Let us see which one of the three students of this Section A get the highest score on the unit test taken on ‘Monday’. Mind that all these three students will get free travel to the science tour organised for South India by the institution.”

2nd Situation: The same teacher introduces this week’s teaching about the same unit in Section B as below:

Let us see how do you learn about the unit ‘Our earth and its rotation’ in the coming days. We will have on Tuesday, weekly test on the unit. All those students who get 90% marks will earn free travelling to the Science tour organised for South India by the institution.

3rd Situation: The same teacher announces about the teaching of unit “Our Earth and Its Rotation” in the Section C in the manner given below:

From today onwards during those weekdays, we will study the unit ‘Our Earth and Its Rotation.’ Let’s see how many of you are able to get 90% marks or more on the Monday test. For the study, I want you to work in groups of three to help one another for the study of this topic. If all the three members of a group get at least 90% on the test then that group will earn free travelling to the Science tour organised for South India by the Institution.

Let us analyse now the above three classroom situations.

- I. The first one is the example of competitive learning. Here only three best students of the whole section are going to get their free travelling. This is obviously a very competitive learning situation. Here many of the students will not even try to compete (and as a result will not be motivated much in the learning of the unit) because of their previous record of doing poorly in the class. Those who come forward, will essentially have a cut throat competition for reaching the top three. In either of these two types of students, it is certain that there will be a desire to get the reward on the individual basis (self is great) by setting aside any intention to help the fellow students learn about the unit “Earth and its rotation”.

- II. The second one is the example of individualistic learning although there is no competition and wish to get ahead at any cost because one's achievement does not affect the other's earning of 90% marks. An average student here may find attraction and motivation to study the unit and doing enough labour to reach the set level of 90% marks. But the question remains the same—Whether one will like to help others in their understanding of the unit and earning 90% marks? May be some of them will come out, if they have the time and intention to do this on their personal level but most of the students work for individual gains.
- III. In the third one you may yourself visualise that there is no cut throat competition and individualism. If you intend to go (or even not going for your own reason) to tour by earning free journey then you have to work hard along with your team members cooperatively in such a way as each of you get at least 90% marks.

It is an example of *cooperative learning*. Here you will try to help your team members to have a complete understanding of some or the other contents of the unit so that they may not lag behind in earning 90% marks. Your award is definitely attached with the cooperation you give and take from your team members.

In this way, the term *cooperative learning* may be understood as a teaching–learning or instructional strategy in which the students of a class or section work in small groups to help one another learn in a cooperative and non-competitive environment. Unlike competitive learning situation (e.g. Situation I; where one student's success actually depends on the failure of others), an individualistic learning situation (e.g., Situation II; where one student's success is unrelated to the fellow students or students in a cooperative learning situation (e.g., Situation III; where students in their respective group work together to achieve common success), work sincerely in close

cooperation with the spirit of “sink or swim together.” (Johnson and Johnson, 1991)

Basic Assumptions and Features of Cooperative Learning

The basic assumptions and features associated with *cooperative learning* may be outlined as below:

1. Cooperative learning ideology believes in making the teacher-learning process as learner centered rather than being content or teacher centered.
2. It advocates constructivist ideology for the better teaching–learning outcomes by encouraging students to formulate their own constructs and ways of understanding the content material.
3. It believes in redefining the role of teacher from a lecturer, expert or repository of subject knowledge to capable facilitator for helping his students in the task of their cooperative learning.
4. It advocates interactive teaching–learning environment instead of more lecturing and demonstrating on the part of teachers. Here responsibility for learning is thus shifted to the students instead of the teacher’s efforts for making his students learn by resorting to one or the other tactics.
5. It emphasises social learning by assuming that learning takes place better in a social situation and group environment rather than individually in isolation.
6. It assumes that children learn better in a non-competitive, anxiety free, cooperative environment than in a competitive and stress full environment available in the traditional classroom situations.
7. It believes in group efforts and cooperation among the learners in place of individual efforts and competition.
8. It believes that children learn better from each other in a cooperative way due to their proximity, equality,

interdependence and rapport existing among them instead of the learning thrust upon them by some outside agency including teacher.

9. It believes that students' achievements and performances may be evaluated better in terms of group achievements in the less threatening group situation rather than the competitive more threatening individualistic situations.
10. It believes that students learn the best when they are totally involved in the learning process by cooperating each other for attaining their maximum.
11. It advocates that the two necessary elements—group goals and individual accountability should be used together for the evaluation of group achievements in cooperative learning.
12. It believes that students must get opportunity to learn and work cooperatively in a group in order to develop themselves into a cooperative and responsible social beings on the very assumption that students who cooperate with each other in learning, learn to like each other in real life.

How to Proceed with Cooperative Learning

To replace the traditional classroom learning and setting by a cooperative learning set up is not an easy task. One may have to face so much opposition and resistance from the fellow teachers, students, authorities and parents in doing so. Moreover, the present circumstances and education system are not at all favourable for the introduction of such innovative and useful practice in our schools and colleges. However, much depends upon the teacher who is himself convinced about the fruitful outcomes of the cooperative learning. For this purpose he must learn the art and skill of employing cooperative learning as the useful strategy of teaching–learning. After then he must get his students, authorities and parents

of the students convinced about the utility of employing this noble practice. With such background and initiation, he should settle down for devising as well as employing variety of ways and means for the adoption of cooperative learning setup. The mentionable few are as under:

1. A unit of the course in a subject may be broken down into certain meaningful sub-units. These sub-units may then be assigned to the different teams (each having 5 to 8 students) of a class or grade for cooperative learning. The team members may collect relevant information and go through learning experiences, activities, etc. for gaining the required knowledge, understanding and insight about the assigned sub-unit in a quite cooperative way mutually helping and complementing each other's efforts for doing so. After sometime (this duration may be fixed in advance), the members of the different teams may sit together for discussing their learning outcomes with respect to the sub-units assigned to them. In fact, they may teach each other the content material or learning experiences acquired by them in their respective sub-unit. After grasping the knowledge and understanding of the whole unit, the students may again be asked to work in their respective groups/teams for gaining more insight and understanding of the unit through cooperative efforts and then show the outcomes of their striving to all the students of the class.
2. Students of a class in any subject/grade may be asked to work on a group project for which they may have a hand in selecting. It may give extensive opportunities to them for cooperative learning as well as working in the group. Such group projects or investigations may be highly structured to emphasise higher order thinking, analysing and evaluating skills. They may also provide a proper platform for the demonstration of practical abilities on the part of students while working cooperatively in a group.
3. In another cooperative learning set up, students with

varying academic abilities may be assigned to 4–5 member-teams for studying what has been initially taught by the teacher and to help each other to reach his highest level of achievement. After such cooperative efforts, all the students of the class are tested individually. After then the different teams of the class may be awarded certificates or other recognition on the basis of the extent to which all team members have progressed over their past records.

4. An another cooperative learning set up may involve the *strategy of reciprocal questioning*. It may be used with a wide range of ages and subjects. In this set up, beginning is made with the delivery of a lesson or some presentation on the part of the teacher. After that, students are asked to work in pairs or triads (group of three) to ask and answer questions about the contents of the lesson or presentation. For gaining proficiency in asking and answering questions students may be initially given some training by the teacher. Afterwards, they may be encouraged to create questions and take turns asking and answering. Such set up of reciprocal questioning has been found to be more effective than traditional discussion groups because it seems to encourage deeper thinking about the material presented to them by the teacher and also it provides all the due benefits of cooperative learning.
5. In another cooperative learning set up a particular topic or unit of the subject is assigned to five or six groups or teams of a class. Each group or team may have a small number of students of varying interests and abilities. In respective team, each team member is responsible for learning a specific part or sub-unit of a topic. He himself strives hard in the learning of this assigned sub-part in close collaboration with his counterparts in other teams. In fact they work closely in a quite cooperative spirit for acquiring necessary knowledge, experience and application related to that very sub-topic. After then all members of the team sit together for discussing the fruits of their striving and acquire complete picture of the knowledge and

understanding of the sub-topics or sub-units related to a particular topic. They may go for its deep understanding and advanced study by repeating their cooperation exercise in the process of learning.

Merits and Advantages of Cooperative Learning

Cooperation learning may prove quite fruitful and advantageous due to the various benefits derived through its use as below:

Academic benefits

1. It involves students actively in the teaching–learning process.
2. It makes the students responsible for their learning.
3. It makes the teacher–learning process as learner-centered rather than content and teacher-centered.
4. It helps the students in developing higher order thinking skills, critical thinking and oral communication skills.
5. It helps the students in learning many tasks requiring manipulation, demonstrative and practical skills simply on the basis of learning through imitation and observation of the behaviour of their peers.
6. It helps the weaker students in improving their performance when grouped with higher achieving students.
7. Students get opportunity for deeper understanding and insight of the subject matter as a result of discussing and teaching the material learned by them to their peers.
8. It helps in providing interactive model for the classroom teaching in place of one sided teacher dominated lecture or demonstration method.
9. It helps in improving classroom results by making the students more involved, motivated and willing to learn and achieve the learning targets more and more by providing an anxiety free non-competitive stimulating environment.
10. It helps in improving the learning environment of a classroom by re-scheduling the roles of teachers as well as

learners. Here teacher now acts as a facilitator to help the learners in learning the task which is totally planned and implemented by them.

11. It helps the teacher to become more free and capable of guiding and supervising the learning activities of his students as groups are easier to supervise than the individual students.

Psychological benefits

1. Students learn better in a cooperative environment which keeps them away from the unnecessary anxiety of being excelled by others.
2. Cooperative learning encourages students to seek help and accept tutoring from their peers. It provides them a sense of security which is almost endangered in a competitive traditional classroom environment.
3. Students are helped through cooperative learning in building their self-confidence and self-esteem in a better way than the traditional classroom teaching.
4. Cooperation and team spirit available in the cooperative teaching helps students in reducing their classroom learning and test anxiety.
5. Cooperative teaching helps in developing healthy interaction among the students as well as between the teacher and students. Students acquire a quite healthy and positive attitude towards each other as well as to their teachers who are always ready for helping them in their learning tasks.

Social benefits

1. Cooperative learning is helpful in the development of many social qualities and virtues among students for becoming an adjusted social being.
2. In cooperative learning, students get a healthy, positive

atmosphere for modelling and practising cooperation and consequently the art of getting and giving proper cooperation can be properly learnt through the practice of cooperative learning.

3. It helps in promoting leadership skills among students.
4. Cooperative learning helps the students to get along with the people of diverse opinion, background, socio-economic status, religion, caste, colour or creed, etc., which is quite helpful to them to live and adjust in a democratic society.

Hindrance in the Path of Introducing Cooperative Learning

As discussed above, cooperative learning offers a platform as well as teaching–learning strategy to bring a desirable reform in the present-day teaching–learning system or strategy adopted in our traditional classroom settings. It is aimed to provide more responsibilities on the part of the learners for carrying out their learning business by themselves while cooperating and working together in small or large group as per demands of their learning situation for the satisfactory accomplishment of the learning objectives of a course related to any subject or grade. In reality, it suits the very nature and purposes of the learners belonging to a free and democratic society and as such it needs to be adopted as one of the good teaching–learning strategies at all levels of school or college teaching. However, in spite of many benefits derived from its introduction, it has not yet taken any shape in the system of our school and college education. Let us see, what are different factors that are coming in the way of its acceptance and introduction as a teaching–learning strategy in our system of education. We can summarise or list these factors or attributes as under:

Resistance on the part of teachers

Teachers themselves do not favour the introduction of cooperative learning in their teaching–learning due to the reason given below:

1. Teachers themselves have not been taught through cooperative learning, strategy at their school or college level.
2. They have not got any orientation and training for the use of cooperative learning strategy in their teacher preparation courses, D.Ed. or B.Ed., etc. They have also not been exposed to its orientation and training through in-service programmes. As a result most of the teachers do not know how or from where to start using cooperative learning techniques in classroom.
3. Teachers fear that they will lose control of the class and their authority if they give more responsibility to the students for their learning as it is bound to happen in a cooperative learning set up. In fact they fear to accept their role as mere facilitator instead of “all in one” in the present education system.
4. Teachers lack self-confidence for trying new methods and innovative practices fearing that it may expose them to potentially different situation. They in fact suffer from the well-known principle of inertia, i.e., resisting any new change or practices.
5. Teachers feel that student will be wasting their time in a cooperative learning set up. There will be a chaotic situation upsurging in the classroom environment with serious disciplinary problems for which they will be blamed by authorities and parents.
6. In the present set up, teachers are supposed to finish the prescribed syllabus of a subject in a fixed duration of the session. Teachers fear that it cannot be possible by adopting cooperative learning techniques.
7. Teachers feel that the required teaching–learning as well as curricular material for the successful use of cooperative learning is not available to them. They themselves have no

knowledge, skills as well as abilities to develop worksheets, project descriptions and other set of handouts helpful as support or base material for cooperative learning. Textbooks are also not written in view of the requirements of cooperative learning. In such circumstances, teachers feel hesitation to switch over to cooperative learning.

8. The use of cooperative learning requires an altogether different assessment technique in terms of assessing group efforts and assigning grades to groups on one hand and evaluating individual's role and efforts in such group venture on the other. Their unfamiliarity with such innovative assessment techniques persuades them to oppose cooperative learning with the assumption that the system will fail in the absence of the assessment of individual accountability of learners.

Resistance on the part of students

Students may also be seen to oppose the introduction of cooperative learning as a teaching–learning strategy mainly for the reasons given below:

1. They are in the habit of seeing the teacher in his authoritarian-expert role presenting each and every type of information and skill before them. They feel much more uncomfortable in putting their own efforts for the acquisition of information and skills and hence oppose the introduction of cooperative learning.
2. Students feel that lecture method is a proper method of teaching and they can also learn easily through its use by remaining quite passive in the teaching–learning process. Therefore, they resent any type of responsibility handed over to them in terms of interactive and cooperative learning.
3. Students think that a teacher resorts to cooperative learning simply for saving his own labour and energy otherwise required for classroom teaching. Therefore, they

begin to criticise the role of the teacher as a mere facilitator instead of expert information presenter.

4. Students are not subjected to any training or experience to cooperate in an academic environment. They are habitual to the spirit of maximum competition for excelling one another in the race of gaining grades and recognition. Therefore they try to resent or become fearful when asked to share information and study techniques or to help their peers in the cooperative learning processes.
5. It becomes quite difficult for the students to feel their utmost individual responsibilities for the greater cause of group work and cooperative learning. They feel that the peers in their team may not provide due cooperation or may play the role of a shirker.

Resistance on the part of authorities

Authorities put hurdles to the introduction of cooperative learning on account of the following reasons:

1. They fear that teachers will not be doing their teaching duties and may play the role of shirkers as an excuse for introducing this system.
2. It will be difficult to evaluate the teachers' effectiveness and output in the absence of the evaluation of students individual performance and accountability.
3. Authorities and administrators themselves have no proper knowledge about the philosophy and methodology of cooperative learning.
4. They fear that an altogether new infrastructure needs to be developed for the introduction of this innovative practice.

Resistance on the part of parents

Parents also oppose the introduction of cooperative learning chiefly on the grounds mentioned below:

1. Parents themselves have not been taught or exposed to the philosophy and methodology of cooperative learning.

2. Parents fear that this system will hamper the proper individual development of their children and they will become unfit for competing in this world of cut-throat competition and high speed advancement.
3. Parents of the bright students fear that their children will be used as tutors or will be wasting their time and energy in carrying the load of their team mates on the name of cooperative learning.
4. Parents take it as an excuse on the part of teachers for getting rid of the load of their teaching assignments and think it better to get their children educated through distance or online education mode instead of wasting their time in cooperative learning.

In this way, we may notice a number of hurdles, fears and resentments standing in the way of introducing cooperative learning in our education system. However, as may be, analysed and concluded easily, all these fears and resentment are absolutely erroneous and baseless. The ignorance regarding the philosophy, methodology and fruitful results of the cooperative learning seems to be the only cause working against the introduction of this noble and effective teaching–learning strategy. Surely and certainly, the lead should be taken by the teachers in education institutions for nurturing the clear picture and methodology of cooperative learning in the minds of the “would be” teachers, so that they may share the desired responsibility of its introduction in the schools, they happen to serve in the future.

PEER TUTORING

You must have heard about the terms tutors and tutorial classes and also must be acquainted with their use in day-to-day life. A tutor is usually differentiated from a teacher on the ground that he is relatively more near to the student than the teacher teaching in the classroom situation. He can establish more rapport with the student. Students can communicate more comfortably and non-hesitantly with their tutors and can avail their cooperation, guidance and help more easily in comparison to teachers. It is this image of a tutor, that helps much in drawing necessary benefits on the part of the students from their tutors. Its value and impact gets more enhanced when a student finds an opportunity to avail the services of one of his peer as a tutor in place of a particular teacher of the school playing the role of a tutor. Such tutorial services provided by a peer to his fellow students are referred to as *peer tutoring*.

In practice in *peer tutoring*, a fellow student is seen to help one or more of his fellow students in their learning and development. It is quite natural for a *peer tutor* to have more rapport, nearness and simplicity in relationship with his fellow students due to their belonging to the same age and grade. There is no much difference in their status in respect of experience, abilities and education status. The only difference that can be seen in a *peer tutor* and a fellow student is that the former knows a little more or is somewhat more skilled than the later and by virtue of his nearness and acceptability he can help the fellow student in a desirable way.

In this regard, the famous Russian Psychologist Lav Vygotsky has tried to convey through the concept of *Zone of Proximal Development* (ZPD) that a child can be helped well in getting instruction from peers who are near to him in respect of the

possession of desired knowledge and experience. Both can enjoy more rapport, nearness and trust between them and it results in appropriate instruction and cooperation much helpful for the success in instruction process. It is why the *peer tutoring* proves a better alternative for many of the students in their instruction and training, in comparison to the help rendered by parents, teachers and experts in this regard.

In the school set-up, *peer tutors* can play a quite significant role in carrying out the teaching–learning activity. The adoption of peer tutorial system can help well in realising the dreams of individualised instruction in a better way. In many of the elementary schools of our country where only one teacher is available for teaching all the subjects and activities of school curriculum and the schools where there is paucity of subject teachers, the so-called peer tutorial system may in fact prove a boon. Here the students studying in the senior classes can play the role of a *peer tutor* in an effective way. A student of the same grade or class having more proficiency or ability may also play the role of a *peer tutor*. We can have the arrangement for providing needed guidance and training to these promising *peer tutors* for playing their role in an effective way so that the deficiency in learning caused by the paucity or lack of teachers may be compensated to some extent. Such type of peer tutoring may also prove quite beneficial to the slow learners, backward and differently abled or disabled students in their proper education and adjustment. In an inclusive education set-up where there is a need of too much individualisation in respect of addressing the needs of the variety of students characterised by too much diversity and differences, the peer tutoring system may help well in a fruitful way.

Advantages and Significance of Peer Tutoring

Peer tutoring can prove quite beneficial in the elementary school

education set-up. We have already mentioned some of its advantages. However we can supplement it further by mentioning its usefulness in the following way:

Helpful in individualising instruction: *Peer tutoring* can provide an appropriate alternative for the individualisation of the process for instruction and guidance. A school can avail the services of a number of tutors at a time in the shape of *peer tutors*.

Availability of better instruction and guidance services: *Peer tutoring* has more potential to help the fellow student in getting instruction and guidance due to the reasons mentioned below:

- While engaging in the process of instruction and guidance along with their *peer tutors* students do not experience hesitation, fear or uneasiness as experienced by them during the interaction with their teachers. Here in this system, they feel more confident and ready to learn and definitely it results in knowing and learning the things that they are unable to learn or know from their teacher and other experts.
- The *peer tutors* are in a position to provide instruction to their fellow students by coming to their level or status. It can happen because after all they are also the students like their classmates. They have no fear for their self-dignity and status like a usual classroom teacher. As a result, the fellow students may come quite near to them for attending what they say or show in comparison to the classroom or subject teachers.
- *Peer tutors* are in a position to get the fellow students acquainted with their own experiences. They can tell them that they also passed through the difficulties and hurdles in learning as felt by the fellow students at any stage. How they got away from those difficulties, the narration of such experiences may prove quite beneficial to the fellow students in their learning task.
- The type of help and guidance that can be availed in the

practice work and training activities from the *peer tutors* is many times proved unmatched. We cannot expect it from the teachers in the usual classroom teaching situation. Students are not troubled by a bitter criticism and frequent testing work performed by the classroom teachers but contrarily get timely help and assistance in a very friendly and cordial way from their fellow *peer tutors*.

Proving advantageous in both the ways: The use of *peer tutoring* system is not only helpful and beneficial to the fellow students in their learning and training, but it also helps the *peer tutors* to get much benefitted in return. The tutorial services provided by them results in having desired mastery over the subject matter, knowledge and skills related to a particular subject or curricular area. It can help them in developing necessary confidence and in their abilities and skills providing necessary motivation for going ahead on the path of their own progress and development.

Helpful in school administration: *Peer tutoring* system may prove quite beneficial in exercising educational responsibilities by the school authorities in a desired way. In the form of tutors here, a school can avail the services of the most efficient and gifted students. They can utilise their services in the capacity of monitors and leaders for running the administration of schools in a better way especially in terms of maintaining discipline and providing individual help to the fellow students at the time of need.

COLLABORATIVE AND GROUP LEARNING

Collaborative and group learning in its simple meaning stands for the type of learning carried out in a group, by a group of interested learners, for the realisation of some common learning goals or objectives. It differs from the individual learning in the sense that it involves a group (consisting at least more than two individuals) as the learning community and they have to come together and work together for the realisation of their common goal.

When employed as learning strategy, the term *collaborative and group learning* may be found to represent a learning strategy aimed to pave the way for such a learning environment where a group of students come together and work together for the realisation of common learning goals such as acquisition of some concepts and skills or gaining of some desirable experiences helpful in their development.

The *collaborative and group learning* differs from the traditional teaching–learning approaches because here the students work together for a common cause rather than competing with each other individually for the completion of their individual agendas.

The adoption of learning strategy characterised with collaborative and group learning, nowadays may be considered a natural consequence of the wind flowing in the favour of social constructivist approach to teaching and learning in which the task of knowledge construction or learning is considered essentially a social construct. Thus, the essential condition for learning in a collaborative or group setting is to come together and work together for the realisation of a common goal.

In this connection, it is well said that coming together is a beginning. Keeping together is progress. Working together is success.

— Henry Ford

Let us try to understand the meaning and nature of the term *collaborated and group learning* in a more clear way by paying attention to some of its distinguished features and characteristics summarised below:

1. Collaborative and group learning represents a learning scene or situation in which two or more people learn or attempt to learn something together.
2. The notion of collaborative and group learning is heavily rooted in Vygotsky's view that learning has an inherent social base and a thing on the part of children may be properly learned and acquired in the company and guidance of the elders, teachers and knowledgeable peers.
3. Unlike individual learning, people engaged in *collaborative and group learning* capitalise on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.).
4. Collaborative and group learning is based on the model that knowledge can be created within a population wherein members actively interact by sharing experiences and responsibilities for the knowledge construction task.
5. Collaborative and group learning refers to methodologies and environments in which learners engage in a common task wherein each individual depends on and is accountable to each other. These include both face-to-face and online conversations.
6. Collaborative and group learning shifts the responsibility of learning to the student in the role of *researcher* and self-directed learner. In order to work towards a collaborative learning approach, the teacher must fully understand their students' preferred learning styles and their own conceptions of learning. This can help the teacher decide where and how to start a group project.
7. For collaborative learning to be effective, there should be both *group goals* and *individual accountability* (Slavin, 1989). This means that the collaborative learning task must

ensure that every group member has learnt something. Ideally, a collaborative learning task would allow for each member to be responsible for some concept necessary to complete the task. This implies that every group member will learn their assigned concept and will be responsible for explaining/teaching that to other members of the group.

8. Collaborative and group activities are most often based on four principles:
 - i. The learner or student is the primary focus of instruction.
 - ii. Interaction and “doing” are of primary importance.
 - iii. Working in groups is an important mode of learning and
 - iv. Structured approaches to developing solutions to real-world problems should be incorporated in learning.
9. In practice more often, collaborative and group learning is used as an umbrella term for a variety of approaches in the field of teaching and learning that involve joint cooperative effort by students or students and teachers for the realisation of common teaching–learning objectives.
10. The learning strategy involving the principle of coming together and working together is addressed with a number of terms and names such as cooperative learning, collaborative learning, collective learning, learning communities, peer teaching, peer learning, or team learning. What they have in common is that they all incorporate group work.

Examples of the Collaborative and Group Learning

1. Groups of students working together to search for understanding, meaning, or solutions or to create an artifact or product of their learning.
2. Group of students engaged in collaborative writing, group

projects, joint problem solving, debates, study teams, and other activities.

3. A group of students discussing a lecture proceedings delivered by the class or subject teacher, guest speaker or expert.
4. Students from different schools working together over the internet on a shared project or assignment.
5. A group of students of the same class or section working together for doing their homework, assignments and projects.

Steps for Executing a Collaborative and Group Work

In general while executing a task/activity in a collaborative and group learning set-up, the students in the group may be seen to follow the steps as below.

1. Choosing a group activity or task.
2. Planning for the execution of the chosen task or activity.
3. Distribution of role and responsibilities among the group members.
4. Execution of the task or activity.
5. Monitoring and coordination of the group activity.
6. Drawing necessary educational benefits from the executed activity.

Distinguishing Collaborative Learning from Cooperative Learning

The basis of both collaborative and cooperative learning is constructivism: *knowledge is constructed and transformed by students*. The learning process must be understood as something a learner does by activating already *existing cognitive structures or by*

constructing new cognitive structures that accommodate new input. Learners do not passively receive knowledge from the teacher; teaching becomes a transaction between all the stakeholders in the learning process as explained in Table 9.1.

Table 9.1 Difference between Cooperative Strategy of Learning and Collaborative Strategy of Learning

Cooperative strategy of learning	Collaborative strategy of learning
1. In the cooperative strategy of learning, the teacher still controls most of what is going on in the class, even if the students are working in groups.	Collaborative strategy of learning, on the other hand, is aimed at getting the students to take almost full responsibility for working together, building knowledge together, changing and evolving together and, of course, improving together.
2. Where a sense of control is needed for carrying out the group work on the part of students, cooperative learning is more preferred over the collaborated approach	Teachers interested in setting up collaborative projects and interested in working towards student autonomy and self-directed learning.
3. According to Brufee (1995) the things falling in the hemisphere of Foundational or basic knowledge (e.g. what is correct spelling; the correct language use; historical facts, etc.) are the best learnt through cooperative learning structures, usually at younger ages.	Brufee (1995) says that the things falling in the hemisphere of Non-Foundational knowledge (knowledge, which is derived through reasoning, questioning, discussion and negotiation of beliefs) are best learnt through collaborative efforts.

Both these terms essentially involve a type of group learning, i.e. a learning in which a group of people is found to come together and work together for the realisation of some common goal. It is why these may be found to overlap each other in terms of their work procedures and outputs. However, some authors have tried to seek distinction between these two terms. Here we would like to focus on the distinction between these two terms pointed out by Dooly, M. (2008) in the manner given ahead.

However, the distinction pointed out above between the terms *cooperative* and *collaborative* learning, if analysed properly may seem to be quite apparent than real. It may have some theoretical significance but on the practical grounds both the terms *cooperative* and *collaborative* learning solidly stand as the constituents of an umbrella term *Collaborative and Group learning*.

In a democratic set-up of the classroom situations or creative and constructive efforts of teaching–learning both may get merged together. It is why they often overlap and considered essentially as one and the same approach adopted for taking the teaching–learning task carried out in the group environment with a single motto of coming together and working together for a common goal. Here we would also like to treat these two terms as parallel terms and consequently would not go for the further discussion of the *collaborative learning strategy* (in relation to its detailed work procedure and merits-demerits) as we have already gone through it in the discussion carried out under the title *Cooperative learning* in this very chapter.

ROLE OF TEACHER AND SCHOOL IN RELATION TO LEARNING STRATEGIES

Learning strategies employed in the specific teaching–learning situations help the learners in realising the learning objectives in the most desirable ways. However, the success in the use of these strategies depends much on the cooperation received and responsibilities exercised on the part of school authorities and teachers. Let us see how they can prove useful and what roles need to be played on their part for the successful utilisation of one or the other learning strategies.

Role of School

School authorities need to carry out following functions and responsibilities in relation to the utilisation of learning strategies.

1. They must have required knowledge and information regarding the latest trends in the utilisation of learning strategies on the part of the teachers and students.
2. They should arrange for the required facilities to the teachers for getting trained in learning strategies for their employment. Teachers should be asked and provided due incentives for attending in-service programs, seminars and workshops related to the application and use of learning strategies.
3. They should take all pains in providing needed infrastructures, resources and material, etc. needed for the successful utilisation of one or the other learning strategies employed by teachers and students in their teaching and learning.
4. They should to conduct seminar and workshops for the lectures and exposition from the experts for getting acquainted their teachers and students with the use and applications of learning strategies in teaching–learning of various school subjects or development of the students in

general.

5. The initiative, efforts and outcomes of the teachers and students utilising learning strategies in their teaching and learning should be well acknowledged, appreciated and rewarded by the school authorities from time to time.
6. They should provide needed autonomy, freedom and facilities to the teachers and students for the utilisation of one or the other learning strategies as per requirement of the teaching–learning situations.
7. If needed, necessary changes and flexibility should be allowed in the time table of school curriculum and the evaluation system for activities and programs related to the implementation of learning strategies.

Role of Teachers

Teachers need to carry out following functions and responsibilities in relation to the utilisation of learning strategies.

1. They must get acquainted with the knowledge, application, skills and significance of various learning strategies applicable in one or the other teaching–learning situations.
2. They must try to orient their students about the need, significance and ways of utilising one or the other learning strategies suitable in a particular teaching–learning context.
3. They should help them to select one or the other, individual or group learning strategies according to the need of the teaching–learning situations.
4. Reasonable freedom and autonomy should be provided by them to their students for the utilisation of individual or group learning strategies. However, in all cases, they should always stand with their students for guiding, helping and assisting them in carrying out various activities related to the utilisation of learning strategies.
5. They should try to monitor the progress of the students in carrying out group work in connection with the utilisation of

cooperative and collaborative learning strategies. Similarly, in the adoption of *peer tutoring* as a learning strategies, they should help in the selection of *peer tutors*, orientation and training of these *peer tutors* and the help rendered by these *peer tutors* in the learning of the fellow students.

6. The initiatives and hard work put by the students in the utilisation of learning strategies on individual as well as collective basis should be well acknowledged, appreciated and rewarded by the teachers.
7. Teacher should help and assist students in the planning, execution and follow up of the activities and tasks related to group learning—cooperative and collaborative. They should help them in the proper selection of the activities, distribution of duties and responsibilities, fixing the group learning goals and execution, monitoring and evaluation of activities related to their group work.
8. Teacher should try to give up the traditional mode of teaching—learning in favour of the utilisation of learning strategies—individual and group, for helping students in constructing and acquiring knowledge and skills with their own independent and collaborative efforts.
9. Necessary flexibility in terms of the implementation of the school curriculum, time table and evaluation, etc., should be maintained on the part of teachers for the utilisation of learning strategies.

SUMMARY

1. The term learning strategy stands for the type of strategy employed by the learner in carrying out his learning task in a way that is most helpful for him to attain the desired learning objectives. As examples of the few popular learning strategies used for this purpose in an individualised and group learning set-up, we can name the (i) Co-operative learning strategy, (ii) Peer tutoring strategy and (iii) Collaborative and group learning strategy.
2. In the utilisation of *cooperative learning strategy* for their learning, students of a class engage themselves in a variety of useful learning activities in a cooperative, non-competitive environment by forming a number of teams, each consisting of a small number of students of different levels of ability for the understanding of a subject.
3. In its practical application, the cooperative learning strategy may be executed in a number of ways like (i) the teacher may first divide the unit of a course subject into certain meaningful subunits and then these subunits may be assigned to different teams (each having 5 to 8 students) of a class or grade for cooperative learning, (ii) students of a class in any subject/grade may be asked to work on a group project, (iii) students with varying academic abilities may be assigned 4–5 team members for studying what has been initially taught by the teacher and to help each other to reach highest level of achievement, and (iv) a particular topic or unit of the subject may be assigned to five or six groups or teams of a class. After then, all members of the team sit together for discussing the fruits of their striving and acquire complete picture of the knowledge and understanding of the sub-topics or subunits related to a particular topic.
4. In the utilisation of *peer tutoring strategy* for his learning, a student may be found to gain knowledge and skills related to a learning area or subject with the assistance, guidance and help from his classmate/peer, adjudged superior to him in

that very learning area. It is quite natural for a *peer tutor* to have more rapport, nearness and simplicity in relationship with his fellow students due to their same age and grade. There is no much difference in their status in respect of experience, abilities and educational status. The only visible difference in a *peer tutor* and a fellow student is that the former knows a little more or is somewhat more skilled than the later. A *peer tutor* is thus more near, close and acceptable to the learners of a class than the usual class or subject teachers and thus may be found more helpful to the fellow student in a more desirable way. With such virtues and goodness on its part, thus, the utilisation of *peer tutoring strategy* may prove quite beneficial in the learning and development of the fellow students in the individualised as well as group learning set up of a class or school.

5. In the utilisation of *collaborative and group learning* as a learning strategy, a group of students is found to come together and work together for the realisation of the common learning goals such as acquisition of some concept and skills or gaining of some desirable experiences helpful in their development. The collaborative and group learning differs from the traditional teaching–learning approaches because here, the students work together for a common cause rather than competing with each other individually for the completion of their individual agendas. The execution of a learning activity by adopting collaborative and group learning strategy may be found to follow a sequence of steps like (i) Choosing a group activity (ii) Planning for the execution of the activity (iii) Distribution of role and responsibilities among the group members, (iv) Execution of the task or activity, (v) Monitoring and coordination of the group activity and (vi) Drawing necessary educational benefits from the executed activity.
6. The learners may be found to adopt one or the other learning strategy depending upon the nature of the learning situation and the learning objectives or purposes set to be realised with their learning in a most desirable way. However,

the success in the use of these strategies depends much on the cooperation received and responsibilities exercised on the part of school authorities and teachers. Both of these functionaries are required to play their respective roles in a quite constructive and cooperative way for reaping the desired benefits of the utilisation of one or the other learning strategy.

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Learning Styles Concept, Types and Implications

LEARNING STYLES: MEANING AND CONCEPT

The term *learning styles* in its word meaning stands for the styles adopted by the learners for their learning. The learning style adopted by a learner in *perceiving, interacting with and responding to the learning environment* is found to differ from learner to learner depending upon their own individualities. As a term, learning style has been defined and explained by various thinkers in their own ways. Let us reproduce the views expressed by a few in this concern.

Claxton and Ralston (1978): Learning styles may be known as a student's consistent way of responding to and using stimuli in the context of learning.

Butler (1988): Learning style is a general concept which highlights the learning differences like the quality of an umbrella. Every individual has a different style. This can be in clothes' form, the music listened to and the colours selected by and the friends and social groups of the individuals. Those different individual styles help the individual to identify a learning style.

James and Gardner (1995): Learning style is the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn.

Grasha (1996): Learning style may be known as the collective experience of learning during the process of gaining knowledge.

A mere glimpse on the above cited definitions may clearly reveal the role of individual differences among the learners for picking up their own styles for learning. Accordingly, in their learning pursuits some may be benefitted from one type of experience and the other

from another type depending upon many factors lying within the learners and their learning environment. In this sense, the term learning styles may be defined as the ways, means and methods adopted by an individual learner for allowing him to learn best in tune with his own nature, capability, motivations and inclinations in a particular teaching–learning situation. It is therefore become essential for the teachers to have necessary cognisance of the learning styles of their students for adjusting their teaching to the learning styles of their students.

VARIOUS APPROACHES ON MODELS OF CLASSIFYING LEARNING STYLES

Learning styles, known as various approaches or ways of learning, have been typically classified into various ways. For such classification, a number of researchers and scholars have come up with certain models reflecting their own views about the learning styles possessed by the individual learners. A few of such models describing the classification of learning styles may be discussed as below:

David Kolb's Model

An American Professor David A. Kolb came up with his idea of experiential learning and learning styles as early as in 1970s. The detailed description in this regard has been given in his book *Experiential Learning: Experience as the Source of Learning and Development* (1984). Conceptualising his model, David Kolb says that as the result of heredity, upbringing and current environmental demands, different individuals have the tendency (i) to grasp (perceive) their experiences in two different ways named as *concrete experience* and *abstract conceptualisation* and (ii) to transform (process) these experiences into two different ways named as *reflective observation* and *active experimentation*. The combination of the two modes of grasping the experience with two modes of transforming the experience according to Kolb then may create four different learning styles as depicted through the two-by-two matrix (Table 10.1):

Table 10.1 David Kolb's Learning Styles

<i>Grasping/transforming experience</i>	<i>Reflective observation (watching)</i>	<i>Active experimentation (doing)</i>
Concrete experience (feeling)	(i) Diverging style (feeling and watching)	(iii) Accommodating style (feeling and doing)
Abstract conceptualisation (thinking)	(ii) Assimilating style (thinking and watching)	(iv) Converging style (thinking and doing)

Diverging (feeling and watching) style: These people are able to look at things from different perspectives. They are sensitive. They prefer to watch rather than do, tending to gather information and use imagination to solve problems. They are the best at viewing concrete situations from several different viewpoints. Kolb called this style *diverging* because these people perform better in situations that require idea-generation, *for example, brainstorming*. People with a *diverging* learning style have broad cultural interests and like to gather information. They are interested in people, tend to be imaginative and emotional, and tend to be strong in arts. People with *diverging* style prefer to listen with an open mind and to receive personal feedback.

Assimilating (thinking and watching) style: The *assimilating* learning preference is for a concise, logical approach. Ideas and concepts are more important than people. These people require good clear explanation rather than practical opportunity. They excel at understanding wide-range of information and organising in a clear logical format. People with *assimilating* learning style are less focused on people and more interested in ideas and abstract concepts. People with this style are more attracted to logically sound theories than approaches based on practical value. People adopting this learning style are found demonstrating effectiveness in information and science careers. In formal learning situations, people with this style prefer reading, lecturing, exploring analytical models, and having time to think through things.

Accommodating (feeling and doing) style: The *accommodating learning* style is 'hands-on', and relies on intuition rather than logic. These people use other people's analysis, and prefer to take a practical, experiential approach. They are attracted to new challenges and experiences, and to carrying out plans. They commonly act on 'gut' instinct rather than logical analysis. People with an *accommodating learning* style will tend to rely on others for information than carry out their own analysis. This learning style is prevalent and useful in roles requiring action and initiative. People

with an *accommodating learning* style prefer to work in teams to complete tasks. They set targets and actively work in the field trying different ways to achieve an objective.

Converging (thinking and doing) style: People with a *converging learning* style can solve problems and use their learning to find solutions to practical issues. They prefer technical tasks, and are less concerned with people and interpersonal aspects. People with a *converging learning* style are the best at finding practical uses for ideas and theories. They can solve problems and make decisions by finding solutions to questions and problems. A *converging learning* style enables specialist and technological abilities. People with a converging style like to experiment with new ideas, to simulate, and to work with practical applications.

The summary of all four learning styles is given in Table 10.2.

Table 10.2 Summary of the Learning Styles, Learning Characteristics and Learner's Characteristics

<i>Learning style</i>	<i>Learning characteristics</i>	<i>Learner's characteristics</i>
Diverging learning style	Concrete experience + reflective observation (feeling and watching)	• strong in imaginative ability and emotional • good at generating ideas and seeing concrete situations and things from different perspectives • interested in people • broad cultural interests
Assimilating learning style	Abstract conceptualisation + reflective observation (thinking and watching)	• strong ability to create logically sound theories than approaches based on practical value • excels in inductive reasoning • concerned with abstract concepts and ideas rather than people

Table 10.2 Summary of the Learning Styles, Learning Characteristics and Learner's Characteristics

Learning style	Learning characteristics	Learner's characteristics
Accommodating learning style	Concrete experience + active experimentation (feeling and doing)	• greatest strength is doing things • more of a risk taker and accepting challenges • performs well when required to react to immediate circumstances • prefer to work in teams to complete task • solves problems intuitively
Converging learning style	Abstract conceptualisation + active experimentation (thinking and doing)	• strong in practical application of ideas • can focus on hypo-deductive reasoning on specific problems • unemotional • has narrow interests

According to Kolb, the learners may be found to give more emphases on their performance for one or the other learning styles. The learners who are adaptable to maximum number of these four styles, however, always remain in gain in terms of learning more effectively and efficiently in comparison to those who stick to a single style of learning.

Honey and Mumford's Model

Peter Honey and Alan Mumford's model of learning styles is the adaptation of the *David Kolb's model*. They published their version of the model in *The Manual of Learning Styles* (1982). According to their model, the learners, in general may be found to have preference for one of the following four learning styles.

1. Activist learning style
2. Reflector learning style
3. Theorist learning style
4. Pragmatist learning style

These learning styles as admitted by Honey and Mumford themselves are the adaptations and variations of the styles advocated by David Kolb. In this connection they write:

Our description of the stages in the learning cycle is derived (originated) from the work of David Kolb. Kolb uses different words to describe the stages of the learning cycle and four learning styles... .

Table 10.3, given below, may be helpful to the readers in getting the idea of the characteristics of the learners with preference of one or the other learning styles proposed by Honey and Mumford along with their equivalent learning styles proposed by Kolb.

Table 10.3 Learning Styles of Honey and Mumford's Model

<i>The Learning Style proposed by Honey and Mumford</i>	<i>Characteristics of the learners</i>	<i>The corresponding learning style proposed by Kolb</i>
Activist style	'Here and now' gregarious, seek challenge and immediate experience, open minded, bored with implementation	Accommodating style
Reflector style	'Stand back', gather data, ponder and analyse, delay reaching conclusions, listen before speaking, thoughtful.	Diverging style
Theorist style	Think through things in logical steps, assimilate disparate facts with coherent theories, rationally objective, reject subjectivity and flippancy.	Assimilating style
Pragmatist style	Seek and tryout new ideas, practical, down to earth, enjoy problem solving and decision-making quickly bored with long discussions.	Converging style

Anthony Gregory's Model

Anthony F. Gregory and Kathleen A. Butter have provided a model of learning styles known as *Anthony Gregory's model*. This model has been described by Dennis W. Mills (2002) in his article entitled *Applying what we know: Student learning styles*. This model conceptualises that:

- One's learning style is influenced by the way one perceives and organises the information belonging to his environment.
- There are two methods or ways of one's perception (i) concrete and (ii) abstract and two organisational or ordering

abilities named as (i) random and (ii) sequential.

- Concrete perceptions involve registering information through the five senses, while abstract perceptions involve the understanding of ideas, qualities, and concepts which cannot be experienced through senses.
- In regard to the two ordering abilities, sequential involves the organisation of information in a linear, logical way and random involves the organisation of information in chunks and in no specific order.
- Both perceptual qualities and both ordering abilities are present in each individual, but some qualities and ordering abilities are more dominant within certain individuals.
- The combination of perceptual qualities and ordering abilities may give rise to one or the other learning styles as depicted in the matrix given below:

<i>Perception of information organisation of information</i>	<i>Concrete</i>	<i>Abstract</i>
Random	Concrete random style	Abstract random style
Sequential	Concrete sequential style	Abstract sequential style

In this way, according to Anthony Gregory's model, there are four learning styles namely concrete random, concrete sequential, abstract random and abstract sequential that may be preferred by the individual learners for their learning. The individuals preferring these styles may be seen to be benefitted from the teaching-learning experiences best fitted to their style of learning.

Gardner's Multiple Learning Style Model

Howard Gardner, while propagating his theory of multiple intelligences and identifying seven distinct intelligences, forwarded the idea of multiple learning-style model. According to Gardner, his theory of multiple intelligences, students are found to differ in terms their cognitive abilities and intelligences and therefore they learn,

remember, perform and understand in different ways. Students learn in ways that are identifiably distinctive and their learning styles are very much guided by the type of cognitive abilities or intelligence possessed by them.

Accordingly, Gardner's multiple learning-style model is known to classify the learning styles of the learners in seven distinct styles as mentioned below.

Visual/spatial style (*related with the ability to perceive the visual*):

Learners having preference for this style tend to think in terms of visuals, pictures and physical space and need to create vivid mental images to retain information. They enjoy looking at maps, pictures, charts, slides, videos and movies. Their skills include: puzzle building, reading, writing, understanding charts and graphs, a good sense of direction, sketching, painting, creating visual metaphors and analogies (perhaps through the visual arts), manipulating images, constructing, fixing, designing practical objects, interpreting visual images. They can be properly taught through drawings, verbal and physical imagery by making use of the tools and aids like graphical aids, three dimensional aids like models, 3-D modelling, drawings, photographs, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

Verbal/Linguistic style (*related with the ability to use words and language*): Learners having preference for this style have highly developed auditory skills and are generally elegant speakers. They think in words rather than pictures. They prefer to listen to the thing being explained than watch or observe those.

Their skills include: listening, speaking, writing, story-telling, explaining, teaching, using humour, understanding the syntax and meaning of words, remembering information, convincing someone of their point of view, analysing language usage.

They can be properly taught with the help of story-telling, lecturing, discussing, using narration, explanation, exposition and illustrating strategies and providing opportunities for self-reading, writing and verbal expression. The use of audio aids may also help in the learning of these learners.

Logical/mathematical style (*related with the ability to use reason, logic and numbers*): These learners think conceptually in logical and numerical patterns making connections between pieces of information. Always curious about the world around them, these learners ask lots of questions and like to do experiments.

Their skills include: problem solving, classifying and categorising information, working with abstract concepts to figure out the relationship of each with the other, handling long chains of reason to make local progressions, doing controlled experiments, questioning and wondering about natural events, performing complex mathematical calculations, working with geometric shapes. These learners may then be more benefited through the use of numbers, symbolic language, formula, logical analysis and systematisation of work processes.

Bodily/kinesthetic style (*related with the ability to control body movements and handle objects and like to make and touch things skillfully*): These learners express themselves through movement. They have a good sense of balance and eye-hand co-ordination. (e.g., ball play, balancing beams). Through interacting with the space around them, they are able to remember and process information.

Their skills include: dancing, physical co-ordination, sports, hands on experimentation, using body language, crafts, acting, miming, using their hands to create or build, expressing emotions through the body. They are able to communicate well through body language and be taught through physical activity, hands-on learning, acting out, role playing with the use of concrete objects, and equipment.

Musical/rhythmic style (*related with the ability to produce and appreciate music*): These musically inclined learners think in sounds, rhythms and patterns. They love music but are also quite sensitive to sounds in their environment. They may study better with music in their background.

Their skills include: singing, whistling, playing musical instruments, recognising tonal patterns, composing music, remembering melodies, understanding the structure and rhythm of music. They can be taught by turning lessons into lyrics, speaking rhythmically, and tapping out time. The teaching learning aids for

them may include music, musical instruments, radio, stereo, CD-ROM, multimedia, etc.

Interpersonal style (*related with the ability to relate and understand others*): These learners try to see things from other people's point of view in order to understand how they think and feel. They often have the ability to sense feelings, intentions and motivations. They are great organisers, although they sometimes resort to manipulation. Generally they try to maintain peace in group settings and encourage co-operation. They use both verbal (e.g., speaking) and non-verbal language (e.g., eye contact, body language) to open communication channels with others and are benefited much through interaction.

Their skills include: seeing things from others' perspectives (dual-perspective), listening, using empathy, understanding other people's moods and feelings, counselling, co-operating with groups, noticing people's moods, motivations and intentions, communicating both verbally and non-verbally, building trust, peaceful conflict resolution, establishing positive relations with other people. These learners may be taught well through group activities, seminars dialogues. The teaching-learning aid material for them may include telephone, mobile phone, audio-video conference, writing, computer conferencing, e-mail, etc.

Intrapersonal style (*related with the ability to self-reflect and be aware of one's inner state of being*): These learners try to understand their inner feelings, dreams, relationships with others, and strengths and weaknesses, they tend to shy away from others but have good tuning with their inner-self. Moreover they are found to possess wisdom, intuition and motivation as well as strong will power, confidence and opinions.

Their skills include: Recognising their own strengths and weaknesses, reflecting and analysing themselves, awareness of their inner feelings, desires and dreams, evaluating their thinking patterns, reasoning with themselves, understanding their role in relationship to others. They remain quite at ease with their independent study. Hence they may produce opportunity for self-reading and independent study, research pursuit, etc.

Sprenger's Model

Marilee Sprenger (2003) has come out with her model of learning styles in her book *Differentiation Through Learning Styles and Memory*. In her model she details various ways in which teachers can teach so that students will remember. She categorises those teaching methods according to the learning styles of the learners categorised as visual, auditory, or tactile/kinesthetic with the explanation as outlined below:

- Methods for visual learners include ensuring that students can see written words, using pictures when describing things, drawing time lines for events in history, writing assignments on the board, using overhead transparencies/handouts, and writing instructions.
- Methods for auditory learners include repeating difficult words and concepts aloud, incorporating small-group discussion, organising debates, listening to books on tape, writing oral reports, and encouraging oral interpretation.
- Methods for tactile/kinesthetic learners include providing hands-on activities (experiments, etc.), assigning projects, having frequent breaks to allow movement, using visual aids and objects in the lesson, using role play, and having field trips.

In the use of such variety of methods on the part of teachers she further advises that by using a variety of teaching methods from each of these categories, teachers are able to accommodate different learning styles. In this manner they are also able to challenge students to learn in different ways for the purpose of making their teaching as effective as possible.

Fleming's VAK/VARK Model

Fleming's VAK/VARK model is one of the quite popular models used for the classification of learning styles nowadays. This model was given by Neil Fleming. In its former version, it was introduced in the form of VAK Model. VAK is an acronym that stands for visual, aural

and kinesthetic. According to this model, the learning styles of the individual learners may be generally classified into three categories namely visual learning style, audio learning style and kinesthetic learning styles. In his model, Fleming (2001) has claimed that:

- The learners preferring visual learning style exercise their preference for seeing (think in pictures; visual aids such as overhead slides, diagrams, handouts, etc.)
- The learner preferring audio learning style prefer learning through listening (lectures, discussions, tapes, etc.)
- The learner preferring kinesthetic learning style prefer to learn via experience—moving, touching and doing (active exploration of the world; science projects, experiments, etc.)

In its later version, the Fleming's model of learning styles has been converted in VARK model signifying that learning styles can be classified as visual, auditory, read/write and kinesthetic. In this model the abbreviation VARK has been explained as below:

V — Visual style (learning through images)

A — Auditory style (learning by listening)

R — Read/write style (learning from text)

K — Kinesthetic style (learning by doing and physical movements)

Audio, Visual and Kinesthetic Learning Styles

In the above lines, we have discussed different models describing the classification of learning styles in various ways. In case we try to analyse the learning styles suggested by these models, we may realise that the learner's in our classroom set up may be usually found to imbibe the three main learning styles namely auditory, visual and kinesthetic. Let us therefore, try to know about these three important learning styles.

Auditory learning style

Auditory learning style may be defined as a style of learning in which the learners are found to be ear minded, i.e., showing the preference

for utilising their sense of hearing in the learning or acquisition of a piece of knowledge or skill related to one or the other subject areas or tasks. In general, the learners preferring this style may be characterised with the abilities and behaviours as mentioned below:

- Auditory learners prefer listening to things being explained rather than read about them.
- They are good listener's and talkative and learn the best by using verbal communication between lectures.
- They learn to talk early as toddlers and enjoy listening to tapes and playing musical instruments.
- They like to read aloud and do tongue twisters. In schools they memorise math facts more easily in a song or poem than from flash cards.
- In case they have information before them in writing (such as in the case of the teacher writing on the blackboard) it is not going to make sense or "click" to them until the information has been heard (presented in the auditory style) by them.
- There are many things that auditory learners listen to for which they are learning a new skill. They listen to the tone of voice, the pitch within the voice and even the speed of the person that is teaching the new skill or information. All this interpreted information is then used for learning.
- Many of the auditory learners may not feel at home or experience difficulty with reading and writing tasks.
- They prefer to have music in the background at the time of their study hours. However other noises may become a distraction for them resulting in a need for a relatively quiet place.
- Many of the auditory learners may be seen often talking to themselves while studying or performing tasks.
- Auditory learners usually get benefited from creating recordings of the information that is being taught, as well as from information that has been played back using these recordings.

- Most of the auditory learners are found to repeat things aloud, so they are able to easily learn the information that is being repeated in this manner.

Visual learning style

Visual learning style may be defined as a style of learning in which the learners are found to be eye minded, i.e., showing the preference for utilising their sense of vision in learning or acquisition of a piece of knowledge or skill related to one or the other subject areas or tasks. In general, the learners performing the style may be characterised with the abilities and behaviours as below:

- Visual learners are good watchers. As babies, they are often attracted to lights, colours and movements. They revel in colourful toys and piles of picture books.
- Visual learners are benefited much through visual presentation of reading or study material. As a result, they learn the best by looking at graphics, watching a demonstration or reading. They can learn science principles by watching a science experiment rather than having opportunity to conduct the experiment themselves.
- For the visual learners, it is always good and easy to learn and focus on the blackboard summary or diagram drawn by the teacher in the class, maps pictures or charts shown, or models demonstrated but they may have little interest or may feel difficulty in focusing while listening to an explanation or verbal talk of the teacher.
- Visual learners are found good at reading and writing language as both these skills are very much linked with their visual abilities and preference for learning.
- A visual learner in the class may be properly identified in case (i) he is found to learn the best and take notes when visual information is being presented and (ii) create his own visual material—charts and graphics while learning. Through the use of hand-outs, charts and visual information on the flash cards, slides and graphics, the visual learner

may be seen to earn enough ability to readily absorb the communicated information.

- Visual learners are seen to be quite good in terms of spatial awareness. They have better sense of directions and understand what things fit into a space in relation to other things. Their ability to draw and understand map reading, designing, drawing, thus may be easily utilised in making them learn and understand the things related to their studies and applications in life.

Kinesthetic or tactile learning style

Kinesthetic or tactile learning style may be defined as a style of learning in which the learners are found to follow the principle of learning by doing or experiencing, i.e., showing the preferences of utilising their sense of touch or movement in the learning or acquisition of a piece of knowledge or skill related to one or the other subject areas or tasks. In general, the learners preferring this style may be found to be characterised with the abilities and behavioural characteristics as below:

- Kinesthetic learners are hands-on types. Kids who love taking things apart to see how they work are Kinesthetic learners. As babies, they are in constant motion, their movements are well coordinated, and they are keen to crawl and walk as quickly as possible.
- These learners want to have direct physical contact with the objects and events for learning and knowing about them instead of merely having a theoretical idea about them.
- They process information or learn the best through *hands-on experience*. Actually doing an activity can be the easiest way for them to learn.
- In school, kinesthetic learners can be fidgety (restless for getting engaged in activity).
- These learners need to be actively involved in the teaching–learning process as sitting still for a long period

while studying or attending the class may be a difficult task for them.

- They are very good in handling the objects and instruments. They love experimentation and learning about the things and events through their own experience.
- They are found to have a short attention span. Therefore, they need to be fully absorbed in the learning task by adopting hands-on approach (learning by doing).
- They are able to communicate well through body language and have a good sense of eye and hand coordination.
- They learn well through real-life experiences or simulated experiences. The activities like role-playing, excursions or visits, establishment of museum, aquarium and vivarium, handling of the objects, instruments and appliances, drama dance, construction, drawing and figural activities may prove a good teaching–learning resource for them.
- These are naturally good in doing physical activities, games, sports and mechanical work needing eye and hand coordination or body movements.

By classifying the learners, in respect to their preferences for one or the other learning styles, we should not mean that the individual learners always stick to a single style of learning. They may be mostly found using a combination of these three learning styles. The dynamics of these learning styles develop and overlap as a function of time and experiences that one gains during the developmental course of his life period. A well balanced intelligent student is able to develop all the three types of learning styles for getting fully benefited through teaching–learning situation. However, as a natural phenomenon, it cannot be denied that the students, as we face them in our classes, may have a clear preference for one of these three learning styles. Therefore, knowing and understanding the types of learning styles is important for students of any age. It is advantageous for students to understand their type of learning style early on so that homework and learning may become easier and less stressful in the future. Although it may be tempting to stick with what works, it's important to make child practice and train him the other

types of learning styles early on so that as he grows, the child could utilise the other types just as effectively for drawing necessary benefits from all types of learning experiences and learning resources.

EFFECT OF LEARNING STYLES ON DIFFERENT KINDS OF LEARNING

The type of a particular style, single or in combination adopted by the learner has been found quite responsible for affecting the learning of the learner in a particular teaching–learning situation. The teaching–learning process carried out in varying teaching–learning situations according to the situation based needs and requirements may create a number of types or kinds of learning, named as *concept learning*, *learning of skills*, *creative and critical thinking*, *modelling*, etc. The specific learning styles preferred by the learners for their learning have been found to influence the presence and products of these different types of learning in significant ways. Let us discuss those in detail.

Concept Learning

A concept in the form of mental image denotes a generalised idea about things, persons or events based on the similarities found in them. The concepts about tree, dog, table, chair, etc., represent our concept of things. The concepts about father, mother, teacher, Indian, Russian, etc., represent our concept of people. The concepts about day and night, summer or winter, etc. represent our concept of events or phenomena. The formation of such concepts due to previous experience, training or cognitive processes is called *concept learning*.

The learning styles are found to influence and affect one's *concept learning* in the way outlined below:

Learning of Abstract Concept

The abstract concepts particularly those not existing in the physical form such as God, religion, democracy, soul, nationality, secularism, can be properly acquired through the auditory learning styles. One can learn about the same by listening to others, through their lectures, discussions, audio tapes, radio broadcast, etc., The learner following the visual style may also acquire them through the reading

of the literature and texts talking about these concepts. The viewing of the films and graphics may also help in the learning of these concepts.

Learning of Concrete Concept

Learning of concrete objects needs direct experience and direct contact with the things, ideas and phenomenon underlying these concepts. The concept like green apples are sour, after sunset there is darkness on the earth, can only be acquired properly by experiencing them in person. As a result the learning of these concepts can be satisfactorily carried out in kinesthetic learning style involving learning by doing or experiencing. The audio and visual style can only initiate the process of such concept formation by arousing curiosity of the learners to test it through their own experience.

Learning of Skills

One needs a variety of skills for being employed in the proper execution of a variety of tasks in his life. In general these skills may be classified in the manner given below:

1. Cognitive skills such as thinking skills, problem-solving skill, decision-making skill, etc.
2. Conative motor skills such as driving a car, drawing of geometrical figures, making ornaments, etc.
3. Affective skills involving social and emotional aspects of one's behaviour.

In the skill acquisition task, modelling is found to play a quite substantial role. Here one learns better by initiating and practicing the observed model behaviour demonstrating the application of a skill in action. Therefore, visual style of learning supported by kinesthetic style of learning can play a better role in the learning and acquisition of many skills related with conative and affective domain of one's behaviour such as motor skills, social and emotional skills.

However, for the learning of cognitive skills, social mediation or modelling is not necessary. Here one has to take his own initiative either by resorting to *trial and error method* or using his intelligence and cognitive abilities for deriving his own conclusions in the skilled execution of a task, i.e. discovering the facts, constructing the needed knowledge, finding the solution of a problem, etc. These cognitive skills are very much acquired through the learner by going through the cognitive experiences at their own. Initiation for the same may come by listening from others, reading the literature or viewing the film or graphic material. Here one can take a word or eyeview of the nature and application of the skill, but its actual acquisition always comes through self-experiencing or doing. Therefore, much emphasis should always be given on the kinesthetic style of learning for the acquisition and learning of the skills.

Creative and Critical Thinking

Creative and critical thinking is totally opposed to our traditional concept of rote memorisation of a learning material accompanied with its exact reproduction. It gives emphasis on the learning based on understanding and reflection. It encourages originality, novelty, minute observation and analysing, flexibility and divergence of the ideas and ways of doing things on the part of learners for enabling them to construct or discover the knowledge with their own efforts. Decidedly, such type of thinking involves higher order cognitive abilities and skills for the planning and execution of the tasks. Let us see what type of learning styles may prove helpful in the acquisition of creative and critical thinking on the part of learners:

- Auditory learning style here may enable a learner to listen to the ideas and views of others about a thing, idea or process. He may evaluate and analyse those in terms of their worth-whileness for his own creation and discovery of the facts and processes.
- Visual learning style learners may get opportunity to build theoretical knowledge and ideas related to the creation and discovery of some new idea, thing or process by reading

the relevant literature and observing the graphics, films or video material.

- The auditory or visual sources can only initiate and provide some preliminary base for sparking the creativity and critical analysis abilities of the learners. The actual thing lies in their own attempts, i.e., doing and experiencing what is new and original in their minds. Therefore, the learners who believe and adopt the style of doing and experiencing the things by themselves may be found to demonstrate more positive results in the learning areas or tasks associated with creative and critical thinking.

Modelling

In the task and process of modelling, the learning on the part of a learner involves the following activities:

1. Observing the behaviour of a model/teacher or instructor as keenly and properly as possible.
2. Listening carefully to the instructions provided by the model/instructor for the learning of a behaviour in the course of behaviour demonstrated by him.
3. Imitating the observed model behaviour.
4. Practicing the behaviour under supervision and scrutiny of the teacher/instructor.

The analysis of the above activities, helpful for the learner in one or the other type of learning, i.e., bringing desired changes in his behaviour related to cognitive, conative and affective domain may reveal us that a combination or synthesis of auditory, visual and kinesthetic styles may bring quite positive results in this respect in the manner given below:

- The auditory learning style may help the students in the careful listening to and grasping of the instructions and theoretical concepts explained by teachers/instructors while demonstrating or modelling something to students.

- The visual learning style may help students in their keen and proper observation of the behaviour demonstrated by teacher/instructor.
- The task of imitation and practicing of the modelled behaviour on the part of students can be carried out by them by resorting to the kinesthetic learning style.

TEACHER'S ROLE IN CHANGING, STRENGTHENING AND SUSTAINING OF LEARNING STYLES

The various learning styles—auditory, visual and kinesthetic adopted by the learners represent their own individuality and ways of learning or acquiring something as a result of their learning pursuit independently or helped by others. While interacting with learner having preference for a particular learning style, teacher has to consider this very fact in adapting his teaching to the typical learning style of the students. Let us see what is required on the part of a teacher while interacting with learners comfortable with a particular learning style.

Learners with Auditory Learning Style

While teaching and interacting with the learners comfortable with the auditory style of learning, the teachers are supposed to adapt their teaching according to learners' needs in the ways outlined below:

- Making use of lecture, discussion and question-answering method
- Making use of the strategies and devices like explanation, narration, illustration, exposition
- Encouraging group activities involving verbal communication such as debate, declamation, symposium, poem recitation.
- Providing enough verbal instructions or directions for doing a task.
- Making use of the story telling, biographical approach and experience narration in explaining the facts, principles and processes.
- Encouraging students to have verbal dialogue and interaction for the satisfaction of their curiosity and acquiring needed information.
- Making use of rhythm, music and poetic touch for the presentation of the subject matter and its practice or

repetition.

- Encouraging the activities that may provide opportunities to the students for their appropriate verbal expression, dialogue and communication with each other as well as teacher.
- Making use of aural aids and equipment such as radio broadcasting, audio tapes, audio-phones, tape recorder language laboratory devices, etc.
- Providing verbal summary of the things taught or discussed in the class.
- Using brain storming strategy through verbal interaction.

Learners with Visual Learning Style

In teaching and interacting with these learners, the teacher is supposed to adapt like below:

- Providing directions and instructions in the written form.
- Giving emphasis on the use of visual aid material such as charts, pictures, maps, diagrams, posters, real objects and specimen, cartoons, display boards like chalk board and bulletin board, flash cards, video material, VCR, slides, transparencies and projecting instruments.
- Encouraging library reading and online reading.
- Providing handouts, agenda, outlines of the things discussed, summary of the discussion for the things taught and discussed in the class.
- Encouraging the habit of notes taking on the part of the students.
- Asking students to do their practice work, drill work, homework and project assignment in writing or visual presentation.
- Encouraging students to make use of graphic and visual material for their expression, learning and evaluation.
- Writing the summary of the things taught and points discussed on the blackboard and encourage students to respond by writing on the board.

- Assessing the learning outcomes through the written mode of evaluation.

Learners with Kinesthetic Learning Style

In teaching and interacting with these learners, the teacher is supposed to adapt like below:

- Making use of the activity aids like demonstration, asking the students to do experimentation in laboratory, work in the workshop, taking students on excursion.
- Resorting to simulation, role playing, and dramatisation activities.
- Asking students to actively participate in the teaching–learning process such as helping the teachers in the demonstration work, solving the problems on black-board and helping in the use of audio-visual aid presentation.
- Providing opportunities to the students for gaining direct experience of the things, events and phenomenon by resorting to learning by doing and experiencing.
- Arranging and encouraging the maximum participation of learners by providing learning situations and maximum physical involvement.
- Encouraging the learning based on “learning while playing”, “learning while doing project” and “learning while engaging in co-curricular activities”.
- Providing importance to the practical work and activities in teaching as well evaluation.

In this way, teachers may take care of the typical learning styles preferred by the learners for their learning. However, it is also an accepted fact that anything for its proper learning, grasping and application certainly needs the use of a number of learning modes on the part of the learners. There should be a total involvement of the learner in his learning and it can be possible only if he makes use of the auditory, visual and kinesthetic styles in their proper combination as per requirements of the learning situation. Therefore,

the teachers are not only supposed to adapt their teaching with the specific learning styles of the learners but also to attempt for bringing desired changes in their preferred learning style aiming to make them more capable, resourceful and active learners in the teaching–learning process. The learners cannot be left as handicapped or disabled in making use of the learning style other than their preferred one. Teachers should, therefore, try to bring desired changes in the learning styles of the learners, depending upon only a particular style of learning. In this regard the things like below are needed on the part of teachers:

- i. They should tell the students the need and advantage of adopting different ways and means by resorting to a variety of learning style in their learning.
- ii. They should try to present the learning material to the students in the aural, visual and action form.
- iii. The students should be encouraged to actively participate in the teaching–learning.
- iv. The technique of operant conditioning and shaping of behaviour may be used by the teachers in making the learners to incorporate a number of learning styles in their learning in the manner as below:
 - Including in the teaching of the learner, the means and measures supporting the style other than preferred by the learner.
 - For providing him opportunity to learn through this mode (e.g., visual learners are exposed to aural communication or activity based learning).
 - Providing learner, the needed reinforcement, encouragement and incentive for getting adapted to the new style of learning (i.e., Feeling more pleasure and satisfaction with this type of learning style or appreciating the students' attempts in doing so).
- v. The students should be made to feel convinced that they should not depend upon a single style for their learning and it is always useful to adopt a variety of styles in their

combination for the better learning of the things and their application.

SUMMARY

1. The term *learning styles* stand for the ways and modes of learning adopted by individual learners in one or the other learning situations depending upon their own motivation, capabilities and goals.
2. There are various approaches or modes of classifying learning styles such as *David Kolb's Model*, *Honey and Mumford's Model*, *Anthony Gregor's Model*, *Gardner's Multiple Learning Styles Model*, *Sprenger's Model* and *Fleming's VAK/VARK Model*, etc.
3. According to the model developed by Professor David A. Kolb, learning styles adopted by learners may be classified as (i) *Divergent Learning Style (feeling and watching)*, (ii) *Assimilating Learning Style (thinking and watching)*, (iii) *Accommodating Learning Style (feeling and doing)*, (iv) *Converging Learning Style (thinking and doing)*.
4. According to Honey and Mumford's Model, learning styles may be classified as (i) *Activist Learning Style (equivalent to Kolb's accommodating style)*, (ii) *Reflector Style (equivalent to Kolb's diverging style)* (iii) *Theorist's Style (equivalent to Kolb's assimilating style)*, and (iv) *Pragmatist Style (equivalent to Kolb's converging style)*.
5. According to Anthony Gregor's model, learning styles may be classified as (i) *Concrete Random Style* (ii) *Concrete Sequential Style*, (iii) *Abstract Random Style*, and (iv) *Abstract Sequential Style*.
6. Gardner's Multiple Learning Styles Model tries to categorise learning styles into seven categories depending upon the type of cognitive ability or intelligence used for carrying out one's learning. These styles are (i) *Visual/Spatial Style* (ii) *Verbal Linguistic Style* (iii) *Logical Mathematical Style* (iv) *Musical/Rhythmic Style* (v) *Interpersonal Style* and (vi) *Intrapersonal Style*.
7. Sprenger's Model categorises learning styles as *visual*,

auditory or tactile/kinesthetic learning styles. Fleming also in his model named as *Fleming's VAK model* first tries to classify learning styles as *visual, auditory and kinesthetic*. Later on, he arrived at with his with his other model named as *VARK Model* emphasising four different learning styles—*visual, auditory, read/write and kinesthetic styles*.

8. In its most practical and applied sense, there are mainly three styles, namely, auditory, visual and kinesthetic adopted by the learners for their learning in one or the other learning situations. Here auditory learning style stands for a style of learning in which the learners are found to be ear minded, i.e., showing the preference for utilising their sense of hearing for their learning. In visual learning style, learners show preference for utilising their sense of sight for their learning and in kinesthetic learning style learners are found to show their preference for utilising their sense of touch or movement for their learning.
9. Regarding the effect of learning styles on different kinds of learning, it is found that while concrete concepts are better learned by adopting kinesthetic learning style, the abstract concepts can be properly acquired through auditory and visual learning styles. In the skill acquisition, modelling is found to play a quite crucial role and for this, one has to observe, imitate and practice the skilled behaviour involving the use of auditory, visual and kinesthetic styles of learning. Similarly, for the learning of the tasks involving creative and critical thinking, one has to make use of all the three auditory, visual and kinesthetic styles for the development and application of creative and critical thinking.
10. Regarding the implications of the awareness about the learning styles of the learners in classroom situations, it can be well inferred that a wise teacher should always try to adopt his ways and methods of teaching to the learning styles (auditory, visual and kinesthetic) of his students in one or the other learning situations.

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e-Learning and m-Learning

INTRODUCTION

The computers with their unimaginable working and functioning capacity, coupled with a tremendous progress in the field of electronics and communication technology have yielded so much power, abilities and capacities to human beings that we can boast to do anything and everything imaginable or unimaginable on the earth. Teaching and learning that entirely happened to be a domain of the human factors—teachers and students—is no longer limited to its traditional boundaries or ways and means. It has gradually turned into a subject of technological progress. Computer operation and networking have almost revolutionised the field of teaching and learning. Instead of the total dependency on the instructions imparted by the teachers and the subject matter available in the books or other printed publications, the learners are now able to utilise the computer's database and networking facilities not only for seeking information but also for interacting with them online in the same manner as happens in the real classroom interaction. Therefore, there is no exaggeration in saying that the future of education and classroom instructions lies to a great extent in the concept and practices of e-learning and m-learning. In this chapter, we will try to know about the nature and mechanism of these two emerging trends in the realm of education.

e-LEARNING

e-Learning is an abbreviation of the term *electronic learning*. Electronic learning in its literal meaning stands for the type of learning carried out, facilitated or supported by some or the other electronic gadgets, media or resources. It is quite a broader meaning of the term e-learning. Judging in this sense, the learning facilitated by the use of any electronic media or means like microphones and listening devices or audio and video-tapes can be termed as e-learning. However, e-learning is not taken in such generalised sense. Although, in general, it may refer to all types of learning facilitated and supported through the use of information and communication technology yet in real practical sense its use is limited and associated nowadays with the field of advanced learning technology (dealing with both the technologies and associated methodologies in learning using networking and/or multimedia technologies).

In this sense, e-learning may call for the services of the advanced electronic information and communication media and means like CD-ROMs and DVDs, teleconferencing, video-conferencing and computer based conferencing, e-mail, live chat, surfing on the Internet and Web browsing, online reference libraries, video game-style simulation, customised e-learning courses, and Web blogs. Identified in this way, *e-learning may be taken as an electronically carried out learning facilitated and supported by the use of advanced learning technology particularly calling for the services of computers, networking and multimedia*.

However, a question may emerge at this stage—Whether or not we should include the learning possibilities through the recorded audio and video-tapes, CDs and DVDs in the category of e-learning? The question seems to be somewhat puzzling and challenging. The term e-learning has entered the realm of teaching and learning in the similar way as other related terms like e-mail, e-banking, e-booking and e-commerce tend to exist with us in our other walks of life. What seems to be common in the nature, functioning and use of these terms may be summarised as below:

- They all call for the services of the computers, laptops and their technologies in their functioning.
- The use of the Internet services and Web technology is must for their functioning.

Having a proper look at the nature and use of e-learning dominated by the Internet technologies, a contemporary author, Rosenberg (2001) tried to define the term e-learning in the following words:

e-Learning refers to the use of the internet technologies to deliver a broad array of solutions that enhance knowledge and performance.

In this way, if we try to have a broad view of the nature and meaning of the concept *e-learning* in terms of the hard realities of its functioning and use in our day-to-day life, we can come to the conclusion that *e-learning is an innovative technique or a form of information and communication technology used in providing learning experiences to the students online through the use of internet services and Web technology of the computers on the same lines as witnessed by us in the form of e-mail, e-banking, e-booking and e-commerce in our day-to-day life.*

NATURE AND CHARACTERISTICS OF e-LEARNING

On the basis of what has been discussed so far, we can draw following conclusions about the nature, meaning, characteristics and functioning of the term e-learning as it exists among us nowadays:

1. e-Learning is a generic term used to refer computer enhanced learning.
2. Its use should be strictly limited to *online learning* carried out through the internet or Web-enabled technology.
3. It conveys broader meaning than the terms 'computer-based learning' and 'computer-aided instruction'.
4. It is broader in its meaning than that conveyed through the simple terms like *online learning* or *online education* (that may call for the absolute Web-based learning without any follow-up, communication and interaction between the teacher and students).
5. It should not be taken as synonymous to audio-visual learning, multimedia learning, distance education or distance learning. It is true that the audio-visual and multimedia technology and distance education programmes rest heavily nowadays on the use of the Internet and Web services provided through the computers, yet these are not identical but complementary.
6. It should be made absolutely clear that the use of the term e-learning should be restricted to the type of learning carried out, facilitated or supported through Web-enhanced instructions and the Internet-based communication like e-mail, audio and video conferencing, mail list, live chats, and telephony. As a result, all types of non-Internet and non-Web technology should not be included in the domain of e-learning. Taking a clear stand on this issue Santheesh Kumar and Sagy John (Kumar and John, 2008) write:

Though computer is used for instruction and learning, the non-Web technology does not come under e-learning. The entire computer-

based instructions, like computer-assisted instruction, computer-managed instruction, integrated learning systems, multimedia, interactive video, virtual reality, and artificial intelligence, etc., not delivered through the Internet but still used for learning and instruction cannot be included in e-learning. However, these techniques, when delivered via Internet for instruction and learning, become e-learning.

CONTEMPORARY CONCEPT OF e-LEARNING

(A blend of online learning delivered through computers and mobiles)

The concept and the mechanism of *e-learning* are very much associated with the use of the Internet and Web-Technology delivered to the end users, say students, via computers or laptops. However, there still remains certain doubt about the true nature and functioning of the term.

- The learners are found to make use of a variety of recorded CDs and DVDs for gaining the desired information and learning experiences in their concerned subjects. Is it to be included in e-learning or not?
- Recently, there is an emerging development in the shape of mobile learning (m-learning). It has the advantage of allowing learners to be *on the move* while learning. As a result, you may reap the benefits of the recorded information/lectures or connect yourself with the Internet and Web pages while driving, jogging or doing some other work. This technique calls for the services of mobile (cell) phones, PDA (Palm Device Assistants) and MP3 players (e.g., iPod and Pod casting). So, now you can avail the services of e-banking, e-booking and e-commerce, etc. including e-learning while on move. The pertinent question that arises with the emergence of m-learning is that whether it should be included in the domains of e-learning or not.

Let us now seek some explanation about these doubts.

While the use of the recorded CDs and DVDs for learning is concerned with the prior stage of the evolution of the concept of e-learning, the mobile learning may be well regarded as an extension of e-learning. Therefore, where one is the past of the present-day e-learning the other is its promising future. It has been properly emphasised by Bhooma Krishnan, the Director, Knowledge Quotient

Education, in his efforts directed to trace the history of e-learning. As a conclusion of his findings, he has mentioned four distinct stages in the evolution of the concept of e-learning (Krishnan, 2007): namely multimedia era (1984–1993), Web infancy (1994–1999), next generation web (2000–2005), and mobile learning. Therefore, as a consequence it is no surprise at present to see the users of e-learning to make use of:

- The stored information and knowledge of the CDs and DVDs coupled with or devoid of the Internet and Web technology.
- The Internet and Web technology services delivered through their computers and laptops.
- The advanced m-learning technology delivered through Web TV, cell phones, pagers PDA, Palms, iPods, etc.

In this way, we can term the present-day e-learning as a learning carried out, supported and facilitated by the advanced multimedia facilities as well as Internet and Web technology delivered to the end users via computers, laptops and mobile ICT appliances.

MODES AND STYLES OF e-LEARNING

The essential condition for calling a particular learning as e-learning, lies in its characteristics of delivering the instructional contents through advanced electronic means like computers, multimedia and mobile ICT appliances. While fulfilling this condition, various e-learning situations may be seen to adopt any of the following delivery modes and styles:

Support learning: e-Learning can play a more supporting role to the teaching–learning activities organised in the class. As a result, a teacher may make its use for his better teaching and a learner for his required learning, e.g. they may use multimedia, Internet and Web services for their teaching and learning to enhance their classroom activities.

Blended learning: In this mode, attempts are made for making use of a combination of traditional and ICT enhanced e-learning practices. The programmes and activities are so planned and executed as to present a happy combination of both the traditional classroom teaching practices and e-learning-based instruction. Thus, one can reap the benefits of both the practices of traditional and e-learning.

Complete e-learning: In this mode of learning, the traditional classroom teaching–learning is totally replaced by the virtual classroom teaching–learning. There is no existence of classrooms, schools and teaching–learning environment as happens in the traditional set-up of school education. The learners are free to take their learning tasks independently with the help of the properly designed e-learning courses. Most of the learning activities are carried out entirely online, but at the same time, they may have also access to the well-stored information and learning packages available in the form of recorded CD-ROM, DVD, etc. Such type of e-learning activities may be found to adopt the following two distinctive communication styles narrated below:

Asynchronous communication style: In this style, the course information or learning experiences are passed to the learners through e-mail, discussion forum, web pages, web logs, blogs, wikis or through the recorded CD-ROM and DVD. As a result, the teachers and learners do not interact simultaneously. Instead, messages/information/reading materials are posted on a forum or web page or are sent as e-mail. At an unspecified time later, reply is given. Any follow-up questions are dealt with through additional pistons or messages with requisite delays. Where the reading material is available in the form of recorded CD and DVD, it neither provides any opportunity for the face-to-face dialogue nor any online, direct, timely interaction between the teachers and the students.

Synchronous communication style: Here the communication between the teachers and students directly occurs in an online chat room or through live audio-video conferencing. It allows them properly to gather at a specified time for communicating with each other regarding the course material. As a result, a teacher can provide valuable information, lecture or share one or the other learning experiences with his students. He can immediately respond to the queries and questions put to him by the students. The follow-up questions can also be addressed immediately at an appropriate level of detail. Moreover, the teacher can inquire as to whether the students are clear on what has been communicated to them as a course material or learning experiences. In this way, synchronous communication offers proper opportunities of lively interaction between the teachers and students although in virtual reality in a system of e-learning only because the Web technologies can allow remote synchronous learning.

Thus, e-learning can have a variety of modes and styles for its operations serving as a support provider, collaborator or partner and substitute or alternative of the real time actual teaching-learning encounters of our classroom. In all of its three forms, e-learning tries to maintain its basic features, i.e. providing learning experiences to the students through the adoption of advanced learning and communication technologies involving multimedia, Internet, Web services and m-learning, etc. Further, for adopting its styles of

communication between the teachers and students, it may choose the synchronous style of communication held in real time setting or the asynchronous style to allow the students to undergo the desired experiences at their own pace and convenience.

PROMOTION AND ARRANGEMENT FOR e-LEARNING IN OUR EDUCATIONAL INSTITUTIONS

e-Learning has enough potential to provide solid assistance to all types of academic tasks-theoretical and practical-in individual and collaborative classroom situations. It can provide a valuable treasure of the knowledge and information of all subjects of the school curriculum besides proving helpful in managing the multidimensional affairs related to classroom instruction and all-round development of the personality of the students. In the rapidly moving world, we can sustain only by making ourselves capable of racing with the pace of the time and technological progress. e-Learning and m-learning is the demand of the time. We have to prepare our students and bring suitable modifications and improvements in the prevailing system of our educational institution to face this challenge. Let us see what can we do, in general, for promoting e-learning in our educational institution.

1. The first and foremost thing that needs to be done is to develop a positive attitude towards the processes and products of e-learning. For this purpose, attempts should be earnestly initiated to develop a culture that value e-learning as much as traditional face-to-face education. The students should be made to appreciate the fruits of e-learning. In any case, they should not be allowed to get a wrong message that online education or learning is somehow second rate.
2. Provide the needed facilities for training and equipping the students and teachers (along with the supporting staff) with the essential technical knowledge and skills related to the operation and utilisation of multimedia appliances, computers and their networking with special emphasis on the Internet and Web technology.
3. Provide proper orientation to the staff and students not only in terms of making them technologically capable for

engaging in e-learning but also to have full awareness about all the possible advantages and gains drawn from such ventures. The following initiatives may be taken for this purpose:

- The students may be guided about what is available to them on the Internet specifically concerned to their course studies, general knowledge, personality development, creativity enhancement, or enrichment of their specific interests and aptitudes.
 - Acquaint them with specific websites that provide reference tools and resources including dictionaries in all languages, grammar and spelling tools, maps and world atlases, encyclopedias, and historical, geographical, scientific and cultural milestones in the human progress.
 - Acquaint the teachers and the supporting staff with the websites that provide classroom management tools (downloadable or online), e.g. sites offering (i) software for the creation of online or paper tests, telling the method of scoring or grading or even doing these things by themselves, (ii) the problems and questions for the classroom drill, practice and recapitulation work, (iii) the services of various types of diagnostic testing and remedial measures, (iv) help in suggesting the solution of the various classroom and behavioural problems, and (v) lesson plans and unit plans for the instructional work.
 - Acquaint the staff and the students with the websites offering the popular academic tools, e.g. worksheet generators for making the students engaged in the activities like specific crossword puzzles, word searches, cryptograms, mathematical exercises, geometrical and drawing exercises and multimedia flashcards.
4. Make provision of the Internet facilities and classroom website for giving opportunities to the teachers and students to carry out the teaching–learning tasks using the

mechanism of e-learning. For this purpose, an institution can venture to create an effective online learning course or programme proving as a substitute or alternative for the live classroom instruction or use its website as a tool for providing appropriate support or supplementary services to the traditional classroom instruction and school activities. Whatever may be the purpose or form, one should take care for the development and utilisation of such school and classroom websites as given ahead:

- It must fit to the age, mental and skill level, clearly defined learning objectives and goals, and local needs and available resource related with the student population.
- Provide special attention in displaying information or learning experiences on the web pages of the site. It should invariably allow ease of navigation and charm of their multimedia presentation. Use a familiar interface such as a standard Web browser or Microsoft Windows interface so that the users don't have to master a new technology for reaping the benefits of the school and classroom website.
- Have adequate provision of including an interactive element in the website for enabling the students to interact with their teachers or with each other. In case the website is in the developing stage, then at least include options such as self-quizzes or simulations, which let them test and apply what they have learned.
- Utilise the services of the website to extend learning from school to home. At a result, for example, let the students have proper access to the curricular contents, weekly or daily assignments, project work and other activities needed to be performed at their home, allowing them to complete their work, interact with their teachers or fellow students if so needed, and receive immediate feedback either through their teachers or the software programme installed on the

website.

- Make provision for the due enrichment of the website by adding the Internet facilities like e-mail, chat option or audio-video conferencing for the needed communication and interaction among the students and teachers.
 - Utilise the services of the Internet facilities and websites of the school and classroom for building bridges with parents and community. It will surely provide a proper platform for seeking involvement of the parents and the community for the enhancement of the learning and personality development of the students.
 - Utilise the school and classroom website as a communication tool to connect the school and classroom to others across the region, country and the world as a whole for the exchange of information, knowledge and skills contributing towards the enhancement of the learning experiences of the students and practices of the teachers.
5. Last but not the least, make adequate provision for the availability of technical support services to train and provide online support to both the teachers and students in reaping maximum benefits from e-learning programme.

ADVANTAGES AND APPLICATIONS OF e-LEARNING

e-Learning as an innovative technique provides unique opportunities to the learners for gaining useful learning experiences both on the individual and group levels. Its advantages are summarised below:

1. Most of the learners who may not have time and resources for getting access to the traditional classbound learning experiences may now get it easily at their convenience in the form of e-learning. A learner can now satisfy his desire and fulfill his ambition of getting access to school or higher education or take up a hobby course without leaving his job, compromising his comfort or feeling handicapped in one or the other sense on account of his limitations. The learners can access information and educational contents any time, any place.
2. e-Learning has enough potential to make the education, instruction and learning opportunities provided to the learners, adaptable to their needs—mental ability and skill—local needs and sources at their hands.
3. It has a unique feature of arranging access to the same quality of the content that a full time student has. The best of the world's educational content, treasury of knowledge and the opportunities are available through e-learning to an increasing number of learners especially in the developing and underdeveloped countries.
4. Unlike traditional classroom education, e-learning can cater to different learning styles and promote collaboration among students from different localities, cultures, regions, states and countries.
5. e-Learning can prove an effective medium and tool for facing the problems of lack of trained and competent teachers, paucity of schools and the needed infrastructure and material facilities for providing quality education to the number of students residing in the far and wide corners of

the country.

6. The flexibility of e-learning in terms of delivery media (CD, DVD, laptops, and mobile phones), type of courses (modules or smaller learning objects) and access (real time or self-paced) may prove a big advantage and attractive option.
7. e-Learning may make the students more interested and motivated towards learning as they may get a wide variety of learning experiences by having access to multimedia, Internet, Web technology and mobile-learning along with the verbal and non-verbal presentation of the learning contents.
8. The opportunities of having online, offline and live integration between the students and teachers and among the students themselves may make the task of e-learning a joy and the best alternative to the lively face-to-face interaction and real-time sharing of the experiences in a traditional classroom setting.
9. e-Learning through audio-visual recording technology has a unique advantage of providing learning experiences that can be paused and reversed for observing, learning and imitating at the will and convenience of the learners. Such self-pacing provides a special weightage to the process of learning.
10. It may also provide opportunities for testing and evaluating the learning outcomes of the learners through teachers, peers and auto-instructional devices and software available with the reading material online, or through the Internet and mobile phone facilities. It may work for them as a desired source for the proper feedback along with the needed diagnostic and remedial teaching.
11. Learning experiences via simulated and gaming techniques may also provide the benefits of getting richer experiences on the useful pedagogical footings of play-way spirit and learning by doing or living.

m-LEARNING—MEANING AND APPLICATION

m-Leaning or mobile learning is nothing but a specific type of online learning and e-learning made possible through the services of smart phones. Let us know about these phones and the type of teaching–learning made possible through their use on the part of learners and teachers.

Smart Phones—Meaning and Features

What is a smart phone?

A smart phone is a mobile phone that allows people to make phone calls and send messages, like a conventional mobile phone, and also, has the additional capacity of performing many other functions of a computer, typically having a touch screen interface, internet access and operating system capable of running downloaded mobile apps.

The first, most successful smart phone was the Blackberry. However, it was Sony that first introduced the smart phone closest to what we know today. Now we have many brands of smart phones available in the market including the most dazzling Apple iPhones.

Typical features of a smart phone

1. Smart phone has an operating system which manages the gadget's hardware and software. It is no different from the operating system of a desktop computer.
2. Another characteristic of a smart phone is the presence of at least one home screen. It is the main menu display that shows the apps and widgets.
3. It has the ability to not only make and receive phone calls, text messages, and send voicemail, but it also has the ability to access the Internet.
4. It possesses the ability to access digital media. This means that the user can download music, video, and pictures onto their phone and be able to enjoy all of their media while on the go.

5. Smart phones incorporate some sort of audio video recording technology in the form of built-in camera and voice recording functions. This means that a person can easily take pictures, shoot video and even record ideas and make use of those while on the go.
6. One of the biggest features of smart phones is their ability to make use of small computer programs called apps. These applications can perform a wide variety of functions for the users. Almost all smart phones have the ability to access a repository of thousands of apps making the functionality of smart phones almost limitless.
7. Moreover, smart phones are also smart due to their great working but a quite small size and portability in comparison to other devices like PC, laptops or tablets.

What can the Students Do with Smart Phones?

- Mobile phones with internet connection give students access to tons of content anywhere, anytime. They can use this facility for finding, reading and reviewing instructional material/articles, taking notes or share those online with peers or study group.
- They can use those for the learning of new languages, improving their pronunciation, spellings, grammar, and compositions and creative writing.
- They can use those for the study and learning of various school subjects including social sciences, mathematics, physical and biological sciences, fine arts, painting and drawing, learning of physical and gaming skills, etc.
- They can use those for participation in co-curricular activities and social services.
- These can be used by them in noting down and completing their presentations and assignments, doing their individual and group projects, giving their presentations and engaging in cooperative and collaborating learning. For video assignments, students can record their films using a smart

phone and send them to a computer for editing.

- A smart phone's built-in audio recorder as well as camera is also useful in several ways. Students can just take pictures of what the teacher writes on the board instead of copying the information in their notebooks. Students can also record the discussion, so that they can re-listen to the lecture later at their case. The audio and video recordings so made on the part of students are quite helpful to them in terms of paying more attention to what the teacher is saying and doing in the class.
- The students can make use of the audio and video facilities of their smart phones for recording their experiences with their natural surroundings and social and cultural environment especially while getting opportunities in terms of tours and excursion.
- The services on smart phones can help students in interacting with their teachers, experts in subjects and other persons for seeking the needed guidance and help. As a matter of self-study and self-help, the students can have instant access to numerous websites for questions needing answers and problems to be solved.
- Services provided on smart phones may work as a gateway to tools, resources and various applications loaded on the phone. It may help in making learning more personalised as well as in creating bridges over the gaps between teacher and student.
- The Apps (Applications software loaded on the smart phones) may help them in performing many useful activities such as:
 - Drawing of diagrams, maps, sketches and figures desired in the study and learning of various school subjects.
 - Using Drop box or Google Drive on their smart phone to make available their saved files across all devices used by them in school or home.
 - Creating audio recording notes of the classroom lectures and sending the files to their laptop or computer desktop

of their home PC through e-mail (with the use of a software known as Recordroid).

- Having interaction with the peers or teacher by sending data in multimedia format (text, pictures, audio, video, etc. with the help of a specific App like *WhatsApp*).

What can the Teachers Do with Smart Phones?

- Teachers can make use of the smart phones in their pre-preparation for classroom instructions, rendering guidance and counselling to the students and for their participation in seminars, workshops and conferences related to their professional enhancement.
- They can use those as an instant source for the needed references, spellings, grammar correction and aid material to be displayed in the class.
- With their help teachers can create presentations or flashcards for helping them in their instructional task. There are many educational apps (e.g., iOS and Android) available for this purpose. Teachers or students can download a number of flashcard sets to help with teaching and learning. They even have text-to-speech features making the class lecture multisensory instead of just a visual presentation.
- Teachers can use smart phones for file sharing, especially if they have the Dropbox app. This app is great for distributing information. Teachers can tell their students to make Dropbox accounts and create class-shared folders so that students can just submit their essays and projects using their computers or smart phones.
- Teachers can listen to and also view the students on their smart phones for the needed interaction, instruction and guidance, providing assignments, homework and project work to the students, receiving the files sent by students and providing feedback and doing assessment of their work and activities.

- With the help of many useful apps loaded on their smart phones teachers can be benefited in their task in the manner as outlined below:
 - With the use of an app named as *a Personal Assistant*, the teachers can find a great assistant in their smart phones for helping them in many of their tasks such as organising thoughts, making a to-do list, and preparing a lesson plan.
 - An app named as *Evernote* is also a great app for teachers to use. It has a file-sharing feature, but it is mainly for taking notes. Teachers can now share their lessons wirelessly to let students review their notes after class.
 - The use of an app known as *Teacher kit* can help teachers to record the grades of students, rank the students according to their grades, keep track of their attendance, and anything else a teacher needs.
 - With the use of an app named as *Wolfram Alpha*, teachers can be helped in searching for questions and getting direct answers, getting charts and graphs for many topics related to their teaching subjects like mathematics, sociology, basic sciences, commerce, history and geography.

SUMMARY

1. *e-Learning* is an abbreviation of the term *electronic learning*. It may be understood as an innovative technique or a form of ICT used in providing learning experiences to the students on line through the use of Internet services and web technologies of computers. However, in practice as we find nowadays, the use of the term e-learning is not limited to the use of Internet and Web technology. Therefore, as it exists today, we can term the present-day e-learning as *the learning carried out, supported and facilitated by the advanced multimedia facilities as well as Internet and Web technology delivered to the end users via computers, laptops and mobile ICT appliances*.
2. The different types of modes and styles adopted for the various e-learning situations may be outlined as (i) support learning (for playing a mere supporting role to the teaching–learning activities organised in the class) (ii) blended learning (making use of a combination of traditional and ICT enhanced e-learning practices), and (iii) complete e-learning involving asynchronous communication as well as synchronous communication styles (totally replacing traditional classroom teaching–learning with the virtual classroom teaching–learning).
3. A number of measures may be employed to promote and arrange for e-learning in our educational institutions like (i) developing a positive attitude towards the processes and products of e-learning, (ii) providing the needed facilities for training and equipping the students and teachers along with the supporting staff in operation and utilisation of multimedia appliances, computers and their network technology, (iii) creating full awareness about all the possible advantages and gains drawn from their ventures in e-learning, (iv) making provision for the Internet facilities and classroom websites, and (v) making adequate provision for the availability of the technical support services to train and

provide ongoing support to both the teachers and students.

4. e-Learning may prove quite beneficial to the learners in various ways like (i) getting access to learning by breaking all barriers of time, pace and distance, (ii) providing individualized instructions suiting to the needs, abilities, learning styles, and interests of the learners, (iii) providing an access to the unlimited numbers of the learners with same quality of the content that a full-time student has, (iv) in promoting collaboration among students from different localities and cultures all around the world, (v) in facing the lack of men-material resources for providing quality education to all, (vi) having flexibility in terms of delivery media, (vii) helpful in making the students more interested and motivated towards learning, and (viii) providing opportunities for timely evaluation and feedback for the learning outcomes.
5. e-Learning is said to suffer from some serious limitations and drawbacks like (i) difficulty faced by the users in having proper access to the use of multimedia, Internet and Web technology, (ii) unwillingness or difficulties on the part of teachers and schools for making its provision to their students, (iii) lack of proper provision to equip the teachers in their pre-service or in-service programmes for its use, (iv) feeling of isolation experienced by the users of e-learning by not having face-to-face interaction and (v) an overall negative attitude towards it by adjudging it as second rate in comparison to regular classroom learning.
6. The term m-learning or mobile learning stands for a specific type of *online learning* and *e-learning* made possible through the services of smart phones.
7. A smart phone is a mobile phone that allows people to make phone calls, and send messages, like a conventional mobile phone, and also, has the additional capacity of performing many other functions of a computer, typically having a touch screen interface, internet access and operating system capable of running downloaded apps.
8. Smart phones can be utilised on the part of students for

carrying out various useful purposes regarding their learning and gaining experiences in various learning areas and school subjects in the shape of (i) using internet facility for accessing limitless contents and information anywhere, anytime (ii) finding, reading and reviewing instructional material/articles, and taking notes or share those online with peers or study group (iii) learning and improving their communication and linguistic ability, (iv) studying and learning of various school subjects and improving their performance in various activities—curricular and co-curricular (v) making use of the audio, video recording facilities and loading various application helpful in their learning.

9. The facilities available through smart phones can be utilised by the teachers for planning, organising, delivering and evaluating their learning tasks carried out by their students in a quite convenient way at anytime, and anywhere in a convenient way. They may be found to make use the smart phones (i) in loading valuable material and information for their pre-preparation of classroom instruction and guidance to their students, (ii) helping in their professional development, (iii) interacting with their students and students' parents, (iv) using various apps helpful in their teaching and students' welfare.

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Transfer of Learning or Training

WHAT IS TRANSFER OF LEARNING OR TRAINING?

We learn many things and perform many tasks in our lives. Sometimes when we learn or perform a new task, we find that it has been influenced by some of our *previous learning* or *training*. The learning of addition and subtraction helps the child learn multiplication and division. Learning of mathematics helps him in solving the numerical problems in physics. Similarly, if one has learned to play tennis, one finds it easier to learn playing ping-pong or badminton. Thus, learning or training in one situation influences our learning or performance in some other situation. This influence is usually referred to as the carry-over of learning from one task to another. The learning or skill acquired in one task is transferred or carried over to other tasks. Not only the learning of the *tricks of a trade* or the knowledge and skill acquired in a particular school subject is transferred to other situations, but also the habits, interests and attitudes get transferred and try to influence the activities of an individual in the future. Crow and Crow express it in the following words:

The carry-over of habits of thinking, feeling, or working, of knowledge or of skills, from one learning area to another usually is referred to as the transfer of training. (1973, p. 323)

Sorenson also takes the same stand when he explains the meaning of transfer in the following words:

Transfer refers to the transfer of knowledge, training and habits acquired in one situation to another situation. (1948, p. 387)

In the field of education, such mechanism of transfer plays a quite significant role as learning in one situation is always required to play its role in one's subsequent or further learning in that particular learning field. It is why, in education, the term *transfer of training* or *transfer of knowledge* is always referred to learning in one context

and applying it to another, i.e. the capacity to apply required knowledge and skills to new situations (Baldvin and Ford, 1988 : 64)

In this way, we can define transfer as *a process by which some influence is exercised over our new learning or performance by our previous learning or training.*

TYPES OF TRANSFER

Transfer of learning from one situation to another may take a variety of forms and shapes depending on many things like the nature or content of thing to be transferred, the situation in which such transfer has to take place and the capacity of the person seeking such transfer. A number of scholars and psychologists working in this area have suggested the taxonomy of such transfer in their own ways. Let us present a few ones for the illustration.

According to Schunk (2004 : 220), transfer may happen in the variety of forms and shapes outlined below:

1. Near and far transfer

- the *near transfer* there is considerable overlap between situations and here we may find much similarity between the contexts of original and transfer settings.
- In the far type of transfer, there is a little overlap between situations and here we may find dissimilarity between original and transfer settings.

The difference between these two types may be made clear through the nature of the transfer examples provided in the Table 12.1.

Table 12.1 Illustrating Distinction between Near and Far Type Transfers

<i>Near transfer</i>	<i>Far transfer</i>
Transfer from using one type of coffee mug to another type of mug.	Transfer drinking hot coffee from a mug to drinking hot coffee out of a thermos (rule—do not burn yourself).
Transfer from using one shuttle bus to another.	Transfer from reading the shuttle bus schedule to reading an airline schedule.
Transfer from using a knife and fork to using a different size of knife and fork.	Transfer from using a knife and fork to using chopsticks.

1. Vertical and horizontal (or lateral) transfer

- In the *vertical transfer*, knowledge of a previous topic is essential to acquire new knowledge.

- the horizontal or lateral transfer, knowledge of previous topic is not essential but helpful to learn a new topic.

The difference between *Vertical and Horizontal/Lateral transfers* may be illustrated in the Table 12.2.

Table 12.2 Illustrating Distinction between Vertical and Horizontal/Lateral Transfers

<i>Vertical transfer</i>	<i>Horizontal or lateral transfer</i>
Transfer from “learning to multiply” to “learning to raise numbers to a power” (like squaring, cubing, etc.)	Transfer from “learning to multiply to base ten” to “multiplying in base two”.
Transfer from knowing “how to sew” to knowing “how to embroider”.	Transfer from learning “how to sew with thread” to knowing “how to sew with rawhide strips”.
Transfer from knowing “how to use a jack” to “being able to change a tire”.	Transfer from knowing “how to use one type of jack” to “being able to use a different type of jack that uses the same idea”.

1. Positive or negative transfer

- In *positive transfer*, what is learned in one context enhances or helps learning in a different setting.
- In *negative transfer*, what is learned in one context hinders or delays learning in a different setting.

The difference between these two can be exemplified through Table 12.3.

Table 12.3 Illustrating Distinction between Positive and Negative Transfers

<i>Positive transfer</i>	<i>Negative transfer</i>
Learning of Punjabi language may help a learner to Learn Hindi language.	Learning of one’s regional language like Punjabi may create problems in the correct pronunciation and spelling related to national language (Hindi) or international language (English).
Learning to play badminton may help in learning to play Table Tennis or Lawn Tennis	Learning to play badminton may prove hinderance to the learning of Lawn Tennis playing due to the difference in situations and skills required to play these games.

1. General/literal and specific/figural type transfers

- In general, or *literal transfer*, the whole knowledge is transferred to the execution of the new task.

- In specific or figural transfer, one uses some aspect of the whole knowledge, i.e. specific one for thinking, learning or performing a task.

The difference between these two can be illustrated through Table 12.4.

Table 12.4 Illustrating Distinction between General/Literal and Specific/ Figural Type Transfers

<i>General/literal transfer</i>	<i>Specific/figural transfer</i>
Transfer from being able to pick up one type of small objects to pick up any type of small objects made possible through the general fine motor coordination.	Transfer from being able to pick up one coin to pick up any coin because you understand how to tip it enough to get one edge up.
Transfer from being able to read “the first check register” you use with your account to later registers on the same account because the numbers go in the same blanks on each.	Transfer from being able to balance on a 4-inch beam to being able to balance on an elevated 4-inch beam.

According to Simons (1999 : 580), there are three kinds of transfer named as:

1. From prior knowledge to learning
2. From learning to new learning and
3. From learning to application

In this way, as claimed by Simons, we need transfer of our acquired knowledge, skills, interests, and attitudes for helping us in the acquisition of our present and future learning as well as utilisation of such learning in our day-to-day life or other professional, scientific and technological activities.

In case we try to think over the above cited modes of classifying the transfer into certain distinct forms or types we may come to the conclusion that whatever, names or categories we may assign to the process and product of transfer, the effect or outcomes of such transfer are strictly confined to one of the following three forms:

1. The learning in previous situation helps or positively affects the learning in the present situation.

2. The learning in previous situation provides obstacles or negatively/adversely affects the learning in the present situation.
3. The learning in previous situation neither helps nor hinders the learning in the present situation.

In this way, basically in our opinion, transfer is said to have the following three distinct forms or types, namely:

(i) Positive transfer, (ii) Negative transfer and (iii) Zero transfer.

Transfer is said to be *positive* when something previously learned benefits performance or learning in a new situation. Similarly, when something previously learned hinders performance or learning in a new situation, we call it *negative transfer*. In case the previous learning makes no difference at all to the performance or learning in a new situation, there is said to be *zero transfer* from the previous situation to the new one.

Sometimes, it is also possible that previous learning may partly help and partly interfere with the performance or learning in a new situation. In learning to play the game of tennis, for example, a person learns many things that are likely to be transferred in learning to play baseball. Promptness in starting, keen observation of the positions of one's opponents and movement of the ball and one's attention on the game rather than on the spectators are some of the positive transfer effects. But there may be some negative transfer effects also. A baseball comes at a faster speed than a tennis ball. The style of using the baseball bat is also different from that of the tennis racket. A similar thing may also be said about the influence of one's mother tongue on the subsequent learning of some other language. In this case also, we have positive as well as negative transfer effects.

THEORIES OF TRANSFER OF LEARNING OR TRAINING

It should be clear by now, with the help of the discussion carried out above in this chapter that due to its transfer value, a particular learning is able to exercise positive as well as negative effects on some subsequent learning. Therefore, it is necessary for a learner to realize the transfer value of the learning in a particular subject. On one hand, he has to reduce as much as possible, the negative transfer effects of one learning and on the other hand, he has to make attempts for getting maximum advantage by securing positive transfer effects. In order to do this, he has to know what it takes to introduce the element of transfer from one situation to another. How does the transfer take place from one situation to another? Psychologists, from time to time, have tried to find out the answer to this question. As a result of their experimentation and thinking, various theories have come up. Some of the important theories (explaining transfer of training) are mentioned below.

THEORIES OF MENTAL DISCIPLINE (Faculty Theory)

It is the oldest of all the transfer theories. This theory believes that the mind is composed of many independent faculties like memory, attention, imagination, reasoning and judgment, etc. These faculties, according to this theory, are nothing but the *muscles of the mind* and like muscle of the body, they can be strengthened or improved through exercise (practice and use). Such properly strengthened or improved faculties later on function automatically in all the situations and areas in which they are involved. For example, if the memory of a person is strengthened or improved to a great extent through the memorisation of long and difficult passages, then it can prove useful in memorising dates, names, formula, figures and in fact anything and everything that involves memory. In the same way, propagators of the theory claim that reasoning and imaginative powers developed through the study of geometrical propositions can be used in solving various problems in life that demand a good deal of reasoning and imagination.

Mental discipline as an educational doctrine and as the basis for transfer of training was first seriously challenged by William James. He wanted to see whether daily training in the memorisation of poetry of one author would affect the learning of a slightly different poetry of another author. For this experiment, he acted as a subject for himself. He memorised 158 lines from Victor Hugo's *Satyr* in $131\frac{5}{6}$ minutes spread over eight days. He then worked for about 20 minutes daily memorising all of the first book of Milton *Paradise Lost*. This required 38 days. After this period of memory training, he returned to the *Satyr* and memorized 158 additional lines. But now he could do so in $151\frac{1}{2}$ minutes as against $131\frac{5}{6}$ minutes in the first instance. James, therefore, concluded that memory was not affected by training as claimed by the faculty theory.

Similar experiments were performed by many psychologists to test the validity and reliability of the *faculty theory*. Worth mentioning

are the experiments conducted by Dr. Sleight and Briggs. The findings of all these experiments have gone against the *mental discipline or faculty theory*. Therefore, nowadays it stands almost rejected.

Theory of Identical Elements

The chief propagator of the theory of identical elements in *transfer of training* was *Thorndike*. Later on, *Woodworth* supported this theory and used the word *components* in place of *elements*. Therefore, the theory is also called *Theory of Identical Components*.

This theory maintains that the transfer from one situation to another is possible to the extent that there are common or identical elements in the situation. For example, there is a possibility of transfer from the field of mathematics to the field of physics to the extent that there are some common elements like symbols, formulae, equations, numerical calculations, etc. In a similar way, transfer takes place from typing to playing a piano to the extent that such skills as eye-finger co-ordination are identical to both the activities. Thus, similarity in two situations with regard to the common elements of content, skill, attitude, method, aims, habits, interest, etc. facilitate the process of transfer.

Theory of Generalisation

The theory of generalisation as an explanation of transfer of training or learning has been put forth by *Charles Judd*. This theory advocates the transfer of generalisations in the new situations in place of identical elements as suggested by *Thorndike*. As a result of certain experiences, the individual reaches some conclusion or generalisation. This conclusion or generalisation can be applied by him in the coming new situations. Thus, generalisation is nothing but a principle, law or rule that can be easily transferred to other situations.

According to this theory as *Crow and Crow* put it. *The developing of special skills, the mastery of specific facts, the achieving of particular habits or attitudes in one situation have little transfer value*

unless the skills, facts, habits are systematised and related to situations in which they can be utilised. (1973, p. 319)

Therefore, this theory, in order to achieve the maximum transfer of learning or training, insists on systematic organisation and generalisation of experiences.

Judd's experiments

Judd conducted a dart throwing experiment to test the transfer value of generalisation. He took (after matching those in terms of intelligence) two groups of children of fifth and sixth grades. He called one group as an *experimental group* and the other as *control group*. The purpose of experiment was to study the effect of instruction in the principle of *refraction of light*, upon the ability of boys to throw darts at target placed 12" under water. The *experimental group* was given a full theoretical explanation of refraction and the other group was left to work without any theoretical training. Both the groups were then asked to throw darts to hit a target placed 12" under water. Both the groups did not do well irrespective of the fact that the experimental group had a theoretical understanding of the phenomenon of refraction. Mere theoretical understanding of refraction could not help the experimental group to have better performance than the control group. Again, the situation was changed. The target was placed 4" under water. This time, the experimental group showed much better performance than the *control group*. Both the groups had an equal chance of practice but while the control group could not make use of its earlier experience, the experimental group derived maximum benefit from it. The understanding of the principle of refraction (theoretically as well as practically) helped them to hit the underwater targets that appeared a little raised than their actual position.

On the basis of his experiment, Judd concluded that it is the generalisation of the general understanding of some relationship (a rule or a law) that is usually transferred from the former situation to the latter one. Similarly, the day-to-day generalised experiences of a

child, like *In touching the fire, we get burnt, or green apples are sour in taste*—always get transferred to the coming new situations.

Therefore, one is largely benefited by the systematic and organised generalisation of experiences and in this way, this theory lays stress on the generalisation of specific experiences and formulation of some rules or principles so that they may be transferred from one situation to another.

Theory of Ideals

This theory was put forward by W.C. Bagley. He tried to explain mechanism of transfer in terms of ideals. He asserted that generalisations are more likely to transfer if they are regarded as ideals of some value as desirable. There are two experiments on transfer of neatness that support Bagley's assertion.

In the first experiment, the experimenter emphasised neatness in the preparation of arithmetic papers by pupils in the third grade. Nothing was said about neatness in the rest of the school subjects. Language and spelling papers were then compared with arithmetic papers for improvement in neatness. While the arithmetic paper showed clear proof of neatness, the language and spelling paper rather showed a decrease in neatness. It was concluded that specific training in neatness in one area did not transfer to other areas.

In the other experiment, the experimenter insisted on neatness in all papers, and the children were told about the advantage of neatness in other respects of life inside and outside the school. In this way, great effort was made to develop an ideal of neatness. The result showed an overall improvement in neatness in all the subjects. The conclusion was that ideals do transfer.

In this way, the theory of ideals emphasises that the ideals like love for wisdom, thirst for knowledge, tolerance for difference of opinion, spirit of enquiry, etc. are transferable from one situation to another, and therefore every attempt should be made to develop desirable ideals among the children.

All the above theories seem to hold divergent opinion regarding the explanation of transfer from one situation to another. But in general, these differences are probably more apparent than real. All these theories are complementary and not contradictory. In one way

or the other, each one of these tries to explain the mechanism of transfer. By synthesising the viewpoints of all these theories, we can place ourselves in a position to know how transfer of learning or training takes place from one situation to another.

EDUCATIONAL IMPLICATIONS OF TRANSFER OF LEARNING OR TRAINING

The knowledge and understanding of the mechanism of transfer of learning has wide educational implications for the curriculum planners, teachers and learners in the ways mentioned below:

Implications for Curriculum Planners

In order to seek maximum positive transfer and deriving the needed educational advantages, the curriculum planners and developers should try to develop school curriculum that can help in providing adequate opportunities for the transfer of knowledge, skills, habits and attitudes acquired in the classroom to life situations and experiences. The contents should accordingly be chosen with reference to the learner's present and future needs. The curriculum as a whole should reflect a close integration within different subjects. Besides this, they must also try to seek all the following type of correlation while giving shape to their curriculum.

1. Correlation among different subjects of the school curriculum.
2. Correlation of school subjects with the social and physical environment. Correlation of different branches of the same subject.
3. Correlation of different topics within the same branch.
4. In addition to this, they should try to organise the courses of instruction of different classes as well as the future learning in such a way as whatever is learned in a class at a particular time should have its proper connection with the previous learning.

Implications for the Teachers

Every teacher should realise the importance of transfer in the teaching–learning process. He should himself get proper training for achieving maximum positive transfer of the things which he wants to

teach his students. Responsibility of teachers in this direction has been beautifully emphasised by Crow and Crow (1973 : 340) in the following words:

First the teacher should know what it is that he wants the children to transfer to other field; second, she must learn by experience or experiment how to teach for transfer and third, to go ahead and do it.

The things needed to be done for helping the learners in getting benefit from the mechanism of transfer of learning should be properly cared on the part of teachers. In brief, for this purpose, they are required to observe that:

1. There should be a provision for the integration of theory and practical.
2. Principle of correlation should be properly followed.
3. Identical components between the situations should be identified and the relationships should be pointed out.
4. Rote learning should never be encouraged. Students should be made to learn through proper understanding and insight.
5. Verbal illustration and the audio-visual aid material should be used to make the learning, interesting, lively and effective.
6. Proper attention should be paid to the process of learning as well as to the product. Learner should be asked the *why* and *how* of his opinions, statements and beliefs. Logical thinking should be kept in constant focus. As far as possible, he should be made to know the things by himself. He should be made to discover the facts and solve the problems.
7. Principles, generalisations and rules should be emphasised instead of discrete facts. Child should be made to discover formulae, rules and principles on the basis of his experiences and should be given full opportunity for the required practice in the use of the generalised principles and formulae.
8. They not only have to seek positive transfer of the knowledge, skill, experience, attitudes and habits, etc., but

also have to safeguard against the old expectations, mental-sets and the factors which bring negative transfer and interfere in the acquisition of present learning. They must not only be able to perceive the similarities in terms of the elements, generalisations and ideals among the different situations, but also make their students think in this direction. They should seek unity in diversity and thus stimulate their students to seek harmony among the different subjects of the school curriculum and transfer the classroom learning to the solution of many problems that arise in day-to-day life situations.

Implications for the Learners

The knowledge and understanding of the mechanism of transfer of learning helps the learners realise what one learns or experiences in a particular situation can either be utilised for the learning in the new situations or applied to the solution of day-to-day problems. Therefore, a wise learner should try to secure maximum transfer so that he may be benefited properly from his earlier experiences and training. The following suggestions can help in this direction:

1. What is being learned at present should be linked with what has already been learnt in the past. What one already knows should form the base for one's present learning. In this way, one should try to take advantage of the past experiences of learning by seeking its proper transfer.
2. While engaging in learning, the learner should try to integrate theoretical studies with the practical experiences.
3. The learner should always keep in mind the principle of correlated learning. What he is trying to learn should be properly correlated with his life experiences, environmental surroundings and other areas of study and knowledge.
4. Identical components between the two learning situations should be properly identified by the learner. Afterwards, he should try to see the relationship between those. With the knowledge of such relationship, he should try to transfer

learning from one situation to another.

5. The learner should avoid rote learning. He must develop the habit of learning through proper understanding and insight with the help of his past experiences and present understanding.
6. He must try to take the help of multimedia and sensory aids for the proper understanding and gaining of the required knowledge and skills.
7. As far as possible, the learner should try to learn on his own. He must make use of logical thinking for knowing and discovering the things by himself.
8. The learner should try to seek unity in diversity by searching for the commonness and harmony among the different subjects and learning experiences. He should never hesitate to utilise the learning of one field in the learning of other fields.
9. Instead of learning discrete and isolated facts, the learner should concentrate on the learning of the principles, generalisation and rules. He should try to discover formulae, rules and principles on the basis of his experiences and then give sufficient time for their utilisation and practice.
10. The learner in all the situations should be fully convinced about the importance and value of the transfer of learning or training. He may take the help of his teacher, elders and other experts for learning the art of transfer. As far as possible, he should try to imbibe an attitude of transferability so much that he remains engaged in making conscious and deliberate efforts for the transfer of his learning and experiences from one situation to another.
11. Ideals, as we have seen, possess a great transfer value. Therefore, the learner should try to imbibe desirable attitudes and ideals for the things he wants to transfer from one situation to another, or more specifically to their specific life activities.
12. Learner should try to gain proper knowledge and insight for

making distinction between positive and negative transfer of his learning or training. As far as possible, he should seek the maximum positive transfer of his learning or training by saving himself from the ill-effects of the negative transfer.

In this way, if one remembers some of the above points, one may be able to get advantage of the mechanism of the transfer of learning and training for illuminating his path for fulfilling his responsibilities as a curriculum planner, teacher and learner in one or the other teaching–learning situations.

SUMMARY

Transfer of learning or training refers to a process by which learning or training in one situation is transferred or carried over to another situation. Such transfer is generally categorised into three distinct types—positive, negative and zero. It is said to be positive or negative when learning in one situation helps or hinders the learning in other situations. It is said to be zero when it neither helps nor hinders. Apart from these three general types of transfer, there may be a fourth probability that learning in one situation may partly help and partly hinder the learning in another situation, i.e., learning of a foreign language under the influence of one's national language or mother tongue.

Theories of transfer of learning or training aim to throw light on the mechanism of transfer or learning, i.e. how does the transfer take place from one situation to another? Theory of mental discipline (Faculty theory) advocates that the faculties of one's mind like memory, attention, reasoning, etc., can be trained and strengthened like the muscles of our body for being utilised automatically in the other learning or training situations.

Theory of identical elements or component propagated by Thorndike and Woodworth maintains that the transfer from one situation to another is possible to the extent that there are common or identical elements or components involved in these situations.

Theory of generalisation put forth by Charles Judd asserts that transfer does take place in the form of generalisations (conclusions derived through experiences or experiments) instead of the isolated facts related to the identical situation. That is why we usually find that laws, principles or rules once established and understood by a learner may help him a lot in their application and further learning in other likewise situations.

Theory of Ideals put forward by W.C. Bagley asserts that only the ideals and not the common elements or the generalisation get transferred from one learning situation to another. Therefore, it suggests that one should first concentrate on building desirable attitudes and ideals about a theory or idea for seeking its transfer from one situation to another.

As a matter of the educational implication, the findings of the theories of transfer of learning or training can be properly summed up and utilised for seeking maximum positive transfer from one learning situation to another on the part of the curriculum planners, teachers and learners. In the task of seeking such transfer, they may be properly helped if he keeps in his mind the principle of correlation, integration of the acquired experiences, generalisation of the facts and principles and accepting generalisation in the form of ideals, etc. However, much depends upon the determination, will power and sincere efforts of learners, for making them successful in achieving success in such transfer for attaining their objectives.

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Motivation in Teaching– Learning

MOTIVATION—NATURE AND MEANING

A small bird collects the material to build its nest in the upper corner of our drawing room. After looking at it we try to remove it. But the bird again brings the small pieces of straws, leaves, etc., and engages itself in building its nest. What makes it so much hard working? Why did it learn to build the nest? Similarly, we see a student burning midnight oil during the examination days or a boy constantly busy in learning how to cycle even after getting many cuts and bruises. What makes them to engage in one or the other types of learning and continue their efforts while facing even so many handicaps and obstacles?

Such questions related to 'why of learning' are always answered through a key word 'motivation'. The bird, which is building its nest, the student, who is studying hard and the boy, who is learning how to cycle; all do so because of the 'Motivation'. They learn because they are motivated to learn. They act because they are persuaded to act in order to satisfy their basic needs and attain the desired goals. There is something which energises or compels them to act and behave in a specified way. The question arises what is that which pushes and pulls an individual to move or act in such a specified way to attain the desired objectives. In psychology, it is named as *motive*. A motive drives our behaviour in the same way as a motor vehicle is driven by the fuel in its tank. There are a number of motives in our personal and social life which are responsible for energising and motivating our behaviour. These motives can be broadly classified into two categories named below:

1. Primary motives
2. Secondary motives

Primary motives: These motives are linked with the basic primary needs associated with the biological or physiological well-being of the individual. That is why these motives are often named as *biological or physiological motives*. These motives ensure the preservation of life for the individual and for his race. Examples of such motives are hunger, thirst, sex, avoidance of pain, elimination of body wastes, sleep and rest, etc. The primary motives are universal motives; they are found in all organisms human or non-human, in one form or the other. They serve the basic physiological need of the organism. They are inborn and innate.

Secondary motives: These are linked with one's socio-psychological needs and hence are named as the psychological or social motives. They are acquired like other forms of learned behaviour in the course of satisfaction of the needs. Examples of such motives are *Power motives, Achievement motive, Self-actualisation motive, Security motive, Application motive, Affiliation motive*, etc.

At any occasion when a primary or secondary motive is attached with one's action or behaviour, then his behaviour patterns get dominated by such motive. His behaviour is termed as motivated behaviour forcing and compelling the individual to behave in a particular way at the command of the involved motive.

Such motivated behaviour of an individual possesses the following characteristics:

1. A motive works as a source or energiser for pushing and pulling the motivated behaviour.
2. It is, in fact, aimed towards the satisfaction of one or the other basic need.
3. One's behaviour can be properly initiated and its continuity can be properly assured in the shape of his motivated behaviour.
4. Motivated behaviour is quite selective. Here one tries to respond to the environmental stimuli strictly in view of the satisfaction of the desired needs linked with the motivated

behaviour.

5. Motivated behaviour has dynamicity and flexibility in its nature. In the course of behaving, if there is some alteration in the nature of the further requirements of satisfaction of the need, it may bring change in one's motives of behaving. As a result, the shape or direction of the motivating behaviour may altogether be changed as per demands of the new situation.
6. Motivated behaviour is goal directed. The individual is totally engaged in the realisation of the goals of his motivated behaviour. The realisation of one goal may further put him in the cycle of motivated behaviour as he may feel the necessity of the realisation of his further needs in the path of his progress or cycle of his life.
7. Motivated behaviour helps us in seeking equilibrium between our needs and their satisfaction. It lies in between one's need and its satisfaction. Since, the key to our adjustment lies in the satisfaction of our needs, the motivated behaviour proves an important tool and means for making ourselves adjusted and integrated.

In this way, with what we have discussed in the above lines, we may be now in a position to have a workable definition of the term *motivation or motivated behaviour* in the following way.

Motivation as a process or behaviour refers to a reinforced, selective and goal directed behaviour initiated and energised by a motive which aims to maintain and balance the equilibrium of the person in relation to his environment by keeping his basic needs in the process of satisfaction.

THE MOTIVATIONAL CYCLE

Motivation, as we have discussed earlier, stands for the state of an organism which involves the existence of a need that moves or drives him from within towards a goal for the satisfaction of the desired need.

As visualised from Figure 13.1, the *motivation* or *motivated behaviour* functions as a continuous flow in the shape of a cycle named motivational cycle explained below:

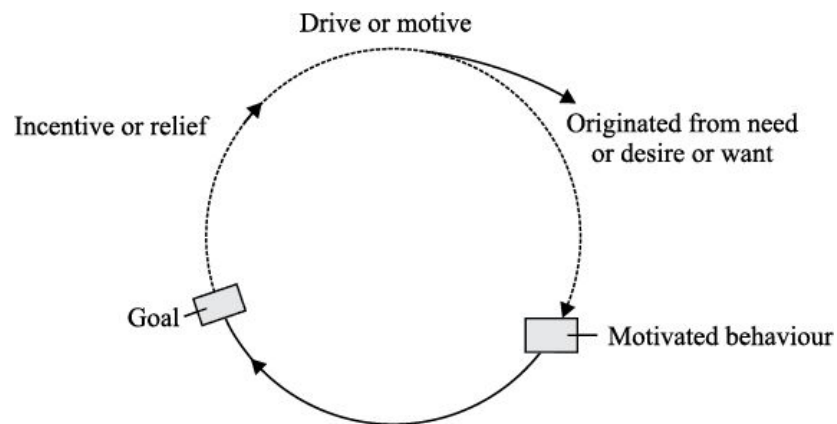


Figure 13.1 The motivational cycle.

1. The behaviour is initiated due to some inherent need. Thereby, the first stage or the starting point of the *motivation cycle* is the birth of a desire, want or need in the individual. This desire, want or need makes an individual to think about the ways and means of its satisfaction. He may become now quite anxious and perturbed for the satisfaction of his desire or need, such that the stage of his mind and body becomes a germinating point for the birth of a drive or motive.
2. The *drive* or *motive* so produced due to the felt need or desire, now becomes a driver, persuader and energiser of one's behaviour. It initiates one's behaviour to a goal directed path, provides sufficient inputs for the continuation of such behaviour till the goal in terms of the realisation of the desired need, desire or want is not attained. Thus, in the end, the organism becomes able to reach the desired

goal and feel satisfied in terms of the satisfaction of his need or motive. It enables him to get relief from the anxiety and tension related to the satisfaction of his need and motive.

3. However, what one gets through the satisfaction of his felt need or desire through his motivated behaviour, provides a temporary halt to his behavioural activities. The journey is not at all completely stopped, but in fact advances further with a new zeal and enthusiasm for the realisation of some other needs and desires. Satisfaction of a need through a motivated behaviour reinforces one's behaviour to work for the realisation of another goal, i.e. satisfaction of other needs or desires accompanied with new motives. In this way, one motivated behaviour gives birth to the next motivated behaviour in the shape of a motivational cycle. Originated from the felt needs, energised and directed by one's motives, reinforced by the progress in the satisfaction of the need or other external reinforcement, the motivation behaviour thus helps in the satisfaction of one's needs or motives. It further energises an individual to remain in the cycle of motivation by creating new desires, ambitions and needs, the satisfaction of which further requires a new set of motivation behaviour and motivation cycle.

TYPES OF MOTIVATION

The motivation can be broadly classified into two types:

1. Natural motivation or intrinsic motivation
2. Artificial motivation or extrinsic motivation

Natural motivation or intrinsic motivation: This type of motivation is directly linked with the natural instincts, urges and impulses of the organism. The individual, who is intrinsically or naturally motivated, performs an act because he finds the activity interesting. He is engaged in learning something because he derives pleasure by learning of that thing. The activity carries its own award and the individual takes genuine interest in performing the activity due to some outside motives and goals.

When a student tries to solve a mathematical problem and derives pleasure in the task of solving it or tries to read poetry and the reading itself gives him pleasure, we can say that he is intrinsically motivated. In these cases the source of pleasure lies within the activities. He solves the problems or reads the poetry for its own sake. Such type of motivation has real values in the learning task as it creates spontaneous attention and interest and sustains it throughout.

Artificial motivation or extrinsic motivation: In such motivation, the source of pleasure does not lie within the task. Such kind of motivation has no functional relationships with the task. Here the individual does or learns something not for its own sake, but as a means of obtaining desired goals or getting some external reward. Working for a better grade or honour, learning a skill to earn the livelihood, receiving praise and blame, rewards and punishment, etc., all belong to this category.

In comparison to extrinsic motivation, intrinsic motivation, as a source of spontaneous inspiration and stimulation, brings better results in the teaching–learning process. Therefore, *it is always better to make use of intrinsic motivation, whenever it is possible to*

do so. But in case, when it is not appropriate to make use of intrinsic motivation, the use of extrinsic motivation should not be suspended. Depending upon the learning situation and the nature of the task, the choice for providing appropriate motivation should be made by the teacher so that the learner may take proper interest in a learning activity.

NEED OF MOTIVATION FOR THE LEARNERS AND TEACHERS

The knowledge regarding the phenomenon and mechanism of motivation along with the technique of its enhancement among the learners may prove quite beneficial to the teachers and learners in the variety of ways like below:

1. Motivation carries a great significance to the learner. It results in proper readiness for learning. According to Thorndike's law of readiness, the learning takes place well when the learner has proper willingness or readiness for the learning of a thing. Motivation helps the child in making him ready and willing for a particular learning. If it is done, then a great work is automatically performed in the direction of teaching work performed by the teacher and learning task carried out by the learner.
2. Motivation helps learner to take interest in his learning, capturing his interest and get him focused on the learning task relatively for a longer time. Interest, attention and sustaining of attention are quite vital for the effectiveness of learning and a learner can reap their benefits well by getting motivated for learning a task. The learners who seem quite motivated to learn are bound to get desired success in the accomplishment of their learning objectives.
3. A teacher should learn the art and techniques of motivating his students for target-learning. He should also learn to help his students to seek intrinsic motivation in place of extrinsic motivation. However, he should not also feel hesitation in getting his students motivated through extrinsic means like praise, appreciation, certificates, medals, etc. He should try to avoid punishment, reproof or blaming as a method of instigating or compelling the students for a particular learning and always prefer positive means like appreciation and rewards over the negative means.

4. A teacher should try to use the learning experiences and learning opportunities in tune with the needs, motives, interests, goals and aspirations of the learners for seeking means of intrinsic motivation to his learners.
5. While delivering his lesson to the students in the class, a teacher must begin his journey of teaching by seeking proper motivation of the students towards his lesson. For this purpose, he should try to get their attention focused and interest maintained in his delivered lesson by adopting a variety of means and techniques. In all cases, he should make the students feel the importance or genuine need of studying the topic to be presented by the teacher in the class or an activity performed by the students on an individual or collective basis.

THE CONCEPT OF NEEDS, DRIVES AND INCENTIVES

While discussing the process of motivation through a motivation cycle we have used the terms needs, drives, incentives, etc. All these concepts need a necessary explanation for knowing about their true nature and role in the process of motivation. Let us have a brief discussion about all of them.

Needs

Meaning of the term 'Need': We make use of the term *need* in our day-to-day life in many ways. When we desire or wish to have food, we say that we are in need of the food, some eatable. We need water for quenching our thirst, sex objects for the satisfaction of our sex needs, companions and friends in the hours of loneliness and loneliness or rest after being tired of the busy schedule. We have a craving for being loved or to love and also remain struggling for achieving some status, recognition and appreciation for our work and duties. In this way, the term *need* is very often used as synonymous to the terms 'want' and 'desire'. We are always in a state of anxiety, eagerness and temptation for fulfilling our desires or wants. In fact these desires or wants (psychologically named as needs) prompt or persuade us to behave in a specific way.

In the light of the above discussion, we may now have a workable definition of the term *need* in the following way:

Need refers to a condition or state of our mind that prompts or persuade us to act or behave in a specific way.

What are the Basic Needs?

There is no end of our desires or wants in our life. As a result it is difficult to name or tell the number of the individual needs. However, there are needs which are quite essential for an individual in terms of his remaining alive, maintaining proper physical and mental health, leading a social life and getting well in terms of personality development, etc. Such essential needs are referred to as

individual's basic needs. These basic needs for their proper understanding may be broadly classified into the following two categories:

1. Physiological or biological needs
2. Socio-psychological needs

Physiological or biological needs

All our bodily or organic needs fall into this category. They may be further categorised as under:

1. In the first category of biological needs, we have need for oxygen, water and food. These needs are most fundamental for our survival and existence. Without them we can hardly survive.
2. In the chain of our survival and existence the other category of the biological needs include needs such as:
 - a. Need for rest when tired.
 - b. Need for being active when rested.
 - c. Need for sleep when deprived of it for long.
 - d. Need for regular elimination of waste products from the body.
 - e. Need for having an even internal body temperature.
 - f. Need for protection against the threats of physical environment like hazards of weather, natural calamities, wild animals, etc.
3. In the third category of biological needs, we can place the need for satisfaction of sex urge or desire to seek sex-experiences. Although sex urge is not essential for the survival of an individual, it is the strongest human urge in the satisfaction of which lies his proper growth, development, adjustment and well-being. Moreover, the satisfaction of this need and normal sex behaviour are most essential for a happy family life and the continuity and survival of the human species.
4. In the last category of biological needs, we have needs that

are associated with the demands of our senses. These sensory needs include the need for physical contact, sensory stimulation and stimulus variability and manipulation. Although we may not die if deprived of these needs, they are supposed to be quite essential for our general welfare and optimal growth.

Socio-psychological needs

Under this category, we can list all those needs that are associated with the socio-cultural environment of an individual. They are acquired through social learning. Although such needs are not linked with the survival of the organism or species, their deprivation may lead to a psychological state seriously affecting his survival and welfare. These needs for the sake of clarity may be classified as follows:

The need for freedom or gaining independence: An individual possesses a craving for independence. Nature has created us free and independent as individuals and requires us to remain so. Therefore, all human beings have an urge to remain free and independent.

The need for security: Every one of us needs to feel secure to save ourselves not only from the physical dangers but also from socio-psychological angles. One needs desirable emotional, social and economical security for his well-being.

The need for love and affection: Every one of us, irrespective of age, caste, colour and creed, has a strong desire to love and be loved. Depending upon one's age and circumstances, it may vary in kind and nature, but a sort of emotional craving for the satisfaction of this need is exhibited universally by all living organisms.

The need to achieve: Every human being has a strong desire to achieve some or other things like money, fame, reputation, degree, merit, position, medals, good life partner, spiritual attainment, etc. not only for raising his status in the eyes of others but also for the satisfaction he gets out of his own accomplishment.

The need for recognition or social approval: Each one of us has an inherent desire for gaining recognition, appreciation and esteem at the hands of others. An artist may thus desire to be known for his art, a young woman may desire to be appreciated for her beauty, good manners or housekeeping by fellow human beings especially the members of the group to which she belongs. A student may show this desire in surpassing other students of his class and thus gaining required social status, prestige or approval from his fellow students, teachers and parents.

The need for social company: Man is referred to as a social animal in the sense that he has a strong urge to be with his own kind and maintain social relations with them. The real strength of this need can be felt by those individuals who face social rejection or solitary confinement.

The need for self-assertion: Every one of us has an inherent desire to get an opportunity to rule or dominate others. It may vary in intensity from person to person but it is surely exhibited by all of us in one or other situation irrespective of age, strength and status. Some may show it to their juniors, servants, life partner or children while others may exhibit it towards their pet animals, birds and even inanimate things like dolls or pictures. This need of asserting oneself gives birth to an important motive called *power motive* that works as a strong determiner of one's personality and behaviour.

The need for self-expression or self-actualisation: We all have an inherent craving for the expression of ourself and actualisation of our own potentialities. An individual may have a hidden poet, musician or painter in himself and may thus have a strong desire to get his talent exhibited or nurtured. In this way one wants to get adequate opportunities for the expression and development of his potentialities and subsequently he strives for it and is not happy until he gets opportunities for such expression and self-actualisation.

Drives

A need gives rise to a drive which may be defined as an aroused reaction, tendency or a state of heightened tension that sets up activities in an individual and sustains them for increasing his general activity level. The existence of a need moves or drives the individual from within and directs its activities to a goal that may bring about the satisfaction of the need. The strength of a drive depends upon the strength of the stimuli involving the related need.

Drives of any nature are divided into two categories. In the first category we have biological or primary drives such as hunger, thirst, escape from pain and sex drive. In the second category we have *socio-psychological or secondary drives* such as fear or anxiety, desire for approval, striving for achievement, aggression and dependence. These drives are not related to our physiological needs and therefore do not arise due to imbalances in the body's internal functioning. They arise from the socio-psychological needs and are said to be acquired through social learning as a result of one's interaction with his socio-cultural environment. These drives move an individual to act for the satisfaction of his socio-psychological needs which in turn prove as a reinforcer of the behaviour for the continuity and maintenance of the behaviour.

Contrary to the socio-psychological or secondary drives, the biological drives are basically learned in nature. They arise from our biological needs as a result of an attempt to satisfy these needs.

Incentives

Needs and drives, as we have studied in the above pages, reveal and represent the inner state of an individual's behaviour. When there is deficiency or shortage of water and food in our body, we feel the need for their satisfaction. The need gives birth to thirst and hunger drives. But sometimes it may happen that we feel the necessity of getting some eatables or drinks in spite of the fact that our body does not require them. There is no shortage of water or food and hence there is no biological or physiological need that is to be gratified by our behaviour. In this case such need is produced due to our excessive liking for a particular type of food or drink or due to

its scent, taste and other perception, instead of its natural demand or necessity to our body. Such external factors, affecting our needs are usually referred to as *incentives*. Not only our needs but drives—physiological and socio-psychological are also influenced and guided by incentives. If one gets incentives in terms of the food of his choice and taste, he may be attracted and feel necessity of getting it more and more. The drive of hunger here gets a new source of energy and backing through such incentives.

As the examples of *incentives* we may cite praise, appreciation, reward, bonus, fulfilment of one's needs and getting the desired objectives.

Any type of incentive always works as a reinforcing agent as it adds more force to a new attached drive like adding fuel to the already ignited fire. As a result the individual behaves with a new zeal and enthusiasm for achieving his need based objectives. For example, let us take the case of providing bonus to the workers of a factory. Here bonus is an incentive. It provides an additional backup and energy to the workers for doing hard or extra work for attaining the production targets of the factory. It works as a reinforcing agent to activate their behaviour and creates an extra drive for bringing efficiency in their work. The same may be perceived in the case of any individual where we may find a tremendous change in his behaviour through the incentives received by him during the course of his behaviour. For example, a piece of toffee, chocolate or ice-cream or a playing toy may work as an incentive for a boy to give more strength to his drive and as a result he may be further motivated to act or behave in a desirable way. Similarly, a favourite food may provide an incentive for an individual to eat or a favourite movie may compel other individuals to go and watch it. In this way, needs and drives, whether primary or secondary, are greatly affected and directed by the incentives.

It is not essential for these incentives to remain external. The internal incentives from within also have the same effect of directing and influencing one's drive for the satisfaction of one or the other need. During the course of his activity if one feels satisfied with his progress in work or gets success in achieving his objectives, he gets

a lot of incentive from his own self that helps replenish fresh energy to put his heart and soul in the work.

STRATEGIES OR TECHNIQUES FOR MOTIVATING THE STUDENTS

Motivation, as discussed earlier, occupies a central place in the teaching–learning process. It is, in fact, indispensable for learning. Every teacher, at one time or the other, faces the problem of motivating his students to learn. Therefore, it is essential to think of the ways and means for achieving motivation in the classroom situation. The principles of motivation described earlier may provide necessary guidelines for this purpose. However, in brief, we can adopt the following techniques in this regard.

Child-centred approach: It is the child who has to learn. The teacher only helps him to learn. Therefore, what the child has to learn, the teacher is only supposed to help him in learning that. But, what child has to learn, should be judged according to the ability, interest, capacity and previous experience of the child. Is he mature enough to understand the new material or do the assigned task? Does he possess necessary skills and abilities for doing the present task? Is he mentally prepared for the present learning? These are some of the questions which should be kept in mind while asking the child to learn something new or perform some assigned task. The learning material or experiences should always be assigned according to the needs, interests and abilities of the child.

Linking the new learning with the past: Experience is a great teacher. What has been learned or experienced in the past, proves a good base for the present learning. The assigned task seems to be interesting, easy and within the capacity of an individual, if it is properly related with the past experience. The child is easily motivated to learn the new material if he thinks that he knows all which is required as a base for the new learning. Therefore, it is the duty of the teacher to base his present teaching upon the previous learning experiences acquired by the pupil.

Use of effective methods, aids and devices in teaching: Whatever the subject-matter may be, a good teacher with his art of teaching can stimulate the students for learning. Old dogmatic

methods kill the initiative and interest of the learner while the progressive methods based on the psychological principles, keep him motivated. The use of audio-visual aids and the service rendered by museum, library, visit of places, etc., directly help the teacher in motivating his students. Therefore, a wise teacher should make use of the suitable methods, devices and aid-material in his teaching.

Definiteness of the purposes and goals: One cannot feel interested in a task if one is not aware of the purpose served by doing that. Definiteness of the aims and goals makes the learner interested and sets him to work in a desirable direction. The students must be acquainted well with the aims and objectives of studying a subject or topic. They must be told the purpose of acquiring a new skill or experience so that a clear perception of the goals may motivate them and bring required results.

Knowledge of the results and progress: Every learner wishes to know the result of his striving. When we make ourselves engaged in doing some task, it is natural to have curiosity about the progress made in completing that task. The knowledge that we are progressing satisfactorily gives us proper incentive. The child, who is attempting Mathematical problem concerning with a particular topic, gets constant motivation if he is well acquainted with his progress. Immediate knowledge of the results provides sufficient feedback to the learner. It does not only help him in acquainting with his success or failure but also makes him able to plan his further attempts for reaching specific goals. The proper evaluation of the pupil's work in terms of criticism and warning, remarks and praise etc., proves an effective incentive for the desirable improvement. Teachers should make provision for acquainting the students well with their progress. For this purpose, proper Record-cards, Graphs and Charts should be maintained in the schools.

Praise and reproof: Both praise and reproof are the potent incentives. They can be safely used for the achievement of desired motivation in the classroom situations. Which one of these incentives will prove more effective depends upon the personality of the learner as well as of the person who gives them. In the case of some

individuals, both praise and reproof work well while others respond the best to one or the other. Generally, those having feelings of inadequacy respond more favourably to praise and those who are self-assured work harder after criticism. The way, in which these incentives are given or repeated by the teacher, also counts much. The essential condition for the effectiveness of these incentives is that these must either satisfy or threaten our security or one or more of our other motives. In this way, the teacher must try to recognise the nature of the students and consequently make use of the *praise or reproof* in motivating and inspiring them.

Rewards and punishment: Rewards and punishment bring the same results as praise and reproof. Both of these are powerful incentives and try to influence the future conduct or learning of an organism favourably. While punishment as a negative motive is based on fear of failure, fear of losing prestige, fear of insult on rejection, fear of physical pain and so on, the reward as a positive motive seeks to influence conduct favourably by associating a pleasant feeling with the desired act.

As far as possible, the use of punishment as a motivating agent should be avoided as it kills initiative, leadership, resourcefulness and the spirit of free thinking and adventurous living. On the other hand, the rewards like prizes, honours, certificates, medals, etc., have psychological value and develop in the students' creative abilities, spirit of emulation, self-confidence and self-respect and other democratic feelings.

With this discussion, it should not be taken that punishment as a rule should be decried in all circumstances and never be given to anybody. In some cases, it brings more improvement than reward. On the other hand indiscriminate and unqualified use of reward proves harmful as it sometimes tends to become an end in itself. For an example, a student may strive hard to get the Gold medal but in doing so he may be interested, not in learning but in the medal. Therefore, the teacher should be very careful in using rewards or punishment as an incentive to motivate his students.

Competition and cooperation: Competition as a source of motivation is universally recognised. In a simple language, it indicates the desire to excel others. Nowadays we find too much competition in all walks of life. In the field of education, this spirit can be used as a powerful motivating force. We can create learning situations, where the students of a class are engaged in a healthy competition. Competition may take one of the two forms—competition against another person or competition against one's own record. In the former form of the competition there lies a danger of developing undesirable habits in the individual as he may resort to unfair means for excelling others. The other form of competition stimulates the learner to compete with his own past record. It sets him on the path of self-learning and provides an intrinsic motivation. Therefore, the teacher should try to inculcate the feeling of self-improvement in the learner.

Competition, particularly, the group-competition may give birth to bitter criticism, rivalry, enmity and conflicts, etc. For removing these bad effects, the remedy is often suggested in the form of cooperation. The cooperation as well as competition are used in combination. In this process, the members of a group may cooperate with each other, while the group competes with other groups and so on. This type of cooperation and friendly competition develop team-spirit, community feeling, thinking for a common cause, a sense of unity and other socially desirable habits. A wise teacher should try to make use of the competition based on cooperation and 'we feeling'.

Ego-involvement: The ego consists of attitudes relating to the self. Every one of us tries to maintain status and self-respect. We like those people, objects and situations that make us feel important and dislike those that make us feel inferior. Teachers, generally, are in the habit of ridiculing and snubbing their students. It is not the proper way of motivating them, instead of using such means, the teacher should try to motivate his students by appealing to ego maximisation. He should engage them in the activities which can appeal to his self-respect and raise his status among his classmates or peers.

Development of proper attitude: Attitude is defined as one's mindset to react in a particular way in a given situation. It is closely

related to attention and interest. A child, who has developed a healthy attitude towards manual work, takes genuine interest in working with hands, while the other one who has developed a negative attitude, shirks away from it. In this way, a favourable attitude helps the learner in setting of his mind or preparing him mentally for doing a particular task or learning something. Therefore, the teacher should try to develop proper attitude of his students towards the desired act or learning.

Appropriate learning situation and environment: The situations and the environment, in which the learning is to be made by the learner, influence the learning process. A well equipped, healthy classroom environment proves a motivating force. The child likes to read, write or listen to the teacher carefully if he finds favourable environment and appropriate learning situations. The suitability of the school building, the seating arrangement and other physical facilities available and affection he gets from his teachers, the mutual cooperation and help, he gets from his classmates, the opportunity of participation he gets in the school co-curricular activities, etc.—all influence and motivate the learning behaviour of the child. Therefore, efforts should be made to provide suitable learning situations and environment for effective learning.

TEACHER'S ROLE IN MOTIVATING, STRENGTHENING AND SUSTAINING MOTIVATION AMONG LEARNERS

In a teaching–learning process, a teacher can play a quite substantial role not only in motivating his students for the classroom learning but he may be found to remain in a position to strengthen and sustain such aroused motivation among them. Let us see how it can be done by a teacher:

1. A teacher should try to be alert and conscious of getting students motivated to learn the topic of his lesson delivered in the class from the very beginning. He should try to introduce his lesson to the students in such a way as to capture their needed attention and arouse interest and curiosity about studying the topic to be taught to them in the class. For this purpose, he should try to link the introduction of his lesson to the previous knowledge and learning of the topic, their day-to-day experiences and their curiosity to know about new things. He should also try to seek and arouse motivation of the students by linking his lesson with one or the other motives of the students. They should be realised the importance and significance of the topic being taught to them. How they are going to be benefited with the study of the things or learning experiences given to them by the teacher in the class should be clearly known to the students for motivating them towards classroom learning.
2. Once students are motivated, their attention is drawn and interest is created towards the topic, the next essential thing in this direction is to attempt for strengthening and sustaining of the motivated behaviour of the students. For this purpose, a willing teacher may consider following tools and strategies:
 - i. The learning experiences or content material presented before the students should be well integrated, organised in a quite logical as well as

psychological way. What follows should be linked with the previous things delivered or understood by the students as well as it should help in building the base of future presentation of the content material/learning experiences before the students. It should follow the principle of simple to complex, concrete to abstract and examples to generalisation in its organisation as well as delivery.

- ii. Methods of teaching, strategies and devices, media and mode should be so chosen and applied for the classroom teaching–learning as to help the students in maintaining their interest and motive towards classroom learning.
- iii. Teaching–learning process should work on an interactive, learner-centered and sharing basis rather than on a teacher dominated single track. The students should be given proper opportunity for providing their active involvement and participation in the teaching–learning process. They should be inspired and encouraged for asking questions, satisfying their curiosity and meeting their constructive and creative needs.
- iv. Use of audio-visual aids, multimedia and ICT should be incorporated well in the classroom teaching for keeping up a sufficient level of motivation of the students as well as helping them to derive maximum educational benefits with the use of such aid material and equipment.
- v. A motivated behaviour can be strengthened and sustained well if necessary attention and efforts are made for getting it properly reinforced through an appropriate schedule and method of reinforcement. A teacher, therefore, should try to make use of a proper combination of praise and blame, competition and cooperation, reward and punishment, for strengthening and sustaining motivated spirit of the students towards classroom learning. The measures

like asking questions to the students in the class, engaging them in drill and practice work, evaluating their classroom performance and getting them acquainted immediately with the outcomes or results of their performance may also bring quite a positive results towards strengthening and sustaining of their motivation.

SUMMARY

1. *Motivation* refers to a process in which an individual is compelled or energised to act or behave in a particular way at a particular time for accomplishing some specific goal or purpose in order to satisfy his one or the other basic need. The behaviour demonstrated by an individual as a result of the process of motivation is termed as *motivational behaviour*.
2. *Motivational behaviour* of an individual is found to function in a continuous flow of a cycle named *motivational cycle*. The first stage or the starting point of the motivational cycle is the birth of desire, want or need in the individual. The felt need or desire then becomes a germinating point for the birth of a drive or motive. The drive helps in the realisation of the felt needs. But the satisfaction of one need may provide incentive and thus give rise to other similar or higher needs and in this way one may remain in the repeated cycle of such motivational behaviour for going ahead in the path of his progress.
3. Motivation may be broadly classified as *intrinsic and extrinsic motivation*. In *intrinsic motivation*, the source of motivation lies within the task of activity itself. The individual gets motivated to do one or the other things due to the satisfaction received by him in doing so in order to satisfy his natural instincts, urges and impulses. In *extrinsic motivation*, however, the source of pleasure does not lie within the task. Here one does not learn or do something for its own sake but does it as a means of getting some external reward, i.e. working for a grade or honour instead of seeking joy in the activity itself.
4. The activating forces lying behind one's *motivational behaviour* may be named as *needs, drives, and incentives*. The needs that are quite essential for human beings are called *basic needs* and are classified as *physiological (biological needs)* and *socio-psychological needs*. These

needs give birth to one or the other related drives which work as a driver for driving an individual from within to behave for the satisfaction of his needs. Hence drivers are responsible for activating an individual from within. However, the behaviour involving the satisfaction of our needs and drives are also affected by some external factors named as incentives like praise, appreciation, reward and bonus.

5. Strategies or techniques for motivating the students in the ongoing teaching–learning process may be named as: the adoption of a child-centered approach, linking the new learning with the past, use of effective methods, aids and devices, definiteness of the purposes and goals, knowledge of the result and progress, and judicious use of the techniques named as praise, reproof, reward and punishment, competition and cooperation, attempts for the development of proper attitude and ego involvement and caring for the betterment of the available learning situation and environment, etc.
6. In a teaching–learning process, a teacher can play a quite substantial role not only in motivating his students for the classroom learning but he may be found to remain in a position to strengthen and sustain such aroused motivation among them by adopting the measures like (i) motivating the students towards the topic of his lesson at the introductory stage by bringing before the students, the importance of its study, (ii) adopting suitable measures for strengthening and sustaining the aroused motivation of the students in the classroom teaching–learning.

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Teaching Concept, Nature and Importance

CONCEPT OF TEACHING

The general notion, popular opinion and the image which we form about an object, people or idea is termed as our concept about them. It is the result of our experiences direct and indirect which we happen to gain about objects, people or ideas. The same is true also for the concept of teaching. By the term 'concept of teaching' we mean all that which we know or ought to know about teaching in terms of its meaning, nature, and characteristics and all which can distinguish it from the other similar concepts and activities. Looking in this way, if we intend to know thoroughly about the concept of teaching we have to look at it from the various angles, such as:

- Understanding its meaning and defining it.
- Knowing the nature and characteristics of teaching.
- Comparing teaching with other similar concepts.
- Discussing about the analytical concept of teaching.
- Understanding teaching in terms of its variables.
- Understanding the importance of teaching.

Meaning and Definitions of the Term Teaching

Teaching in its simple meaning is referred to either as occupation or profession of a community known as teacher or an activity or activities of a group undertaken to help an individual to learn or acquire some knowledge, skills, attitudes or interests, etc.

However, the meaning and concept of teaching is not as simple as interpreted above. It is a quite complex social, cultural and ethical process designed in a social or cultural context.

By all means and in any shape, it is always designed in a social context and therefore related with the social structures, cultural

environment, values and ideals of the people, society and the government. All these factors always stand for dynamicity, therefore the meaning and definitions of teaching have always been in a state of change depending upon the need of time, place and society. It has resulted into various definitions of the term teaching. Some of such definitions are reproduced below:

H.C. Morrison (1934): “Teaching is an intimate contact between a more mature personality and a less mature one which is designed for further education of the latter.”

John Brubacher (1939): “Teaching is an arrangement and manipulation of a situation in which there are gaps and obstructions which an individual will seek to overcome and from which he will learn in the course of doing so.”

B.O. Smith (1960): “Teaching is a system of actions intended to produce learning.”

N.L. Gage (1962): “Teaching is a form of inter-personal influence aimed at changing the behaviour potential of another person.”

B.O. Smith (1963): “Teaching is a system of actions involving an agent, an end in view, and a situation including two sets of factors—those over which the agent has no control (class size, size of classroom, physical characteristics of pupils, etc.) and those that he can modify (way of asking questions about instruction and ways of structuring information or ideas gleaned).”

Amidon and Hough (1967): “Teaching is defined as an interactive process, primarily involving classroom talk which takes place between teacher and pupil and occurs during certain definable activities.”

Clarke (1970): “Teaching refers to activities that are designed and performed to produce change in student (pupil) behaviour.”

Thomas F. Green (1971): “Teaching is the task of teacher which is performed for the development of a child.”

Let us try to analyse these definitions.

The definition given by Morrison (1934) considers teaching as a disciplined social process in which a teacher by virtue of his ideal position, status, knowledge and experiences influences the behaviour of the less experienced pupil and helps him to develop according to the needs and ideals of the society or government. In this type of teaching the student has to learn and develop according to the ideals set before him by the teacher. The teaching is reduced to what the teacher teaches. The students are there to copy down the model presented by the teacher. There is no interaction but the flow of instructions from the teachers. As a result, the pupils are bound to become the passive listeners and blind imitators.

The definition given by Brubacher (1939) takes teaching to that position where the pupils are required to play the central role and the teacher's task is limited to arrange and create situations for the learning. Here, the students themselves have to decide what they want to do and how they will do that. This type of teaching may lead the pupil to independent learning and problem solving.

The third definition given by Smith (1960) considers teaching as an organised system of specific activities that are aimed to help the learner to learn something. Teaching may be carried out in the absence of a teacher. A book, nature, teaching machine, tape recorder, etc. may play the role of teacher. The important thing is the role of a system of actions or activities. If it results in some or the other types of learning then this system may be termed as *teaching*. The weakest point of the above definition lies in the fact that it does not mention all the elements of the teaching process, namely the teacher, taught and the subject matter.

To do away with the above weakness, Smith tried to elaborate his earlier definition, in 1963 by considering teaching as a tripolar process involving:

1. an agent (the source, human or material that tries to produce learning),
2. a goal or target that is to be achieved through the process of teaching, and
3. the intervening variable consisting of learning or teaching

situation or environment. It may involve physical or human material, conditions and instructional methods.

The definition given by Gage (1962) takes teaching as a process establishing interpersonal relationship between the teacher and the taught, as a result of which the behaviour of the latter is modified. Here the relationship plays the key role. In this age of sophistication, this type of approach is unable to explain the role of hardware, programmed instructions and teaching machines where the bond of interpersonal relationship is somewhat missing.

The next definition given by Amidon (1967) considers teaching as a process of interaction between the teacher and the taught. It considers teaching as a co-operative enterprise, the two-way traffic and a commonly shared phenomenon. It results in the improvement and development of both the participants, i.e. teacher and the taught. It considers teaching as a set of properly planned and clearly defined activities that are undertaken for the achievement of certain objectives. This definition too is limited in the sense that it confines teaching within the interaction of the teacher and taught and that too primarily in the form of classroom talk or a few special activities.

Clarke (1970) in his definition has tried to broaden the base/scope of teaching by taking it as a set of all those organised activities that may result in bringing some change in the behaviour of the pupil or learner.

A year later Green (1971) in his definition tried to delimit the boundary and scope of teaching task. He has defined teaching as a profession or occupation by stating that teaching is what a teacher does for the development of a child.

Actually, this is a very narrow and misnomer concept of the term *teaching*. Teaching can neither be restricted to a profession/occupation of a people or community (i.e., teachers) nor can be always relied for bringing desirable improvement or development in the behaviour or functions of the students. It may end in both ways—desirable or undesirable, hence it cannot be assumed to play a developmental role in all situations.

The above attempt for the analytic description of the definitions may reveal that some of these definitions represent a very limited

view of the functions and scope of the teaching act while others elaborate it to the extent of unbridled freedom and undefined tasks of purposeless outcomes. A good definition of teaching, must accomplish the following objectives:

1. It should tell whether teaching is a process or product.
2. It should clearly indicate its constitutional elements or factors.
3. It should reveal its objective.
4. It should say something about its organisational or structural aspect.

If we try to evaluate the definitions quoted so far on the criterion cited above, none of the definitions are said to be comprehensive and functional definition of the term 'teaching'. There is nothing wrong in the acceptance of truth that it is a quite uphill task to narrate an ideal universal definition of the term 'teaching'. However, for the purpose of this text, a somewhat comprehensive functional definition can be adapted as below:

Teaching is a triadic relation-tripolar process-involving the source of teaching (human or material), student and a set of activities designed and manipulated primarily to bring changes in the behaviour of the student.

Nature and Characteristics of Teaching

The widespread notions about these things can be summarised as below:

Teaching is a complex social process: Teaching is a complex social phenomenon. It is greatly influenced by the social factors. The social and human factors are dynamic and not static and therefore teaching is not a fundamental concept.

Teaching is both art and science: Teaching is both art and science as Silverman (1966) expresses it in the following words:

To be sure teaching-like the practice of medicine—is very much an art which is to say, it calls for exercise of talent and creativity. But like medicine, it is also a science, for it involves a repertoire of techniques, procedures and skills that can be systematically studied and described and improved. A good teacher, like a great doctor, is one who adds creativity and inspiration

to the basic repertoires.

Teaching is a professional activity: Teaching is a professional activity involving the teacher, student and result in the development of the student.

Teaching is the output emanating from the teacher: Teaching is what a teacher does with his student for causing the latter to learn something and it is thus purely an outcome of the teacher's efforts.

Teaching in an organised system of varied action: Teaching is a system of actions which are varied in form and are related to content and pupil behaviour in context with prevailing physical and social conditions.

Teaching is amenable to scientific observation and analysis: What is going in a teaching can be observed, analysed and assessed through teacher behaviour, pupil-teacher interaction and the changes brought in the behaviour of the pupils. Such analysis and assessment may provide essential feedback for bringing desirable improvement in this process.

Teaching is highly dominated by the communication skill: The flow of communication within the teaching elements like teacher or sources of teaching, student and the teaching activities make teaching a reality and a success.

Teaching is an interactive process: Teaching is an interactive process carried out for the attainment of some specific purpose and objectives.

Teaching may be carried out in various forms and styles: Teaching may have various forms like formal and informal, formational or informational, directional or instructional, training, conditioning or indoctrination, telling, showing or doing, descriptive or remedial, etc.

Teaching is a specialised task comprising of different teaching skills: Teaching is a specialised task and may be taken as a set of component skills for the realisation of a specified set of instructional objectives (Jangira and Ajit Singh, 1982).

Difference of Teaching from Instruction, Training and Indoctrination

The terms like conditioning, training, instruction and indoctrination are used to denote some or the other kinds of teaching. Sometimes they are mistaken as synonymous with teaching. Let us try to evaluate their relationships.

In fact each of these terms denotes one or the other types of teaching. These are various modes of teaching each of which contributes towards teaching. Teaching is a larger concept and each of these terms is a part or aspect of this large concept.

Teaching: Teaching, as a whole, is aimed to bring changes in the behaviour of pupils. These changes may occur through (i) teaching them how to do or perform a task or react to a situation or stimuli and (ii) teaching them those things that may contribute towards enriching their knowledge and formation of a system of beliefs. While the former type of teaching (better described through the terms conditioning or training) may result into the shaping of behaviour and conduct, the latter (described through instruction or indoctrination) works as a potent agent for the acquisition of knowledge and formation of beliefs.

The illustration (Figure 14.1) clearly reveals that teaching activities, primarily divided as high or low orders, are distributable along a continuum from conditioning to indoctrination.

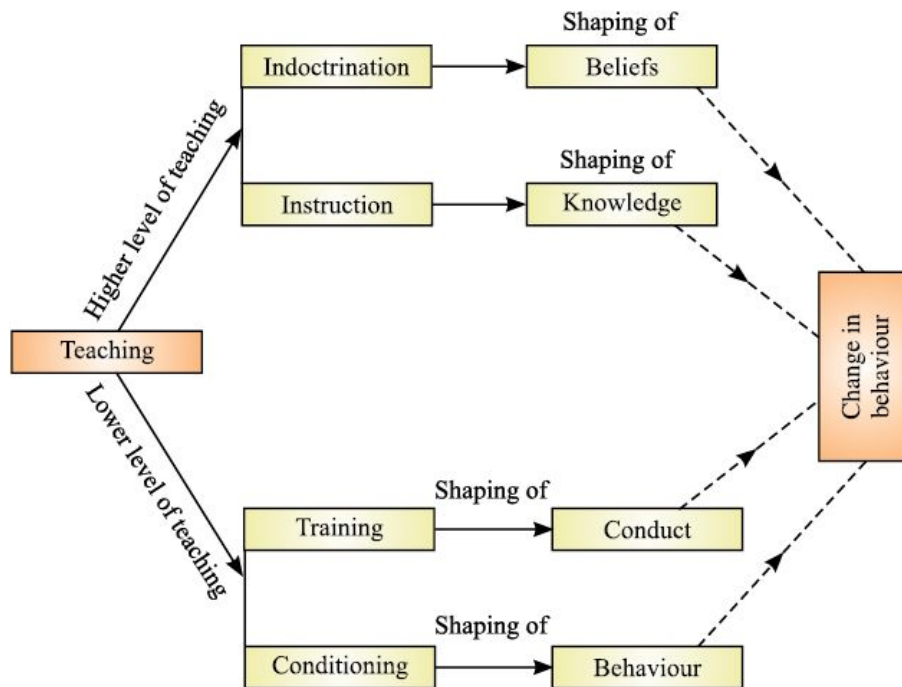


Figure 14.1 Relationship of the term 'teaching' with other related concepts.

Conditioning: This is the lowest level or mode of teaching. As a result, a dog may be conditioned (taught) to lift his paw when it hears a bell. Similarly, many of the animals and human beings may be taught to respond to signals, alarms, signs and warnings through conditioning. Most of our desirable or undesirable behaviours and habits are the creation of the process of conditioning.

Training: is concerned with a little more raised level of teaching than conditioning. It helps in shaping conduct and teaching various skills. A worker may be trained to perform certain tasks requiring very specific skills. He may do a number of jobs on some machine skillfully without knowing its basic structure and operation, the utility of his output and similar other concerns. Similarly, a variety of animals may be trained to perform highly specific tasks for the circus shows. Here the worker and a circus animal, as far as their teaching is concerned, stand on the same footing. Both are taught through a particular mode of teaching known as training. We cannot say that they are being educated. In the case of animals, while starting from conditioning, we seldom cross the stage of training, but for human beings we can move much farther. Here in the case of the worker, we can give him desired knowledge of the machine, its operation

and mechanism. He may be acquainted with his work, his contribution towards the economy of the country and similar other things which may shape his behaviour. Which behaviour is the product of training or which is the outcome of teaching may be properly distinguished on the basis of the amount or the degree of intelligence used or demonstrated through such behaviour. While less intelligent or simple behaviour may be produced through training, the complicated behaviour requiring more intelligence need a higher mode of teaching.

Therefore, the distinction between the terms *training* and *teaching* may be satisfactorily made through the evaluation of the degree of intelligent behaviour produced by them. If the *training* results into a demonstrable intelligent and complex behaviour, it may be equated with *teaching* but if it produces only the simple behaviour requiring no or comparatively less intelligence, it is to be termed as *training*.

Instruction and indoctrination: These both work on a higher footing than *conditioning* and *training* as far as the involvement of intellectual powers and mode of teaching are concerned. But that does not mean that these may be equated with the term *teaching*.

Instruction: Instruction in brief, is mainly concerned with the development of knowledge and understanding in an individual about a thing, system or process. Imparting of knowledge and understanding merely represents one of the many objectives which we want to achieve through the process of teaching. *Teaching* is much more than the act of acquiring some knowledge and understanding. The *conative* and *affective domains* of one's behaviour are badly neglected in instruction. While *teaching* is aimed towards shaping a total man, the *instruction* cares only for the development of intellect and affects the *cognitive domain of one's behaviour*.

Let us also see the distinction between *teaching* and *instruction* from another angle which lies in their processes. The face-to-face

interaction of the teacher and taught found in teaching is not so much essential in the process of instruction. Here teacher can be replaced by the programmed material, computer, teaching machine, radio, television, video and tape recorder. A teacher may also use these aids and devices in his *teaching* and hence instruction may be considered a part of *teaching*.

In short, instruction is always a part or one of the several modes of teaching. Where *instruction* itself can never be called as *teaching*, the term *teaching* may include or cover *instruction*.

Indoctrination: Indoctrination (transmission of doctrine, firm faith or system of beliefs) on the father's side of the continuum of the modes of teaching represents a fairly high level of teaching which adds to the establishment or shaping of beliefs and ideals. It requires higher order of intelligence and results in bringing quite stable changes in the cognitive and affective domains of one's behaviour. Like other modes of teaching, *indoctrination* represents one of the several modes of teaching. When we say *indoctrination*, it also means teaching but the reverse is not true. We may teach without adopting *indoctrination* as the mode of teaching.

The different modes of teaching—conditioning, training, instruction, indoctrination described above—though distinguishable, cannot be termed as quite unrelated. Sometimes they may overlap in their processes and outcomes.

Analytical Concept of Teaching

Analysis concerns with the process of breaking or separating out the elements or constituent of a substance. Therefore, a description of the analytical concept of teaching would demand the separation and naming of different elements or components of the task or process of teaching in relation to its various aspects such as:

- i. Activities undertaken in the teaching task, and
- ii. Educational objectives to be achieved through these activities.

Accordingly, attempts have been made to analyse teaching in several ways with a view to understanding it, designing teaching materials and methods for realising the specific objectives, perform the task of teaching effectively, evaluate and then modify it (on the basis of feedback for acquiring teaching competency and proficiency).

Let us mention some of such attempts:

1. **Komisar (1966)** has tried to analyse teaching into various specific activities like introducing, demonstrating, contrasting, explaining, proving, justifying, explicating, defining, rating, appraising, amplifying, vindicating, interpreting, questioning, elaborating, identifying, designating, conjecturing, confirming, etc.
2. **Gage (1968)** tried to analyse *teaching* in terms of technical skills. According to him: *Teaching skills are specific instructional techniques and procedures that a teacher may use in the classroom. They represent an analysis of the teaching process into relatively discrete components that can be used in different combination in the continuous flow of the teacher's performance.*
3. **Clarke (1970)** while endorsing the viewpoint of Komisar and Gage and suggesting a definition of teaching, has tried to analyse *teaching* in terms of some specific activities that are designed and performed to produce change in student's behaviour. These activities may have a cognitive, affective or conative nature and belong to different levels as expressed in Bloom's Taxonomy (Bloom, et al., 1956).
4. **Brown (1975)** has tried to analyse *teaching* by considering it as a many sided activity which includes a host of activities like questioning, giving information, listening and such others.
5. **B.K. Passi (1976)** has concluded that teaching constitutes a number of verbal and non-verbal teaching acts, like questioning, accepting pupil responses, rewarding, smiling, nodding to pupil response, movements, gestures, etc. These acts in particular combination, facilitate the

achievement of objectives in terms of pupil growth.

6. **N.K. Jangira and Ajit Singh (1982)** have presented the analysis of teaching as below:

Teaching can be analysed in terms of teacher behaviour at least at three levels, viz., component teaching skills, component teaching behaviours comprising the component skill and atomistic teaching behaviours. Diagrammatically this analysis can be presented as given ahead.

Based on the above analysis it can be easily concluded that the complex task of teaching may be safely analysed into limited, but well-defined components called 'teaching skills' or 'technical skills' of teaching, as shown in Figure 14.2.

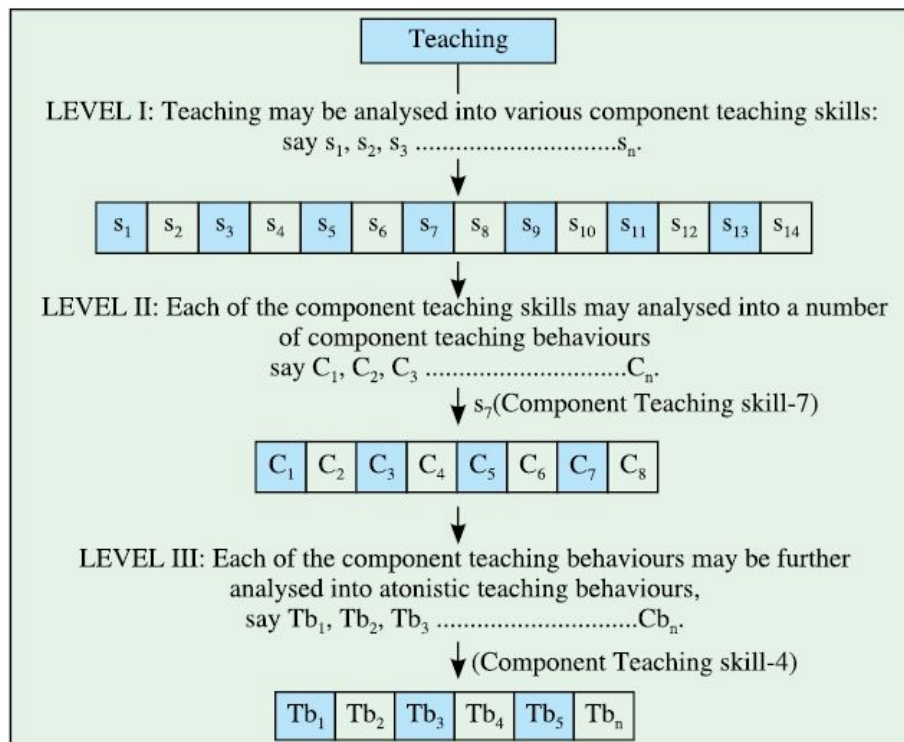


Figure 14.2 Analysis of teaching.

The Asian Institute for Teacher Educators (1972) has considered these skills as specifically those activities of teaching that are especially effective in bringing desired changes in pupils.

In this way, *teaching* may be viewed as a group of skills known as *teaching skills*. A *teaching skill* is defined as a group of teaching acts

or behaviours intended to bring desirable changes in the pupils behaviour.

This approach of analysing *teaching* into some specific components of teaching skills and related teaching acts or behaviours has been under severe criticism. As a result, it has now been realised that *teaching* cannot be regarded as just a sum total of certain teaching skills. Although it cannot be denied that acquisition of teaching skills is very much essential for a teacher for becoming a good teacher yet, in any way, this is not all what is needed. He needs much more, and therefore teaching consists of something more than the teaching skills.

Teaching involves interaction. The personality, attitude, interest and way of exercising desirable influence are some of the factors that definitely count towards effective *teaching*. A teacher cannot be taken simply as a skilled worker who knows his job by acquiring certain specific skills but one who has the proper guts to act from some superior level knowing how to take appropriate decisions, and exercise necessary influence for bringing desirable change in the behaviour of his pupils.

VARIABLES OF TEACHING

The concept of *teaching* may be further explained through description of the different variables involved in the process of *teaching*. Generally these variables may be classified as under:

1. Independent variable
2. Dependent variable
3. Intervening variables

In the process of *teaching*, it is the student who is subjected to changes and development through the efforts of the teacher and teaching process. Therefore, he acts as a *dependent variable* while the teacher has to play the role of *independent variable*. For the achievement of the goals of *teaching* there comes a need of *desirable interaction between independent and dependent variables*. This role is played by the *intervening variables*.

In this way, the teacher plays the role of independent variable. He is responsible for the functioning of the dependent variable, i.e. the students. He is free to act in the teaching process while students are quite dependent on him for seeking behavioural changes and development. Teacher has to plan, organise, lead and control the process of teaching so that desirable outcomes of his teaching may be properly obtained. He has to handle his teaching activities and all the intervening variables in such a way as the desired mobility and functionality can be created among his students for achieving the teaching objectives.

The intervening variables as it sounds, do not exist for creating some interference or obstacle in the functioning of independent or dependent variable. Rather, they help in the smooth functioning of these variables for the realisation of teaching objectives. The contents of teaching, methods and techniques of teaching, tactics and strategies of teaching, management of instructional material and teaching environment, etc., are all known as intervening variables. These variables are responsible for bringing desirable interaction

between the teacher and the taught by producing proper teaching environment, teaching material and facilities and creating appropriate learning conditions or situations.

Functions of teaching variables: In teaching process the active or functional part is played by the independent and dependent variables. Mainly following three types of functions are performed by these variables:

1. Diagnostic functions
2. Prescriptive functions
3. Evaluative functions

Diagnostic functions: The goal is to bring desirable changes in the behaviour of students. The initial task needs a proper diagnosis for the prescription of appropriate treatment (the actual attempts) for bringing desirable behavioural changes in the students. Accordingly, a teacher has to perform the following diagnostic functions.

1. He has to diagnose the *entering behaviour* of the pupil. What is his initial potential in terms of cognitive, conative and affective abilities should be properly diagnosed with the help of some diagnostic tests.
2. He has to diagnose and formulate specific educational objectives, the type and amount of behavioural changes he wants to introduce in the student in the light of the *entering behaviour* and environmental conditions.
3. He has to analyse the content, instructional material and environmental facilities available for carrying out his task.
4. He has to diagnose his own potential and capabilities and bring desirable improvement in his own behaviour for the success of his own mission.

Although the teacher as independent variable is more active in exercising diagnostic functions, yet the role of the student as a dependent variable cannot be underestimated. He has also to

perform certain important diagnostic functions on the basis of his perception for his abilities and responses such as:

- i. He has to diagnose the strength and weakness of his entering behaviours.
- ii. He has to assess himself in terms of the tools of learning like language and comprehension, power of expression, ability to think and analyse, psychomotor skill and emotional behaviour.
- iii. He has to make efforts for knowing about the behaviour of the teacher, the types of teaching strategies, the nature of the content and instructional material for the purpose of initiation and response on his part.

Prescriptive functions: On the basis of diagnosis, the teacher takes decision about the needed prescription for achieving the stipulated objectives. Accomplishment of objectives needs an appropriate interaction between the teacher and the student which in turn needs proper management of the intervening variables by the teacher. Accordingly, he has to perform the functions such as:

1. Selecting appropriate contents and organising them into proper sequence.
2. Selecting proper teaching techniques, strategies and feedback devices in view of the individual differences among the students.
3. Seeking essential cooperation from the student for a purposeful interaction.

In the performance of prescriptive functions also, the teacher is likely to be more active than the students. The prescription is made for the student as to bring desirable changes in his behaviour. He has to work for the purposeful interaction and give his sincere cooperation for the teacher in exercising the various prescriptive functions.

Evaluative functions: Evaluative functions concern with the tasks of evaluating the progress and outcomes of the prescriptive functions which may be decided in the form of realisation of the stipulated objectives. The failure in the realisation of the objectives is essentially a failure in the prescriptive functions either due to improper diagnosis or some serious mistakes in prescribing or carrying out the treatment (actual teaching) task.

The various evaluative devices in the form of tests, observations, interviews, rating scales, inventories and unstructured projective techniques help in exercising evaluative functions. In contrast to diagnostic or prescriptive functions, the student remains more active in the evaluative functions. He has to respond and evaluate his own progress in terms of the abilities acquired and behavioural changes. He has been taught and helped by the teacher in bringing improvement in his behaviour on the basis of his entry behaviour and his potentialities. Now it is his turn to see how far, the treatment prescribed or done by the teacher is helpful for him. If the prescription suits him, he can go ahead with it. If it does not, he must give his full co-operation to the teacher (just like a patient who has to consult his doctor and seek his advice) for the further diagnosis and subsequent prescription in order to get maximum advantage for bringing desirable improvement in his behaviour.

Importance of Teaching

Teaching in its very nature, concept and application is always aimed and meant for learning of students. It stands for bringing needed changes in the cognitive, conative and affective behaviour of the students and contribute towards their wholesome development, progress and well-being. As a professional, teacher engages in teaching for helping the students in their proper learning and realisation of the learning objectives. His or her teaching thus may result in reaping all the benefits and advantages that can be possible through the learning outcomes of his students. A student may engage in the process of learning without the assistance or presence of a teacher's teaching. He can go for the self-study, take the help of library books or other resources, may experiment and engage in learning, investigation or discovery task all alone. However, a

teacher's teaching may prove quite helpful to a learner in his learning task in many ways as discussed below.

Helps in the proper acquisition of facts and principles

Teaching may properly help the students in their proper acquisition of facts and principles related to a subject of teaching. When the students acquire knowledge of the facts and principles related to a subject through their self-study (consulting books or online resources) there remain a number of gaps in their understanding. Teaching makes the things quite simple and easier for the students. They can now understand the facts and principles in a better way. The learning, thus does not remain merely a rote learning with no understanding, grasping and comprehending but things become quite clear for their better learning and use.

Helps in the proper acquisition of skills

The learners may try to learn or acquire one or the other skills on their own, i.e. observing and imitating the actions of others. A girl may try to learn Kathak dance through the lessons delivered in a T.V. episode or watching it from a CD or video recording. However, it can never match the lesson delivered and training provided by a qualified and trained dance teacher. The coaching provided by a capable coach can do wonder for the team of a game, an athlete or player. Demonstration, training observational practice and timely reinforcement provided by a trainer or teacher can make a learner to learn and acquire one or the other skills (academic or life skills) in a better and effective way in comparison to his attempts in some other ways and means.

Helps in properly motivating and reinforcing the learners in the learning task

Teaching creates an environment for learning. In classroom and group environment situations, a learner gets an urge to learn, focus and take interest in the classroom technique. It is quite contrary to the situation when a learner finds himself struggling all alone in the pursuit of his studies with no body to teach or guide him on his learning path. It is very difficult for a learner to get motivated, interested and focused while doing self-study or engaged in self-

learning, self-discovery or self-training tasks. A learner has a need to maintain a proper pace of his learning along with other students of the class. He is interested in getting word of appreciation from the teacher and these things may keep him reinforced and focused in his learning task.

Helps in saving the time and efforts of the learners

The learners may waste their time and energy in struggling all alone in the pursuit of knowing, discovering and acquiring the needed information, skills and application. Teaching may help them to get benefited from the experience and knowledge of their teachers. Teachers are supposed to provide them the needed knowledge, skills and applications, that are the best fit for the abilities, interests and capacities of their students. They can provide them much in a limited time, helpful for the realisation of the learning objectives. In the knowledge construction task also, teaching provides an immense help to learners by playing the role of *guided discovery*. It protects a learner from going astray, wasting his time in useless efforts and get disappointed or frustrated from his failure.

Helps in providing needed practice and revision for the learned facts

Teachers in their teaching are supposed to provide the students needed opportunities for the drill, practice and application work. Learning can appropriately occur only if it is supported by the principle of practice, revision and application. In classroom teaching, a teacher takes necessary pains for providing opportunities for the drill, practice and applications to the students in the form of individual and collective drill, assignments and homework, project work and group activities. It helps the students to fix the gained knowledge in their minds, gain proficiency in skill acquisition and apply the knowledge and skills in their useful way.

Helps in seeking proper modification of the behaviour of the learners

Teaching is always aimed to realise one of the important objectives of school education in the name of bringing desirable modification in

the behaviour of learners in all its three domains, i.e. *cognitive*, *conative* and *affective*.

- i. In terms of behaviour modification in the cognitive domain, teaching may help the learners to think, reason, analyse, synthesise and conclude well.
- ii. In terms of behaviour modification in the affective domain, it may help them to imbibe desirable habits, interests, attitudes, feelings and emotions and ways of utilising and expressing them in a desirable ways.
- iii. In terms of behaviour modification in the conative domain, teaching helps the learners in bringing desirable improvement in their acting out of what they think and feel about a thing, idea, person or situation. They do not only begin to think and feel in a positive way, but now also act in a socially desirable way.

Helps in seeking wholesome development of the learners

The main function of any scheme of childrens' education is to bring an all sound harmonious growth and development in the personality of children and all acts of teaching involving curricular and co-curricular means are always directed to realise this valuable function of education. Teaching in its various forms and functions help the learners in seeking their development in its all aspects and dimensions—physical, mental, social, emotional, moral aesthetic and linguistic. It also help the learners realise the inter-connection and interdependence of existing among all these aspects or dimensions of development. One cannot take risk of neglecting the development in any aspect or dimension at the cost of the other. It is the wholesome or integrated development that matters for the well-being of the individual and society. It is the teaching that can reveal such hard facts about one's growth and development of children and that is why it is considered quite crucial for the development, progress and welfare of children.

Helps in the progress, development and welfare of the Society

and Nation

Teaching through its various forms and means does not only help in the development, progress and well-being of the learners, it can also help in doing the same for the society or nation to which the learners belong. It helps in bringing desirable changes in the behaviour of the learners, and in turn it can work as a potent source of the desired social and cultural changes in the fabrics of a society or nation. Teaching can help the children to get imbibed with the ideals and virtues of democratic socialism, secularism, multiculturalism, freedom from superstitions, stereotypes, and a bent of mind for getting rid of the social evils, injustice, inequality, discrimination and marginalisation prevailing in the society and nation on one or the other grounds. It can help them to think, feel and act together for the development, progress and well-being of their society and nation and that is why teaching of the teachers is said to be a trendsetter for the development and future of a society or nation.

SUMMARY

1. Teaching refers to a tripolar process involving sources of teaching (human as well as physical), the student and the activities carried out for bringing desirable changes in the behaviour of the student.
2. Teaching is known for its specialties and characteristics such as (i) it is a complex social process, (ii) its nature is both artistic and scientific, (iii) it is taken as the profession of the teaching community, (iv) its success depends much on the sincerity and hard work of the teachers, (v) its execution requires the use of various teaching skills, (vi) it is possible to have its scientific observation and analysis, (vii) communication plays a big role in the process of teaching, (viii) it can be executed in a variety of forms, and (ix) it is the outcome of the interaction among its various constituents.
3. The *concept of teaching* differs significantly from the concepts of some similar terms like *conditioning*, *training*, *instruction* and *indoctrination* that may be known to represent the various stages or levels of *teaching*. While the behaviour lying relatively at a low level requiring less intelligence and wisdom may be properly acquired through conditioning and training, the help of instruction and indoctrination is a must in the case of acquiring higher level behaviour needing relatively a higher level of intelligence and wisdom. In comparison to these four terms the concept of *teaching* is more wide and comprehensive. All these four are thus included as parts or sub-systems of the system of teaching.
4. The complex task of teaching can be properly analysed into a few but clearly defined components called teaching skills. These analysed teaching skills may be regarded as those specific teaching tasks or activities that help a teacher in fulfilling his task of bringing desirable modification in the behaviour of the students.
5. The different variables involved in the process of teaching

may be classified as (i) Independent variable, (ii) Dependent variable and (iii) Intervening variables. In the process of teaching, while the teacher acts as independent variable, the learner is said to work as dependent variable for the simple reason that it is the learner who is subjected to changes and development through the efforts of the teacher. All those things or factors helpful in bringing desirable interaction between learner and teacher in a teaching process (such as the contents, methods and techniques of teaching, strategies of teaching, and teaching environment, etc.) are all known as intervening variables. Functions, performed by the two active variables-teacher and learner may be classified into three main types named as (i) Diagnostic functions, (ii) Prescriptive functions, and (iii) Evaluative functions.

6. Teaching carries a quite valuable importance for a learner in his learning task in the manners like (i) Helps in the proper acquisition of facts and principles, (ii) Helps in the proper acquisition of skills, (iii) Helps in properly motivating and reinforcing the learners in the learning task, (iv) Helps in saving the time and efforts of the learners, (v) Helps in providing needed practice and revision for the learned facts, (vi) Helps in seeking proper modification of the behaviour of the learners, (vii) Helps in seeking wholesome development of the learners, and (viii) Helps in the progress, development and welfare of the society and nation.

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Phases and Levels of Teaching

PHASES OR STAGES OF TEACHING

Teaching is the job of a teacher. It is a quite complex task. The successful completion of the teaching act or operation needs a systematic planning and careful execution. In doing so, teaching has to proceed in sequential steps. The steps or stages are known as phases of teaching. In general, a teaching act may be systematically analysed into the following three stages or phases for carrying out its various operations.

1. Preactive phase of teaching
2. Interactive phase of teaching
3. Postactive phase of teaching

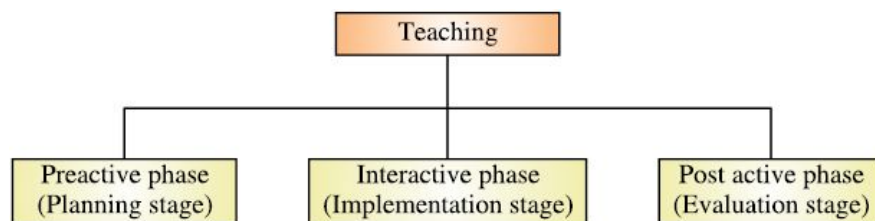


Figure 15.1 Stages or phases of teaching.

Preactive phase

It is the planning phase of the teaching act. A good planning makes the task of teacher smooth, functioning and successful. There are two major steps involved in this phase, namely;

- i. establishment of some kind of goals or objectives.
- ii. discovering ways and means to achieve these objectives.

Operations or activities concerning the planning phase may be summarised as below:

A logical first step in planning for any teaching is the attempt made by a teacher for the establishment of certain goals or

objectives. Accordingly, he formulates in detail, the specific instructional or teaching objectives and writes them in a proper way in behavioural terms.

How can the stipulated objectives be effectively achieved is a thing to be decided in the second step of the preactive phase. Consequently, planning is done for taking decisions about the following aspects:

- i. Choice of the content or material to be taught or learning experiences to be given.
- ii. The organisation or sequence of the content or material.
- iii. Consideration about the principles and maxims of teaching.
- iv. Decisions and planning about the proper use of teaching aids.
- v. Choice of the methods, techniques and strategies of teaching.
- vi. The duration, place and management of classroom teaching.
- vii. Decisions about the evaluation tools.

In short, at the preactive phase, a teacher has to chalk out the details of his journey which he wants to perform in the classroom along with his students

Interactive phase

This second phase of teaching is concerned with the implementation and carrying out what has been planned or decided at the planning stage. It is the stage for actual teaching, success or failure of which depends upon the degree and quality of classroom interaction between the teacher and pupils. The major activities or operations to be taken in this phase may be grouped as:

- (i) perception, (ii) diagnosis and (iii) reaction processes.

Perception: Interaction process demands an appropriate perception on the part of teacher as well as students. When a teacher, enters the class, his first activity is concerned with perception of classroom climate. He tries to weigh himself, his abilities and pre-planning for

teaching—against the class group. Similarly the students also try to have a perception of the abilities, behaviour and personality characteristics of the teacher in order to seek desirable interaction in the teaching–learning process.

Diagnosis: A proper diagnosis of the abilities and behaviour is very essential for the appropriate interaction. A teacher, therefore, tries to assess and diagnose the achievement level of his students with respect to their abilities, academic background, intelligence, interest and aptitude. The diagnosis work may be done in several ways. He may ask some questions or assess their performances and behaviour potential by providing opportunity for performing or behaving. The students also, through verbal or non-verbal interaction, get opportunity to assess and diagnose the abilities, interest, aptitude and behaviour performance of their own response and reactions for contributing towards effective interaction in the teaching act.

Reactive process: Action-reaction processes play the central role in the task of classroom interaction. For this purpose, teacher has to take right decision with regard to the selection and use of the proper stimuli, schedule of reinforcement and feedback devices, and development of suitable strategies suiting to the needs of the pupil, teaching environment and teaching objectives. The pupil has also to learn the proper ways of teaching and responding to the various stimuli and teaching techniques presented to him.

In this way, the interactive phase of teaching is responsible for establishing appropriate verbal and non-verbal classroom interaction between the teacher and pupils by arranging suitable teaching–learning activities and an equally suitable and controlled classroom environment.

Postactive phase

The third phase of the teaching act concerns with the evaluation activities or operation. First of all, the stipulated objectives are considered and attempts are made to measure or assess the degree or qualities of the expected behavioural changes in the students as a result of the teaching activities performed at the interactive phase. This can be done in a number of ways including tests or quizzes or

by observing student's reactions to questions, comments, structured or unstructured situations and behaviour situation. The teacher should try to take right decisions about the selection of the appropriate evaluative devices for this purpose. The result of the carried evaluative may be used by the teacher as well as students for bringing desirable improvement in their roles and activities. It may take the following shapes:

- i. The suitability of the stipulated objectives may be properly assessed. The extent or quality of their accomplishment makes them to take decision about further continuation, alternation, or improvement.
- ii. The suitability of the content and its organisation may be suggested. Decision regarding reteaching the content or moving to new content may, therefore, be taken.
- iii. The suitability of the instructional process, aid material and teaching strategies be evaluated. As a result change and improvement may be introduced in the strategies and techniques of teaching.
- iv. The role of the classroom environment and learning situations may be evaluated. Accordingly, the desired changes may be brought in management of these elements.

In a nutshell, the postactive activities or operations concerning evaluation help the teacher and the students in bringing desirable improvement in their performance by providing necessary corrective feedback.

All the above three phases of teaching, although described separately, are closely inter-related. These represent a continuous cycle of teaching, influencing and directing each other as shown in Figure 15.2.

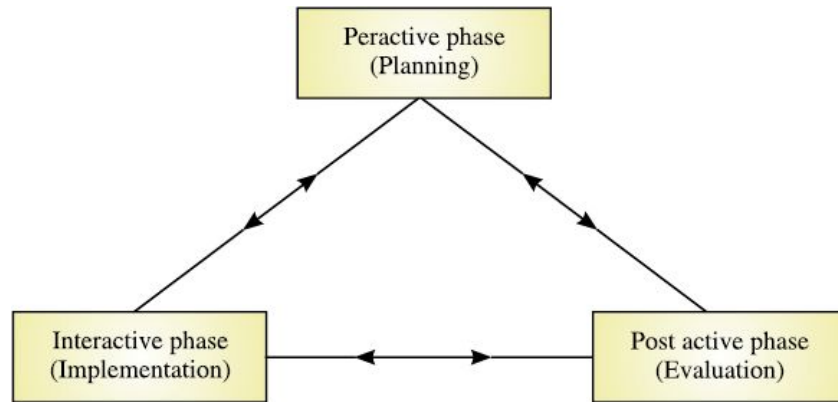


Figure 15.2 Interrelation among the stages or phases of teaching.

LEVELS OF TEACHING

Psychologists and educationists have tried to point out that a teaching act can be carried out at the three clearly identified levels of teaching, namely *memory level*, *understanding level* and *reflective level*.

Memory level falls at the bottom (or at the extreme left on a three point rating scale) depicting the involvement of least thoughtful behaviour and the reflective level at the top needing the involvement of higher cognitive abilities and most thoughtful behaviour. The understanding level falls in between, requiring the involvement of the thoughtful behaviour in a reasonable amount (Figures 15.3 and 15.4).

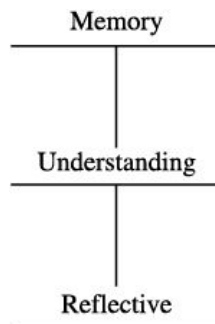


Figure 15.3 Levels of teaching represented on a three point rating scale.

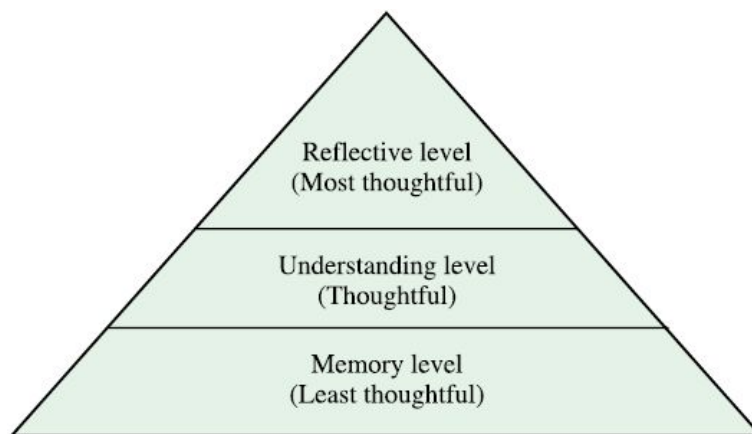


Figure 15.4 Hierarchical order of the levels of teaching.

Let us try to know in detail about the meaning, nature and functioning of these three levels of teaching.

Memory Level of Teaching

Meaning and definition

Teaching act at the memory level represents the involvement of the least thoughtful behaviour. In such type of act, memory plays a key role. The teacher presents factual information before the learner. The learner tries to mug-up these facts with the least involvement of his thinking and reasoning power without any care of the understanding of their meaning and application. It is in this context that Morris L. Bigge has defined this level of teaching as that type of act “*which supposedly embraces committing factual materials to memory and nothing else.*” (1967, p. 316)

This definition conveys that the classroom task at the memory level of teaching is confined merely to the memorisation of the facts or associations related to the content material of a subject. Here the information, facts and body of contents are presented before a learner in such a way as to yield better results in terms of the memorisation of the presented material. The learner is supposed to retain this material as long as possible and to reproduce (recall or recognise) it when needed. The whole efforts in such teaching act then revolve around the acquisition of the factual information or knowledge through rote learning. The students then try to mug-up the content material of the different nature like multiplication tables, the chemical symbols of the elements, dates and sequence of the historical events, words and phrases of the foreign languages, the names and number of bones and muscles in the human body and similar other things, retain them in their memory and reproduce them as and when needed.

Underlying psychological theories and ideas

Memory level teaching can be said to be influenced by the following psychological theories and ideas:

The theory of mental faculty or mental discipline: In the spirit of this theory, teaching task at memory level aims to discipline or train the faculties of mind particularly the faculty of memorisation through exercise, repetition and practice of the learned material.

The Herbartian theory of apperception: In the spirit of this theory, the task of teaching at the memory level consists of implanting in the

minds of the learners a great mass of factual information merely through the process of mechanical memorisation.

The Thorndike's connectionism: In the spirit of Thorndike's connectionism, memory level teaching emphasises establishment of S.R. connections quite mechanically through memorisation. It gives full weightage to the law of exercise propounded by Thorndike in the process of learning.

The theory of conditioning: Influenced by theory of *classical and operant conditioning* memory level learning task converts itself into a task of habit formation through repetition of the association between stimuli and response.

Objectives

The teaching act performed at the memory level is confined to achieve the knowledge objective in the following way:

- Acquisition of presented facts through rote learning.
- Retention and reproduction (through recall or recognition) of the acquired factual information as and when needed.

Nature of the subject matter and its presentation

Memory level teaching is predominantly subject centred. Its sole objective is effective memorisation of the presented material by the learner. For attaining this aim, one should carefully attend to the quality of presented material and its way of presentation. The material for this purpose should be selected judiciously for helping the students to get desirable knowledge of the subject. Moreover, it should be presented in a very systematic manner and definite and fixed order so as to facilitate its proper-retention and easy recall. Such presentation at memory level is quite easy as it is not necessary to associate or link it with the previous knowledge or connect it with the application at the present or future.

The role of the teacher

Teacher plays a very dominant and authoritarian role in the memory level of teaching. It is he who decides about the methodology for the

presentation of the subject material before the learner. He organises and systematises the presented material, presents it merely through his own initiative, makes the students to listen or read, plan exercises for its repetition and drill work, and asks students to memorise the presented factual information with the help of rote learning, retain it and reproduce when asked to do so. In this way, teaching–learning process becomes too much teacher-centered at the memory level teaching.

The role of the learner

The learner has a quite passive role in the memory level of teaching act. His mind is considered as a big store house of the information or knowledge regarding various subjects. The teacher pours information and knowledge and he is there to receive it through mechanical memorisation. He has no freedom or opportunity to gain learning experiences through his own initiative or self efforts and then there is little scope for his interaction with the teacher in the teaching–learning process. He has to make least use of his thought processes and depend merely upon the use of his capacity for memorisation.

Nature of motivation

As the students play quite passive role in the teaching–learning act performed at memory level, the nature of their motivation is largely extrinsic. There is nothing which may compel them from within for taking genuine interest and to feel spontaneous inclination towards learning something. They engage themselves in memorisation of the presented material due to external factor, i.e. fear of punishment, getting favour of the teacher, passing of a test or getting promotion to the next grade, etc.

The methods employed

The methods employed at the memory level are exclusively teacher-centered or subject-centered rather than the learner or situation centered. Consequently, these are mostly non-psychological in nature. The methods like lecture method, textbook method, lecture-cum-blackboard method, deductive method, narration method, etc.

all belong to such category which are suitable for carrying out one-way traffic by the teacher at the memory level of teaching.

The testing devices used

The teaching at memory level is primarily designed for attaining the knowledge objective through the process of mechanical memorisation. It prepares the students to have mastery over the subject matter in terms of their adequacy for retaining and reproducing the material presented to them at the time of teaching. Therefore, here testing devices in the form of essay, short answer and objective type questions are so designed as to test the realisation of the knowledge objective at the memory level. In other words, here we test the capacity of students for the exact reproduction of the memorised material or factual information by measuring their ability to recall or recognise the learned material through suitably framed questions.

The merits of teaching at memory level

The teaching carried out at memory level has many things on its credit side.

1. Firstly, such type of teaching may be found suitable to the very nature of the small children to certain extent as their memory at the younger age is the rote memory. They are very much capable of mugging up the things without caring to know their meaning and use. In this parrot like cramming and reproducing the factual material, there is a least involvement of their thought processes. It may also suit the nature of their cognitive development as they are unable to comprehend, compare, analyse, synthesise and generalise for enabling them to understand and apply the knowledge as effectively as they can at the later stage of their intellectual development.
2. Secondly, the task carried out at memory level in the form of acquisition of many memorised facts prove quite helpful in the teaching-learning activities performed at the understanding and reflective levels. Truly speaking, the

memory level teaching provides solid base for erecting the higher structure of teaching–learning at the other two advanced levels.

3. Thirdly, the memory level teaching gives full freedom to the teacher for realising his goal, i.e., to furnish maximum knowledge of his subject in the form of systematic and well connected pieces of information to his students in a quite planned way in the minimum time period.

Demerits and defects of teaching at memory level

Teaching at memory level is denounced due to its demerits and defects summarised below:

1. It is carried out at the lowest level of the student's thought processes, and therefore provides no scope for the development of understanding, thinking, reasoning and other essential cognitive abilities of the students.
2. The emphasis here is on the acquisition of factual knowledge imparted by the teacher through rote learning and mechanical memorisation. It is very difficult for the students taught at memory level to make any practical use of their learning. There may be enough evidences of such failure in classroom behaviour and in actual life situations. The students acquiring the knowledge of the formula of the area of the four walls of a room may not be able to compute the expenses incurred on the white washing or painting on the walls of the room or an elementary class student after having memorised all the odds concerning multiplication table may not be able to compute even the total amount paid to a shopkeeper for purchasing 6 pencils at the cost of 24 paise per pencil.
3. Despite the best efforts in such teaching there is no guarantee of good retention and appropriate reproduction of the memorised material by the learner. The retention, as usually such, is quite short lived and students many times are found to cut a sorry figure in the hour of need

particularly at the testing or examination time. In this way, the short purpose of the mechanical memorisation is also not materialised fruitfully in such type of teaching.

4. Since the teaching–learning process is too much teacher dominated and there is no proper interaction between the teacher and learner, it leaves a little or no scope for the proper personality development of the learners.
5. The memory level teaching poses a problem of class control and securing attention of the students for classroom teaching. Motivating students on the basis of fear and other extrinsic object is also another weakness. Consequently the real charm of self and purposeful learning is almost missing in such type of teaching–learning.
6. Here the total burden of handling the teaching–learning process falls on the shoulders of the teacher. He has to arrange for the review, drill and effective exercise for the good retention and easy recall. The students are quite passive and without their involvement the teaching–learning process becomes quite dull, un-interesting and unchallenging.

Conclusion

With all what has been said about the defects and demerits of memory level teaching it should not be inferred that memory level teaching is quite absurd and useless and therefore should be abandoned at all. However, the things are not as such. For the small children and at elementary level, as emphasised earlier, it may prove quite beneficial. Similarly, for the disciplines in learning where acquisition of knowledge, factual information and memorisation in the form of names, concepts, principles, formulae, symbols, etc. is involved, the memory level teaching may prove quite useful. Moreover, what is achieved at memory level has all possibilities for being utilised in the teaching carried out at the understanding and reflective levels. One has to utilise the foot board of memory level teaching for jumping to the height of understanding and reflective levels as may be made clear through the reading of the coming

pages of this chapter. However, we must be careful about minimising its drawbacks by making it more meaningful to the learners. There is little use in memorising the meaningless material like nonsense syllables. If the learner is helped in drawing some meaning and purposes out of his memorisation labour, the yield may be more fruitful for the learner's present as well as future welfare.

Understanding Level Teaching

Understanding level teaching represents relatively a quite high level in the teaching–learning process as compared to memory level. It calls for the use of one's thought processes and cognitive abilities in the form of reasoning and thinking powers, powers of imagination, analysis, synthesis, comparison, application, generalisation and drawing inferences, etc. Let us discuss in detail under some important heads about such type of teaching–learning.

Meaning and definition

In his book learning theory for Teachers, Morris L. Biggie has defined understanding level teaching the one—*that seeks to acquaint students with the relationship between a generalisation and the particulars—between principles and solitary facts—and which shows the use to which the principles may be applied.* (1967, p. 323)

An analysis of the above definition may reveal the following characteristics of the understanding level teaching.

- It does not stop with the acquisition of facts or information by the students as done at memory level but takes them ahead for generalising the rules or principles out of these acquired facts.
- The students can identify the relationship between the individual facts and the principles generalised out of these facts.
- It helps the students to make use of the generalised rules or principles as a tool or instrument in the acquisition of new facts or applying them in their practical life.
- Let us illustrate it with an example. When a student memorises a fact $7 \times 5 = 35$, teaching–learning process is

said to be operated at the memory level. In this cases, he memorises the fact without understanding, i.e. he neither knows the generalisation behind this particular fact nor its application. It is only when he is taught at the understanding level, he happens to know that:

- i. 7×5 is similar and equal to 5×7 .
- ii. When seven objects are grouped five times or five objects are grouped seven times, the product is always thirty five.
- iii. This factor relationship is true for all objects in all situations.
- iv. The knowledge of this fact may be usefully applied in calculating the price of seven items if each item is priced for ` five or vice versa.

Underlying psychological theories and ideas

The teaching act at the understanding level is said to involve the following psychological grounds:

a. **The Herbartian theory of apperception and its famous five steps of teaching:** In the spirit of this theory, the teaching at understanding level requires a systematic presentation of the subject matter relating it well with the previous knowledge of the students. Herbart tried to emphasise understanding level teaching through his famous five steps of teaching.

1. In the first step named as “preparation”, (i) the previous knowledge of the students is explored and (ii) need of learning something new is felt on their part.
2. In the Second step, the systematic presentation of the subject matter or ideas is emphasised by relating them with old ones.
3. In the third and fourth steps, comparison and generalisation, students are supposed to identify common elements in the presented material/factual

information and make generalisation in the form of generalised facts, rule or principle.

4. In the step five application, they are supposed to make use of the generalised principle by applying it in a particular novel situation.

In this way, Herbart, through his systematic steps, tried to put teaching–learning at the understanding level by making the students (i) to understand individual facts, (ii) to move from the particular facts to generalised principle and (iii) to use generalised principle to acquire new facts or seek their application in day-to-day life.

- b. **Theory of Insight or Gestalt field Theory:** In the spirit of theory of insight, understanding level teaching requires from the learners: (i) to perceive the situation, i.e. the presented factual information as a whole, (ii) to identify relationship—common elements or difference between the presented body of facts, the new ideas and the old ideas, and (iii) to gain generalised insights which can be applied in problematic situation both in and outside the school.

Objectives

The teaching act performed at the understanding level is aimed to achieve the following objectives:

1. **Knowledge objectives:** Acquisition of required factual information or body of facts.
2. **Understanding objective:** Under this objective the learners are able:
 - to see relationship between acquired facts.
 - to comprehend the meaning of the acquired facts or factual information.
 - to identify the similarities and dissimilarities between the acquired facts.
 - to seek generalisation out of the specific facts.
 - to apply the generalised fact, rule or principle for learning new facts or use them in practical life

situations.

Nature of the subject matter and its presentation

The subject matter for the understanding level teaching is quite structured in terms of planning sequential and organised presentation and meaningful learning. It needs to be linked with the previous knowledge of the students on one hand and with its utilisation for acquiring new facts and application to practical life.

The role of the teacher

Like memory level teaching here at the understanding level of teaching, teacher plays a quite dominant and authoritarian role. This type of teaching is also too much subject centered and hence teacher has to pay his full attention to presenting the subject matter before his students in such a way as to attain the desired understanding objective besides the knowledge objective. He has to take care that the students gain complete mastery over the subject matter in terms of its full understanding and generalised insight rather than its mere memorisation, i.e. retention and reproduction of the memorised facts.

The role of the learner

The learner does not have as passive role here as in the case of memory level teaching. He has to remain somewhat active in acquiring desired understanding of the learned facts. However, the key of the teaching–learning process lies well in the hands of the teacher. The students have to act and interact within the framework set up by the teacher for realising the set objectives of his teaching.

Nature of motivation

Although purpose is always involved in any understanding level of teaching, yet the nature of the motivation here is largely extrinsic as in the case of memory level teaching.

The methods employed

The methods employed at the understanding level of teaching are chosen in the manner as on one hand they may work as teacher and subject centered and on the other hand they may help in realising

simultaneously both the understanding and knowledge objectives. Therefore, lecture method coupled with demonstration or explanation, narration helped by question-answer method, inductive method followed by deductive approach, analytic method integrated with synthetic approach suits the very nature and purpose of teaching carried out at understanding level.

The testing devices used

The teaching carried out at the understanding level requires a more comprehensive evaluation programme than the memory level of teaching which is largely confined to the testing of recall or recognising ability. Besides knowledge is largely confined to the testing of recall or recognising ability. Besides knowledge objective, understanding coupled with the motor skill of making use of the learned principle and ability to apply them in solving problems in and outside the classroom is also to be tested here with the help of well planned oral, written and practical examinations. However, here emphasis is laid over desired tests to know the ability to analyse, synthesise, compare, generalise and apply the generalised principles for deducing new facts and solving novel problems. For this purpose here, short answer type format of the questions is preferred over the objective type question format.

Transfer of training or learning

Since understanding level teaching gives emphasis overseeing relationship between the facts and acquired generalised insight in the form of generalised rules, principles, and theories, etc., it gives greater scope for the proper transfer of the acquired training from one situation to another.

The merits of teaching at understanding level

The teaching at Understanding level may be credited with the following good points:

1. Understanding level teaching helps the students in the acquisition of the facts or information more effectively than the memory level. Here the retention is quite longer as it is

accompanied by clear understanding of the facts or information.

2. It helps them to learn generalised rules, principles or theories built on the basis of individual facts or special examples. Such generalised insight acquired by them works as an instrument or a tool. It proves quite useful not only in the acquisition and interpretation of new facts but also in problematic situations in outside the school.
3. Understanding level teaching trains and equips them for acting more intelligently in proceeding on the path of learning. They get proper opportunity for the development of their cognitive abilities through the various acts like analysing, synthesising, comparing, drawing inferences, making generalisations, applying rules and principles, etc. performed at this level of teaching.
4. Understanding level teaching through the generalised insight equips the students with a mental kit of rules and principles. Such kit proves quite useful in carrying out the teaching activities at the reflective level and also in turning the students as master and experts in the respective field.
5. It provides opportunity for the organised and systematic teaching best suited to the existing school situations of our country. The return in terms of education investment and output in such teaching–learning are maximum in comparison to other levels of teaching.

Demerits and defects

1. The teaching at understanding level is more or less teacher centered and subject centered rather than being child centered. Despite the best efforts students do not necessarily learn in the way teachers think they are teaching them. Moreover, students do not get required freedom for the independent thinking, discovery and problem solving.
2. The motivation is largely extrinsic in nature and the

students' ego is hardly involved in such type of teaching–learning.

3. The results of such teaching are always judged in terms of fixed specific responses to highly specific knowledge and skills acquired through mechanised repetition and drill work or as taught by the teacher in the rigid and controlled teaching–learning situations. Such type of teaching–learning environment and evaluation pattern cannot help in the development of higher cognitive abilities, including creativity and independent problem-solving abilities among students.

Conclusion

The understanding level teaching performed in the more advanced 'thoughtful' modes of operation than the memory level has many things on its credit side. It provides meaning to what is being taught or learned in the learning situation. Students acquire generalised insight in the form of a mental kit of rules through such type of teaching which may be used in their further learning and in dealing with problems. However, as already pointed out, understanding level teaching suffers from mentionable defects and demerits as being turned into a one sided affair and arranged show completely directed and dominated by the teacher. The development of understanding level teaching, as it tries to boast, does not help in the development of independent problem-solving ability and creativity among the students. They remain more or less inert, unable to take any initiative and incapable of choosing their own path in the course of learning. Certainly hence, there is a requirement of arranging the teaching act in a little more advanced 'thoughtful' modes of operation which may help the students in acquiring experiences needed to enhance their intellectual potential to its maximum.

Reflective Level Teaching

Teaching at reflective level represents the highest level of the teaching act that can be carried out in the most thoughtful modes of operation providing the desirable quality of teaching situation and experience to the learner for utilising and enhancing their cognitive

abilities to the maximum. Let us learn about such type of teaching in detail under the essential major heads.

Meaning and definition

According to the dictionary meaning, the word *reflected* stands for the act of reflection (turning back), contemplating or paying serious consideration, etc. Consequently, teaching at reflective level must have its association with the process of reflecting or turning back the existing idea or knowledge for more careful consideration or critical examination to derive fresh conclusion. It is in this sense that Morris L. Biggie has defined it as: *careful, critical examination of an idea or supposed article of knowledge in the light of the testable evidence which supports it and the further conclusions towards which it points.* (1967, p. 324)

A careful examination of this definition may reveal the following facts about the nature of the reflective level of teaching:

- It provides opportunities to the learners for the close, careful and critical examination of the existing facts, ideas, insights and generalisations.
- The learners try to test themselves in the light of the relevant evidences.
- They are free to set independent hypothesis, test those and draw their own conclusion for learning new facts or acquiring new insight.

Looking into the above cited nature, it is must that teaching at the reflective level be organised at quite advanced level providing opportunities for the utilisation of the learner's cognitive abilities. Such opportunities may be best provided if the teaching-learning situations are turned into problematic ones and the students are made to discover the solution to problem in the light of their own thinking and independent pursuit of knowledge. Therefore, in practical sense, teaching at reflective level is nothing but a problem solving or discovery approach towards teaching as yourself may conclude after going through the coming pages of this chapter.

Underlying psychological theory and ideas

Reflective level teaching has its roots in the *cognitive field theory of learning*. This theory, also called as *goal insight theory* opposed the traditional mechanical memorisation and meaningless understanding of the facts. It gave emphasis on the purposeful, goal directed, insightful approach to learning and tried to make the learner learn the art and skill of the problem-solving behaviour by identifying his goal and problem and learning to solve the problem in a scientific way. The reflective level teaching–learning in the spirit of this theory emphasises upon the learning of generalised insight, ways of discovering the facts, and acquiring the skill of problem solving.

Objectives

The teaching at reflective level may be said to act for the attainment of the following objectives:

- i. To make use of the learned facts and acquired understanding or insight for learning reflectively.
- ii. To help the learner in building an enlarged store of the tested insights of generalised character.
- iii. To enhance their ability to develop and solve problems at their own initiative.

Nature of the subject matter and its presentation

Here the subject matter is not presented in the highly structured form as done at memory and understanding level. It is almost open ended in the form of problem raising and problem solving. Thus, in such presentation, the genuine problems helpful to the students for the acquisition, understanding and application of the generalised facts, principles, and to enhance their ability of problem solving are raised, developed, and tried for their solution.

Problem raising in the words of Morris L. Biggie can be understood as *a process of discovering and identifying inadequacies and disharmony of outlook or insight* (1967, p. 338). The students may come across such inconsistencies or inadequacies and they

feel tensed for coming out of them. These situations may also be created in the classroom through mutual discussion among the students and teachers or observing something.

Let us study the following situations for the beginning of the study at the reflective level.

1. Students observe that in a tray filled with water, some objects sink while others float, why is it so?
2. The water of their hand pump does not make lather with the soap while that belonging to their neighbour makes a good lather, why?
3. The bat can be described as a bird and an animal too. How is it so?

In all such situations, as may be easily inferred, the instructions at the reflective level teaching–learning classes should essentially begin with the feelings in the learner *Let me find the solution to this problem. Let us try to know the reason for such inadequacy, inconsistency or happening, etc.*

Moreover, such problem raising situations must make the learner to feel the necessities and genuine interest for the discovery of the solution to the felt problem. It should create a sort of psychological tension in him by concluding like below:

- i. I have to find its solution but how should I proceed, there is no path to reach my goal.
- ii. The answers and solutions are many, but which one would be appropriate in solving my problem?

When the students are trapped in such a situation the stage is set for further organisation of teaching–learning act at the reflective level. The students are then made to solve such felt problems independently by following systematic steps of the problem-solving procedure.

Role of the teacher

At the reflective level teaching, the teacher does not play a dominant and authoritarian role like memory or understanding level teaching. Here, instead of telling the facts or generalisations, he has to make the students to discover them. He is there to help them in such learning and discovering by raising problems, initiating mutual discussions and interactions, welcoming critical reactions and engaging them in the discovery of the truth of the matter and solution to the problem as independently as possible. In this sense, this type of teaching assigns more serious responsibilities on the part of the teachers. Telling of the information is a simple task but to make the children feel the necessity of getting such information and to discover this information by their own efforts is quite challenging which needs a lot from the teachers in terms of their own reflective thinking, ingenuity, scholarship, persistence, tact, open mindedness, democratic leadership and similar other personality characteristics.

Role of the learner

The learner cannot remain a passive listener or silent observer in reflective level teaching. He has to make use of his cognitive abilities and take all initiatives in the process of problem raising and problem solving involved at this level of teaching–learning. In addition to the learning and understanding of the facts and generalised insight he has to work for the learning of the art and techniques of problem-solving processes.

Nature of motivation

The motivation involved at this level of teaching is quite intrinsic rather than being extrinsic as happens at the memory and understanding levels. The learners face a situation where they feel a sort of psychological tension and curiosity of knowing about something. Sometimes they are inclined to go deep into the nature of matter and feel the urgent necessity of solving a problem. Such type of motivation helps in building a very healthy environment which is more lively and exciting, more critical and penetrating, and more open to fresh and original thinking, for carrying out reflective level teaching activities.

Methods employed

The methods and techniques employed in the teaching act performed at reflective level are more learner centered than the teacher or subject centered. Here instead of telling about the facts and generalisations by the teacher, the emphasis is laid over the raising, developing and solving of the problems. The methods and techniques are therefore so chosen as to help in the task of feeling, the need of solving a problem and discovering the ways and means of solving it through a lively interaction between the teacher and taught. Consequently, the methods like analytic method, discovery method, problem-solving method, assignment method, project method, etc. prove quite useful at the reflective level teaching.

Testing devices used

The testing and evaluation techniques are always planned to the tune of the objectives and nature of the teaching–learning process carried out for achieving these objectives. Since reflective level teaching does not limit itself merely to the collection of facts and generalised insights but centers around equipping the learner to acquire power for the independent discovery of the facts and generalised insight and utilising those for the solution to the felt problems, therefore, the usual testing devices do not work well at this level of teaching. Here it remains more appropriate to set questions preferably essay type or open-end type which can test their problem-solving ability, ingenuity or creativity, etc. in relation to the study carried out by them. Their answers may be tested considering their attempts for solving the given problem and the quality of the discovered solution to the problem, etc.

Merits and advantages

The reflective level teaching can be credited with the following points:

1. It involves learner centered approach in place of subject or teacher centered approach towards teaching. The learner himself sets his goal and discovers the path of reaching the goal.
2. The process of teaching act is carried out in the more

advanced 'thoughtful' modes of operation than at the memory of understanding level. It provides better opportunities for the utilisation of one's cognitive abilities to acquire information, generalised insight and problem-solving skills and in turn helps in the proper development of one's intellectual powers.

3. What is mostly needed in life is the proper identification of the felt problems and the way of facing and solving those problems. Undoubtedly, it is only the reflective level teaching that can prove helpful in equipping the students to face and solve their problems in and outside the walls of their schools.
4. Teaching at reflective level is helpful in making the classroom environment quite democratic, healthy, lively and exciting. There is a free and useful interaction between the teachers and the pupils. Pupils are allowed to be critical. They can raise probing and penetrating questions, engage in independent and original thinking, discovery and problem solving. The teacher is there to help them in their independent pursuit of the knowledge and the task of problem raising and problem solving is performed in a very open, thoughtful and democratic environment.
5. The outcomes of the reflective level teaching automatically involves the fruits of memory and understanding level teaching-learning. As a result there is an enlarged store of accumulated facts and tested insight of a generalised character. The students are able to grasp the understanding of various principles, relationships, concepts, generalisations, rules, laws and theories. But in addition to that, the credit of the teaching at reflective level lies in equipping the students with the enhanced ability to develop and solve problems on their own. This is a rare quality which can be developed only if the teaching act is carried out at the reflective level.
6. The reflective level teaching, in fact, suits the very need of today's fast developing age. There is a vast storehouse of knowledge and in one's lifetime it is not possible to have

access to even a part of that. The reasonable thing here is to make the child not to acquire this storehouse of the knowledge but to equip him with the power of acquiring, analysing and discovering this knowledge. As a useful and progressive citizen of the fast developing world we do need a generation of the people who can react, criticize, think and work constructively for the discovery of new facts, generalised insights and application for making this world a place of more comfortable and progressive living. It can only be done through the problem centered, creatively fostered and discovery oriented teaching carried out at reflective level.

7. The reflective level teaching makes possible maximum transfer of learning or training which otherwise is missing at the memory and understanding level. The art and techniques acquired for coming out of a felt problem can be made transferable in any real-life situation pertaining to the educational, vocational and personal character.
8. Teaching at the reflective level has enough flexibility to be employed for the teaching–learning in all school subjects. Moreover, it also provides freedom from the rigorous and rigid organisation of course material as it grows more from unique relationship between teacher and students than from any different nature of formal course material (Biggie, 1967).

Demerits and limitations

The reflective level teaching is said to be suffering from the following limitations and defects:

1. The teaching–learning situations are organised in a quite flexible way. In the absence of any formal course material the students are unable to acquire the systematic and organised knowledge of the school subjects.
2. The freedom and flexibility enjoyed by the students in the unstructured teaching–learning situation may drift the

students from the learning path. They can waste their time and energy in the discovery of the facts, raising irrelevant questions and pursuing meaningless investigation. Due to the lack of experience, required maturity, and undeveloped cognitive abilities, they may arrive at the erroneous conclusions and wrong answers to their problems.

3. Despite the claims of its wider application in the learning of all school subjects at all grade levels, its field is quite limited. In practical sense, it is usefully applicable to the learning of subjects and areas where discovery and problem-solving approach can be better employed. Similarly, it works well with the mature students of higher school classes having more developed cognitive abilities needed for the reflective thinking and problem solving.
4. It requires more efforts on the part of teachers. They have to gain complete mastery over the facts and generalised insight often cutting across the various subjects and life situations. They must be well acquainted with the process of discovery and problem-centered teaching, and have enough patience and competency for the proper organisation of classroom environment and effective handling of teaching-learning situation at the reflective level. In the absence of such experience and efficient teachers, teaching at the reflective level does not bear the desired fruits.

Conclusion

Shortcomings and defects outlined above about the teaching act at the reflective level do not count towards any genuine difficulty in its carrying out with the desired degree of success. There is a need of a little more care on the part of teachers for taking control of teaching-learning situation and training the children in the problem-solving process. The results are unmatched. If taught on reflective level the students get tremendous power for the acquisition of facts, principles and generalised insight including the problem-solving ability through their own efforts. They learn how to identify and analyse the problem, testify and generalise it by applying to real

problems, etc. It is not a small achievement if we as a teacher can create situation in which our students can learn on their own, working on the lines as historian finds historical fact, scientist gathers scientific information and mathematician finds the solution to an unsolved problem. Such situations can only be imparted through teaching at the reflective level where we can involve students in the process of knowledge-getting and giving them the instrument of discovering the knowledge by their own efforts.

COMPARATIVE STUDY OF THE THREE LEVELS OF TEACHING

The Table 15.1 given ahead can provide a summarised view of the comparison among the memory, understanding and reflective levels of teaching.

Table 15.1 Comparative Study of the Different Levels of Teaching

Characteristics	Memory level	Understanding level	Reflective level
Modes of operation	Least thoughtful	Moderate thoughtful	Most thoughtful
Underlying psychological theories and ideas	Theory of mental discipline, Herbartian apperception mass theory, Thorndike's connectionism and theory of conditioning	Herbartian five steps of teaching-learning and theory of insight or Gestalt field theory	Cognitive field theory of learning
Main objective	Knowledge: To acquire the knowledge of the facts and information	Understanding: To acquire the knowledge with full understanding and generalised insights	Understanding and creative: Understanding of the acquired facts with the increased ability to reflect and discover new insights leading to independent problem solving
Nature of the subject matter and its presentation	Structured, organised and preplanned; systematic presentation of the factual material	Structured, organised and preplanned meaningful and sequential presentation leading to generalisation and application	Unstructured and open ended; problem centered presentation
Role of the teacher	Dominant and authoritarian; telling without caring for understanding	Dominant and authoritarian; providing knowledge with full understanding	Democratic and cooperative; helping pupils in reflecting thinking and problem solving
Nature of motivation	Extrinsic	Extrinsic	Intrinsic
Nature of the methods employed	Subject and teacher centered; leading to rote-learning	Subject centered; leading to meaningful learning	Learner centred and problem centred; leading to problem solving and discovery learning
Classroom environment	Quite dull, single sided affair of the teacher with no interaction	Moderate in terms of interaction providing big role to teacher	Quite healthy, lively, exciting, providing opportunity for reflective thinking and constructive interaction
Testing devices used	Oral and written; use of objective, specially recall and recognition type questions for testing memorisation power	Oral, written and practical; use of objective and short answer type for testing knowledge and understanding objective	Oral, written and practical; Essay type or open-ended questions for testing originality, creativity and problem-solving abilities

SUMMARY

1. In a teaching task, while in progress, we may observe the presence of three variables, namely independent variable, dependent variable and intervening variable. Since a student is subjected to changes and development through the efforts of a teacher, he is referred to as the dependent variable. The teacher acts as an independent variable and the variables standing between the teacher and the student for bringing desired interactions between them (like teaching contents, methods of teaching, teaching–learning environment, etc.) may be called the intervening variables. All these three variables are found to execute the three types of functions, namely *diagnostic functions*, *prescriptive functions* and *evaluative functions* at different stages of a teaching task for the realisation of the aim and purpose of bringing desired modification in the behaviour of the dependent variable, i.e. students in a given teaching–learning situation.
2. For realising its purpose well, a teaching task has to be proceeded in some sequential and organised steps. These steps or stages are known as the stages or phases of teaching. In general, a teaching task involves three such stages or phases, namely *pre-active phase*, *interactive phase*, and *post-active phase*.
Pre-active phase is the planning phase of the teaching task. There are two major steps involved in this phase, namely (i) formulation of teaching goals or objectives, and (ii) discovering ways and means for the achievement of these objectives. *Interactive phase* is the phase or stage for the implementation of what has been planned at the pre-active phase. Its success depends much on the quality of the interaction taken place between the teacher and the students. *Post-active phase* is concerned with the evaluation of what has been planned and executed at the first and second stages respectively of the teaching task. The output of this phase provides feedback for bringing the desired

modification and improvement in the activities carried out at the planning and execution phases.

3. A teaching task may be performed at various levels, ranging from least thoughtful to most thoughtful behaviour or mode of actions, namely *memory level*, *understanding level* and *reflective level*. In a *teaching task organised at the memory level*, memory plays a key role. Here a teacher presents factual information before the learner and he mugs that up with the least involvement of his thinking and reasoning powers without any care for understanding and comprehension. *Understanding level of teaching* represents a relatively high level in the teaching process as compared to the *memory level*. It calls for the use of one's thinking and reasoning power, power of imagination, and other cognitive abilities for the realisation of the two major objectives of a teaching task, namely *knowledge objectives* and *understanding objectives*, lying in the cognitive domain. *Reflective level of teaching* represents the highest level of teaching act that can be carried out in the most thoughtful modes of operation, not only to have a clear understanding of the facts on the part of learner but also to provide him the opportunities for the utilisation and enhancement of his cognitive abilities to the maximum. This type of teaching may prove quite helpful in developing the desired insight and deep understanding of the facts and principles, building useful generalisations and making their use and applications in solving problems and advanced learning.

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Variables in the Teaching Process

VARIABLES INVOLVED IN THE TEACHING PROCESS

Teaching and its process carried out by teachers is well intended to make students learn the essential for the accomplishment of the pre-determined teaching or instructional objectives. In this way, a teaching process may be attributed to have three essential variables in the form of:

1. The learning or teaching task (instructional objectives)
2. The learner (what he is at the time of initiating the teaching process) and
3. The teacher (what he is in respect to his teacher behaviour for carrying out the task of teaching).

These three variables, their mutual interrelationships and interdependence, are responsible for initiating, executing and fulfilling the purpose of the organisation of a teaching process. Their roles and functions with regard to such interrelatedness and interdependence may be illustrated through Figure 16.1.

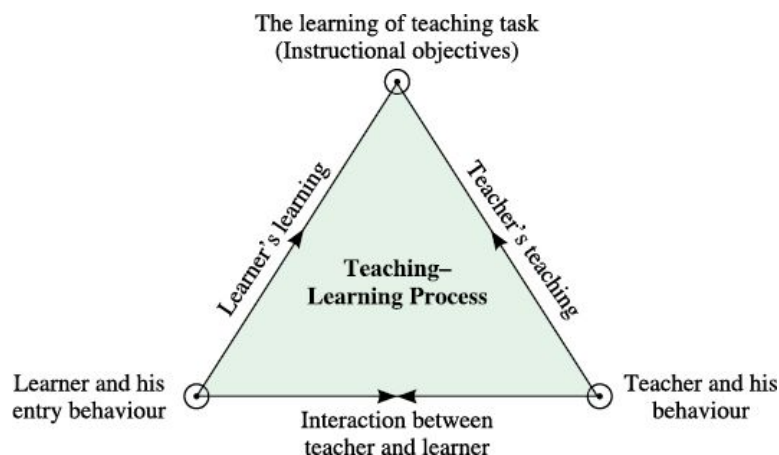


Figure 16.1 Variables in the teaching-learning process.

Let us now discuss these variables one by one.

The Learning or Teaching Task (Instructional Objectives)

What is being learned by learner or taught by teacher is governed through the pre-determined teaching–learning or instructional objectives. Before the initiation of the activities related to teaching–learning, it is quite obligatory on the part of the teachers to set the desired teaching or instructional objectives, i.e. the definite set of purposes to be achieved or the required patterns of behavioural changes expected from the students in their cognitive, affective and conative domains. In this way, the term *instructional objectives* may be defined as a group of statements formulated by teacher for describing what learners are expected to do or will be able to do as a result of the process of teaching. In fact, instructional outcome is the product in the form of behavioural changes in learners that a teacher expects as a result of his teaching. It is this instructional outcome (priorly determined as expectations) that is named as *pre-determined instructional objectives*. What are these instructional objectives that are planned and determined in advance for bringing changes in all the three domains of behaviour cognitive, affective and conative? How are these classified ? For throwing light on these aspects the researchers like Bloom and his associates have tried to provide taxonomy of instructional objectives. Let us discuss those in detail.

Taxonomy of instructional objectives

Taxonomy means system of classification and in this sense a taxonomy like Bloom's taxonomy presents a system of classification of the objectives in the similar way as Dewey's Decimal system tends to classify a number of books in a library.

The taxonomy of *instructional objectives* has been worked out on the assumption that the teaching process may be conceived as an attempt to change the behaviour of the pupils with respect to some subject-matter or learning experiences. Behaviour is divided into

three domains—*cognitive (knowing)*, *affective (feeling)* and *psycho-motor (doing)*. The taxonomy of instructional objectives has also been considered to be belonging to these three domains.

The taxonomy related to *cognitive domain* has been presented by Bloom (Bloom et al., 1956), the second related to *affective domain* by Krathwohl, Bloom and Masia (Krathwohl et al., 1964) and the third related to *psycho-motor domain* by Harrow (Harrow, 1972) and Simpson (1966).

Let us have a brief description of these taxonomies.

Bloom and his associates have classified the objectives related to *cognitive domain* into six categories arranged from the lowest to the highest level of functioning as described below:

Table 16.1 Taxonomy of Objectives in the Cognitive Domain

1.	Knowledge
	(i) Knowledge of specifics such as (a) Knowledge of terminology (b) Knowledge of specific facts
	(ii) Knowledge of ways and means of dealing with specifics (a) Knowledge of conventions (b) Knowledge of trends and sequences (c) Knowledge of classification and categories (d) Knowledge of criteria (e) Knowledge of methodology (iii) Knowledge of universals and abstractions in a field (a) Knowledge of principles and generalisations (b) Knowledge of theories and structures
2.	Comprehension
	(i) Translation (ii) Interpretation (iii) Extrapolation
3.	Application
4.	Analysis
	(i) Analysis of elements (ii) Analysis of relationships (iii) Analysis of organisational principles
5.	Synthesis
	(i) Production of unique communication (ii) Production of a plan or a proposed set of operations (iii) Derivation of a set of abstract relations

6.	Evaluation
	(i) Judgement in terms of internal evidence (ii) Judgement in terms of external criteria

Let us try to elaborate the above taxonomy of objectives of *cognitive domain* given by Bloom for its clarity and understanding.

Knowledge: It represents the lowest level of the objectives belonging to the cognitive domain and primarily aims at the acquisition of the knowledge concerning:

- i. specific facts, terminology, methods and processes, and
- ii. generalised principles, theories and structures.

The knowledge objectives mainly call for the recall and recognition level of one's memory and therefore their evaluation is primarily made through a simple recall or multiple choice type questions.

Comprehension: Comprehension is based upon knowledge. If there is no knowledge, there will be no comprehension. On the ladder of the acquisition of cognitive abilities, its level is little higher than knowledge. Specifically, it means the basic understanding of facts, ideas, methods, processes, principles or theories, etc. As a result, what is communicated to a learner, he may:

- i. translate or summarise the communicated knowledge in his own words.
- ii. interpret, i.e. cite example, discriminate, classify, verify or generalise, and
- iii. extrapolate, i.e. estimate or understand by use of knowledge and extend it to other subjects and fields.

Application: The knowledge is useful only when it is possible to put it to use. The application of an idea, principle or theory may be made possible only when it is grasped and understood properly. Therefore, the category of application automatically involves both the earlier categories, i.e. knowledge and comprehension. Under this objective,

the learner is required to acquire the ability to make use of the abstract or generalised ideas, principles in the particular and concrete situations.

Analysis: Analysis refers to an understanding at higher level. It is a complex cognitive process that involves knowledge, comprehension as well as application of an idea, fact, principles or theory. Through the realisation of these objectives the learner is expected to acquire the necessary skill in drawing inferences, discriminating, making choices and selection and separating apart the different components or elements of a concept, object or principle.

Synthesis: The objectives belonging to this category aim to help the learner to acquire necessary ability to combine the different elements or components of an idea, object, concept, or principle so as to produce an integrated picture, i.e. a figure of wholeness. As a result he may be expected to propagate an integrated picture, i.e. a figure of wholeness. He may also be expected to propagate or present a theory or principle by combining different approaches, ideas or viewpoints. He may arrive at something new or originate some novel thing or ideas after synthesising all what is already known to him. In this way, it calls for the creativity aspect of the cognitive abilities and therefore may be definitely considered a higher level of learning, involving knowledge comprehension, application as well as analysis.

Evaluation: This category of objectives aims to develop in the learner the ability to make proper value judgement about what has been acquired by him in the form of knowledge, understanding, application, analysis and synthesis. It represents definitely the highest level of objectives belonging to cognitive domain and involves all the five categories described earlier. As a result, the learner is expected to take proper decision about the quantitative and qualitative value of a particular idea, object, principle or theory. He may arrive at an appropriate decision about the matter and methods by making use of all cognitive abilities acquired through the earlier categories of cognitive objectives.

Table 16.2 Taxonomy of Objectives in the Affective Domain* Arranged from Lowest to Highest Level of Functioning

1.	Receiving (Attending)		
	(i) Awareness	(ii) Willingness to receive	(iii) Controlled or selected attention
2.	Responding		
	(i) Acquiescence in responding	(ii) Willingness to respond	(iii) Satisfaction in response
3.	Valuing		
	(i) Acceptance of a value	(ii) Preference for a value	(iii) Commitment
4.	Organisation		
	(i) Conceptualisation of a value	(ii) Organisation of a value system	
5.	Characterisation by a value or value complex		
	(i) Generalised set	(ii) Characterisation	

* Abstracted from Krathwohl, D.R., Bloom, B.S. and Masia, B.B. (1964) *Taxonomy of Educational Objectives: Handbook II, The Affective Domain*, New York: David McKay.

Let us try to further elaborate the given classification for its clarity and understanding as below:

Receiving: It represents the initial category for objectives belonging to *affective domain*. For the inculcation of certain interests, attitudes, values or ideas it is essential that learner should be made to receive or attend the desired ideas, events or objectives. This category points out towards this necessity and takes into consideration three types of following sequential activities:

- i. Firstly, the learner is sensitised or made aware about the existence of certain stimuli.
- ii. Secondly, the desired intention or willingness for receiving or attending the stimuli is created in the learner.
- iii. Thirdly, the efforts are made for the control of the attention of the learner. He may be trained to pay selective attention and sustain it for the desired period.

Responding: It represents the second level of objectives for the categories belonging to *affective domain*. Once a learner receives or attends to a particular idea, event or thing he must be made to respond to it as actively as possible. The response here does not confine itself in just paying attention or arousal of a simple intention

or desire of getting a thing, as in the first category of receiving, but manifest itself in the active behaviour like obeying, answering, reading, discussing, recording, writing and reacting to a stimulus, etc.

Valuing: When one attends as well as responds to a particular thing, idea or event, he is naturally drifted towards taking value judgement about that thing; *idea or event*. Therefore, this category of valuing depends upon both the former categories, i.e. *receiving and responding*. Here, the learner is expected to imbibe a definite value pattern towards different ideas, events and objects. In practice, the objectives belonging to this category are usually concerned with the development of typical value patterns, attitudes etc.

Organising: The category of objectives concerns with the construction of relatively enduring value structure in the learner by organising and synthesising the different value patterns imbibed by him from time to time. Ultimately, this category of objectives leads the learner to form a set value structure or philosophy of life.

Characterising by a value or value complex: It is the highest level category of objectives belonging to the *affective domain*. Up to this stage, the learner is able to imbibe all the essential *affective behaviour*, i.e. various interests, attitudes, values, value complex or value patterns, a permanent set value structure and therefore all the earlier categories are automatically involved in the objectives of this category. At this stage, the learner is destined to imbibe typical characteristics of his individual character, i.e. lifestyle of his own. In fact, it is the end point or ultimate goal in the process of education.

Taxonomy of Objectives in Psychomotor Domain

The classification of psychomotor objectives was first produced by Simpson (Simpson, 1966) and later modified by Harrow (1972). Those given by Harrow are described below under six different categories arranged from the lowest to the highest level of functioning.

Reflex movements: *Reflex movements* may be considered as the involuntary motor responses to the various stimuli in the environment. Examples of such reflex movements or actions are: the jerking of hands, the closing of eyelid, stretching of the arms, etc. These movements represent the lowest level of the psychomotor behaviour. They are largely controlled by the autonomous nervous system. However, they are very much essential not only for the development of psycho-motor abilities but also for the survival of human beings.

Basic fundamental movements: *Fundamental movements* are just a step ahead of the simple *reflex movements*. They are not so inborn and innate as the reflex movements, but a child may be seen to demonstrate such movements in his very early days of life. Their movements in the form of kneeling, creeping, stumbling, walking, jumping, moving hands, neck, head, etc. may be named as *basic fundamental movements*. They represent the simple basic movements of the body almost requiring no serious attempts or skilled practice for their occurrence. In the later years of our life, these movements are made as a result of obeying certain kinds of orders.

Perceptual abilities: The development of motor abilities related to the phenomenon of perception belongs to this category of objectives. When some meaning is attached to sensation, it is termed as *perception*. As a result, the learner is able to derive useful meaning out of the exposure of their senses to various stimuli in the environment. His bodily movements are then governed and controlled by his perceptual abilities. Whatever is perceived by him through his senses becomes an ignition point for the motor behaviour. Such type of behaviour is a learned behaviour. It is always acquired through experience and systematic training.

Physical abilities: For an effective motor behaviour, there is an urgent need for the development of desirable *physical abilities*. If one has adequate physical stamina and abilities, he may go ahead in the task of improving his psychomotor behaviour. Therefore, this

category of objectives aims to develop the various physical abilities of learners like ability to bear and stand against rough weather, to do hard labour, to carry a heavy load, to bend an article, to demonstrate one's physical power in starting, stopping or running an object or machine, etc.

Skilled movements: *Skilled movements* are those complex bodily movements which help in performing the skilled tasks. These movements are to be acquired through an organised and systematic learning process. Their acquisition requires an intelligent understanding and sufficient drill or practice work on the part of learner. The art of dancing, diving, driving, playing musical instruments, skating, typing, swimming, tailoring, etc. represent such *skilled movements*. The development of abilities concerning such skilled movements depends upon the development of motor abilities described under all the above four categories.

Non-discursive communication: This category represents the highest level of the psycho-motor behaviour. The bodily movements are hereby integrated with the inner feelings and *affective behaviour* of the learner. In this way, the *non-discursive communication* may be defined in terms of the over behaviour activities related with the communication of affective behaviour feelings or emotions. This communication may range from a simple behaviour expressible through posing of facial expression to a complex behaviour performed through a highly sophisticated activity like classical dance, sketching, painting or acting.

An Alternative Taxonomy of Psychomotor

Objectives

An alternative taxonomy in the psychomotor domain has been proposed by Dr. R.H. Dave (1969) in the shape of a working hypothesis as below:

Table 16.3 Taxonomy of Psychomotor Objectives (R.H. Dave)

1.	Imitation	
	(i) Impulsion	(ii) Overt repetition

2.	Manipulation		
	(i) Following direction	(ii) Selection	(iii) Fixation
3.	Precision		
	(i) Reproduction	(ii) Control	
4.	Articulation		
	(i) Sequence	(ii) Harmony	
5.	Naturalisation		
	(i) Automatism	(ii) Interiorisation	

Let us discuss the above steps in detail.

Imitation: For the learning of a psychomotor activity, i.e. drawing or surveying skill in mathematics, the task begins with the imitation of observed acts. The child observes the demonstrated behaviour related to drawing of a line, angle or circle, etc. He feels an inner push or an impulse (by having an inner rehearsal of the psychomotor activities) to imitate action. It is followed by the overt repetition (imitation) of the demonstrated behaviour.

Manipulation: This second category of psychomotor objectives emphasises manipulation on the part of the learner for the acquisition of skills by following directions, performing selected actions and fixation of performance through necessary practice.

Precision: In the third category of psychomotor objectives learner is able to perform skilled acts or motor activities with a derived level of precision (accuracy, exactness and right proportion) and as such may be said to reach a higher level of refinement in reproducing a given act or skilled task.

Articulation: It is the fourth category in the hierarchy of learning the psychomotor activities or skills. At this stage, learner becomes capable of coordinating a series of acts by establishing appropriate sequence and accomplishing harmony or internal consistency among different acts.

Naturalisation: It is the highest stage reached in terms of the development or proficiency acquired in the learning of a skill or psychomotor act. One can now perform a single act or a series of

articulated acts with greater refinement, ease and convenience as automatic and naturally as possible.

Writing Objectives in Behavioural Terms

The major weakness about the taxonomies of objectives given above lies in the fact that they do not state objectives in terms of *terminal behaviour*, i.e. *what* the learner should be able to do at the end of teaching specification of objectives in a task of teaching and learning may prove more effective and purposeful if they are translated into behavioural language.

The structure of the educational or instructional objectives mainly consists of two parts, namely:

(i) Modification part, and (ii) Content part.

Modification part represents the behavioural changes that are designed to occur in the behaviour of learner through the related instruction or learning experiences.

Content part refers to the syllabus in particular and to the curriculum in general to be covered by the related instruction.

Therefore, the writing of an objective in behavioural terms is always done in relation to the following three things:

- i. Nature of objective, i.e. knowledge, application, etc.
- ii. Area or domain of behaviour, i.e. cognitive, affective, etc.
- iii. Specific content areas in which behavioural changes are planned to be brought, i.e. measurement of temperature, sources of heat, types of frictions, etc.

There are several methods of writing objectives in behavioural terms. In this text here, we are going to discuss the following three approaches:

- i. Robert Mager's approach
- ii. Robert Miller's approach
- iii. RCEM approach

Robert Mager's approach

According to Robert Mager (Mager, 1962), instructional objectives are best described in terms of *terminal behaviour* expected from learners. He recommends the following things for the writing of objectives.

1. Identification of the *terminal behaviour* of performance and its naming.
2. Description of the important conditions under which the behaviour is expected to occur.
3. Specification of the criteria of acceptable performance (desired terminal behaviour) by describing how good a learner's performance must be for being acceptable.

Mager's approach has adopted Bloom's taxonomy as a starting base for the writing of objectives. He has sought the help of the associated action verbs for stating the different objectives. The verbs help in describing the outcomes of learning or terminal behaviour of the learner in a well-defined way (observable and testable). A list of associated action verbs for cognitive and affective domain has been presented in Tables 16.4 and 16.5.

Table 16.4 List of Associated Action Verbs for the Cognitive Domain

Objectives (based on Bloom's taxonomy)	Associated action verbs
1. Knowledge	Define, List, Label, Measure, Name, Recall, Recognise, Reproduce, Select, State, Write Underline, etc.
2. Comprehension	Change, Classify, Distinguish, Explain, Formulate, Identify, Illustrate, Indicate, Interpret, Justify, Judge, Name, Represent, Select, Summarise, Transform, Translate, etc.
3. Application	Assess, Change, Choose, Conduct, Construct, Compute, Demonstrate, Discover, Explain, Establish, Find, Generate, Illustrate, Modify, Predict, Perform, Select, Solve Use, etc.
4. Analysis	Analyse, Associate, Compare, Conclude, Contrast, Criticise, Differentiate, Identify, Justify, Point out, Resolve, Select, Separate, etc.
5. Synthesis	Argue, Conclude, Combine, Derive, Discuss, Generalise, Integrate, Organise, Precise, Prove, Relate, Restate, Select, Summarise, Synthesise etc.
6. Evaluation	Associate, Choose, Compare, Criticize, Conclude, Defend, Determine, Evaluate,

	Judge, Identify, Recognise, Relate, Summarise, Support, Verify, etc.

Table 16.5 List of Action Verbs for Affective Domain

Objectives (based on Bloom's taxonomy)	Action verbs
1. Receiving	Ask, Accept, Attend, Beware, Catch, Discover, Experiment, Identify, Favour, Follow, Observe, Prefer, Perceive, Receive, Select, etc.
2. Responding	Answer, Assist, Complete, Derive, Discuss, Develop, Help, List, Label, Name, Obey, Present, Practice, Record, Select, State, Write, etc.
3. Valuing	Accept, Attain, Complete, Choose, Decide, Demonstrate, Discriminate, Develop, Increase, Indicate, Influence, Participate, Prefer, Recognise, etc.
4. Organising	Add, Associate, Change, Compare, Complete, Coordinate, Correlate, Determine, Find, Form, Generalise, Intergrade, Judge, Project, Prepare, Relate, Select, Synthesise, Organise, etc.
5. Characterising	Accept, Change, Characterise, Decide, Discriminate, Demonstrate, Develop, Experiment, Face, Identify, Judge, Prove, Revise, Serve, Solve, Verify, etc.

In case we strictly follow Mager's approach for the writing of objectives in behavioural terms we have to adopt the following procedure for writing an instructional objective in behavioural terms.

1. First State conditions under which the performance is to occur like *using a Doctor's thermometer the students are able to or will be able to ...*
2. Then use an action verb for telling what students will be able to do like *measure/read/identify*, etc.
3. Finally state a criterion for success like *using a Doctor's thermometer the students will be able to read the temperature of the body of their fellow students with cent-percent accuracy.*

By following such procedure an instructional objective related to the topic *Computation of kinetic energy* may be written as under:

Given a mass 'm' and velocity 'v', the students are able or will be able to compute kinetic energy of a moving body by using the formula $K.E. = \frac{1}{2} mv^2$ with cent-percent accuracy.

Limitations of Robert Mager's approach

Mager's approach although quite popular in the development of programmed instruction, suffers from the following limitations:

1. Mager's approach is a behavioural approach but human learning cannot be confined merely to simple S-R learning.
2. It concentrates on cognitive and affective domains and neglects the psychomotor domain of learner's behaviour. Therefore, its use is limited for the writing of cognitive and affective objectives.
3. For the writing of objectives, it gives emphasis on action verbs designating behaviours and does not tell anything about the related mental processes or mental abilities. Therefore, it does not even serve the purpose of writing cognitive and affective objectives in an appropriate way.
4. The overlapping of action verbs in different categories of the cognitive as well as affective objectives creates confusion in the use of appropriate action verbs for writing particular instructional objective.
5. Moreover, the list of action verbs provided is too long and unwieldy to have any meaningful application to classroom teaching.

Mager in his approach badly neglected the conative domain or psychomotor aspect of behaviour. Robert Miller (Miller, 1962) for meeting the requirement of writing psycho- motor objectives put forward his scheme based on skill analysis by outlining the following procedure:

1. Description of the indicator, indicating the relevant activity.
2. Description of the indication or stimulus which calls for a response.
3. Controlling of the object which is to be activated.
4. Description of the activity to be performed.
5. Indication of the adequacy of responses or feedback.

Like Mager, he also tried to enlist associated action verbs for the psychomotor objectives.

For the purpose of using Miller's approach a list of appropriate action verbs is provided in the following Table 16.6 based on the classification of psychomotor objectives pointed out by Harrow (Harrow, 1972).

Table 16.6 Associated Action Verbs for Psychomotor Objectives

Objectives (based on Harrow's classification)	Associated action verbs
1. Reflex movements	Bite, Harden, Jerk, Lengthen, Loosen, Make Small, Relax, Stop, Straighten, Stretch, etc.
2. Basic fundamental movements	Befall, Catch, Creep, Drink, Hold, Jump, Kneel, Move, Reach, Run, Walk, etc.
3. Physical abilities	Begin, Bear, Bend, Conduct, Increase, Lean, Reform, Smash, Start, Stop, etc.
4. Perceptual abilities	Balance, Bend, Catch, Discover, Eat, Explore, Feed, Identification by touching, seeing, smelling or hearing, Memory Tracing, Smell, Throw, Write, etc.
5. Skilled movements	Dance, Dive, Drive, Knit, Play the musical organs, Row, Skate, Shoot, Swim, Type, etc.
6. Non-discursive communication	Mimic, Pose, Sit, Sketch, Smile, Stand, Tease, etc.

RCEM approach

Both Mager's and Miller's approaches have remained unsuccessful in the task of writing all instructional objectives belonging to all three domains of behaviour. Where Mager's approach serves the purpose of cognitive and affective objectives, Miller's scheme is meant for psychomotor objectives. Thus, none of these two approaches cover all the domains of human behaviour. Moreover, both of these approaches lay emphasis on associated action verbs (which are more often overlapping within and among the objectives of the domain) designating behaviours for writing a particular objective and completely neglect the mental processes or abilities of the learner in the learning process. On account of these limitations both these approaches have come under severe attack in our country and now

being replaced by a more reasonable approach known as RCEM approach developed by *Regional College of Education, Mysore*.

This approach makes use of mental processes or mental abilities in place of action verbs in the writing of instructional objectives. It makes use of its own taxonomy of objectives, known as *RCEM Taxonomy of objectives*, which is somewhat a modified form of the Bloom's Taxonomy. Here there are four categories in place of six given by Bloom. For doing so the last three categories, *Analysis*, *Synthesis* and *Evaluation* of the Bloom's Taxonomy have been replaced by a common category, i.e. *Creativity*. The other difference lies in naming the Bloom's Comprehension Category as *Understanding the RCEM approach*. Those objective categories of RCEM approach, along with the associated mental processes or abilities, are given in Table 16.7.

Table 16.7 Objectives and Mental Processes in RCEM Approach

Objectives	Mental processes or mental abilities
1. Knowledge	1.1 Recognise 1.2 Recall
2. Understanding	2.1 Seeing relationship 2.2 Cite example 2.3 Discriminate 2.4 Classify 2.5 Interpret 2.6 Verify 2.7 Generalise
3. Application	3.1 Reason out 3.2 Formulate hypothesis 3.3 Establish hypothesis 3.4 Infer 3.5 Predict
4. Creativity	4.1 Analyse 4.2 Synthesise 4.3 Evaluate
Note: For comparison of Bloom's objectives with the RCEM objectives, readers are advised to refer Table 16.1.	

The four categories of objectives, as may be evident from the above table, have been divided into seventeen mental processes or abilities. These processes or abilities are used for writing the

objectives in behavioural terms. For this purpose, RECM approach lays down the necessary outline of the seventeen frames or statements given below:

1. Knowledge objectives

- 1.1 The learner is able to recognise
- 1.2 The learner is able to recall

2. Understanding objectives

- 2.1 The learner is able to see relationship between and
- 2.2 The learner is able to cite example of
- 2.3 The learner is able to discriminate between and
- 2.4 The learner is able to classify
- 2.5 The learner is able to interpret
- 2.6 The learner is able to verify
- 2.7 The learner is able to generalise

3. Application objectives

- 3.1 The learner is able to reason out
- 3.2 The learner is able to formulate hypothesis of
- 3.3 The learner is able to establish hypothesis of
- 3.4 The learner is able to infer about
- 3.5 The learner is able to predict about

4. Creativity objectives

- 4.1 The learner is able to analyse
- 4.2 The learner is able to synthesise
- 4.3 The learner is able to evaluate

How to write objectives in RCEM approach

The procedure may be sequenced as below:

- 1. First of all, have in mind the entry behaviour of the learner.
- 2. Try to think over the element of content, topic or the learning experiences to be infused in the learner.
- 3. Try to think over the teaching or learning objective or objectives.

4. In view of the entry behaviour, element of content and the particular objective, try to select appropriate mental processes or mental abilities for writing the objective in question.
5. Try to make use of the seventeen frames or statements of the RCEM approach given earlier in this chapter and fill in the blanks considering the entry behaviour of the learner and learning experiences infused in him.

Let us now try to illustrate the RCEM approach of writing objectives with an example.

Example 1	Subject :	General Science	
	Topic :	Laws of Floating Bodies	
1.2	The learner is able to recall the laws of floating bodies.		(Knowledge)
2.6	The learner is able to verify the laws of floating bodies.		(Understanding)
	The learner is able to reason out why does a bigship that in small needle sinks.		(Application)
4.3	The learner is able to evaluate the application of laws of floating bodies in his day-to-day life.		(Creativity)

Conclusion Regarding Writing of Instructional Objectives

The discussion held so far may help the pupil teachers in the task of formulating the desired instructional objectives related to the topics or sub-units of their daily lessons. They have to bring desired behavioural changes in their students. These changes are to take place in all the three domains—*cognitive*, *affective* and *conative* of their behaviour. The taxonomies related to these three domains along with the approaches adopted for writing these objectives are behavioural terms and may provide desired help to the teachers in the task of planning and writing of instructional objectives. The question however arises in actual practice and in the existing conditions available for teachers training, what type of behavioural changes can be actually expected in the behaviour of students through the teaching of the lessons in various school subjects.

These changes falling in the different domains of their behaviour may generally be summarised as under:

1. Students may acquire the knowledge and understanding of facts, principles, processes and ideas related to the topics and units of a particular school subject.
2. They may learn about various skills related to the process and products of a school subject like manipulative and experimental skills, drawing skills, mathematical skills, problem solving and inventive skills, etc.
3. They may be able to utilise the knowledge, understanding and skills related to the subject in their day-to-day life as well as in their study of other subjects.
4. They may develop positive attitude for learning as well as acquiring knowledge and skills in the subject area.
5. They may develop proper interests and appreciation for the processes and products of the concerned subject.

In the light of the above types of expected change in the behaviour of students, the following types or categories of instructional objectives may be considered by the subject teachers for the planning of lessons in their subjects.

1. Knowledge and understanding objectives
2. Skill objectives
3. Application objectives
4. Attitude objectives
5. Interest and appreciation objectives

The Learner and his Entry Behaviour

Learner has a quite unique place in the system of teaching–learning process. In fact everything here is meant for the development and welfare of the learner. Instructional Objectives are set for bringing desirable changes in the behaviour of learner and what a teacher

does through his teaching and interaction with his students are all meant for serving the interests of his students.

Therefore, the learner and his behaviour should always be the prime consideration while planning and executing the task of teaching.

The question arises, how should a teacher begin his task of bringing desirable modification in the behaviour of learner? For deciding from where he should begin, a teacher must know learner especially in terms of his initial or entry behaviour. The teacher may thus plan properly about his teaching, his role and behaviour as a teacher for taking the learner to the level of *pre-determined terminal behaviour*, i.e. attainment of the stipulated teaching or instructional objectives.

Every learner is quite unique in terms of the possession of his stock of entry behaviour at the time of initiating the task of teaching by the teacher due to his hereditary tendencies and prior experiences (in terms of previous learning and training). This entry behaviour is extended to all the three domains—*cognitive, affective and conative* and thus may be judged or evaluated in terms of the possession of the following attributes regarding the subject or topic to be taught by the teacher:

Level of achievement in the knowledge area of a particular subject or topic.

1. The nature of interest, attitude and aptitude as inclination for the learning of topic.
2. The level of motivated behaviour of the learner for the learning of a topic.
3. The level of maturation of the learner at the time of initiating the task of teaching by the teacher.
4. The nature and level of the growth and development in various areas and aspects of development such as physical, motor, cognitive, social, emotional, moral and aesthetic.
5. His individual characteristic of having a typical learning style such as active learner or passive learner, preference

- for individual, social or cooperative learning, his preference for guided, direct, constructive or discovery learning, etc.
6. His reading, writing habits and level of communication (oral and written).
 7. His level of necessary skill development (cognitive, conative and affective) needed for the learning of a topic.
 8. His overall personality development and possession of traits especially concerning to his introvert and extrovert tendencies affecting his learning behaviour and developmental trend.

Decidedly, the potentialities related to the initial or entry behaviour of the learner as outlined above provide a basic frame work, direction and guideline for the teacher in playing his role as a teacher for the accomplishment of pre-determined teaching or instructional objectives.

The Teacher Behaviour

The term *teacher behaviour* in its word meaning denotes the behaviour of a teacher that is assumed or expected from a teacher for fulfilling his duties and responsibilities as a teacher with his students in order to seek their desirable development and welfare. In the light of its such wide and comprehensive meaning, the term *teacher behaviour* has been defined by McNergency and Carner (1981) in the following words:

Teacher behaviour may be regarded as a function of the characteristics of the teacher, his environment and the task in which the teacher engages.

The definition provided by McNergency and Carner highlights the following facts related to teacher behaviour:

- *Teacher behaviour* is the function of the characteristics of a teacher. What a teacher is in himself, in this way, may be a potential contributor for tailoring his behaviour and functioning as a teacher. In this sense, the personality of the teacher as a whole may be regarded as an important attribute or component of the teacher behaviour.

- The characteristics that help the teacher for functioning effectively as a teacher, besides the teacher like personality traits may also invariably include an important attribute named as *teacher competence* for helping him to demonstrate his effectiveness as a teacher.
- *Teacher behaviour* is also governed by the environmental situations in which a teacher has to function for fulfilling his responsibilities as a teacher. Such environmental situations assisted by the learner's entry behaviour or basic potential persuade or compel a teacher to have particular type of expectations from the individual learners. These expectations in turn affect the teacher behaviour, learner's learning and development and many other things related to their behaviour.
- *Teacher behaviour*, to a great extent, may also be termed as a *function of the task in which the teacher engages*. As we know, the major task of the teacher is *teaching*, therefore, the manner and style a teacher adopts for his teaching may be said to be a great contributor or component of the teacher behaviour.

Judging in this way, for throwing essential light on the nature and functioning of teacher behaviour, we would like to discuss this aspect under the heads mentioned below:

- Teacher competence
- Teacher expectations
- Teacher personality
- Teaching styles

Teacher competence

The term *competence* is a quite wide and comprehensive term and when referred as a quality or characteristic of a teacher, it denotes his overall efficiency and effectiveness as a teacher. In this way, *teacher competence* may be taken as an equivalent to teacher

effectiveness. In its another meaning, the term *teacher competence* may be perceived as the presence of such desirable teacher behaviours in the teacher that help him in fulfilling his responsibilities as an efficient and effective teacher. A teacher is thus said to be a competent teacher or attributed with *teacher competence* if he is in possession of the abilities or behavioural characteristics as detailed below:

1. Mastery over the subjects or areas, the teaching of which is his responsibility.
2. The possession of required teaching skills and the ability to make their use effectively, in a given teaching–learning situation. These teaching skills may include the skills like introducing the lesson, narration, explanation, description, illustration, reinforcement, blackboard writing, etc. The skillful and effective use of all these teaching skills in his teaching task is a major component of the ability known as *teacher competence*. Actually what is known by the term *teacher competence* is mostly considered in the practical sense as the teacher's ability to accomplish all the task involved in effective teaching with the use of teaching skills at the command of the teacher.
3. The ability or skill to communicate. One is said to be a competent teacher to the extent he is well versed with the art and science of communicating well with students. Competent teachers are not only the master of their subjects but are also able to communicate their knowledge and skills to the students.
4. The ability or capacity to have intimate, close and effective relationship with his students for having smooth two-way flow of communication, exchange of ideas attitudes and feelings.
5. The ability or capacity to seek proper class control and management of the teaching–learning situations. A competent teacher is a good manager for the effective control of the situation allowing the desired outcome of the

teaching–learning efforts in the classroom or outside the classroom involving various formal and informal teaching–learning situations.

6. The ability or capacity to work as a role model before the students for getting them imbued with the required behavioural changes and personality traits.
7. The ability or capacity to know the students with their strengths and weakness in all the dimensions of their growth and development—physical, motor, cognitive, social, emotional, moral and aesthetic.
8. The ability to act as a philosopher, friend and guide of the students for helping them in their proper development and progress.
9. The ability or capacity to adapt himself for employing a teaching method, tactics, strategy and teaching style depending upon the needs and characteristics of learners in an individualised or class teaching.
10. The ability to timely diagnose the weakness and deficiency of students properly and then help them in getting rid of such deficiencies and weaknesses.
11. The ability or capacity to have a continuous and comprehensive evaluation of the teaching–learning outcomes and then plan for the required reinforcement, correction and advancement efforts as follow-up.
12. The ability or capacity to win confidence and admiration of the students for his sincerity and devotion to his duties aimed towards their overall progress and welfare.
13. The ability or capacity to maintain healthy interaction and desired communication with the school authorities, parents and members of the community for seeking their cooperation and involvement aimed towards the welfare and progress of the students.
14. The ability or capacity of a teacher to work as an effective and efficient leader for leading his students on the path of development and progress.

Teacher expectations

By the term teacher expectations here, we mean the expectations—higher or lower, good or bad, kept by teacher for a student in respect of his behaviour, present potential and future outcomes. It is true that every teacher has some opinion of such sort about his students no matter how poor, erroneous, solid or true it may be. These expectations do not only colour the perception of the teacher about a student and thus play a significant role in shaping the behaviour of the teacher and teaching activities for the student but in turn also affect the mode of interaction, interrelationship and the progress as well as welfare of the student as a whole.

Research studies on teachers's expectations from their students have generally demonstrated that students do (to some degree) live up to the expectations that their teachers express (directly or indirectly) for them (Slavin, 1991, p. 335). It is also usually visible in the day-to-day situations at home and in school that we as parents and teachers, stick a label on the children for their goodness or badness, hopelessness or bright, etc. It may channelise them psychologically as well as physically behave and expect from their own self as such.

Let us illustrate the impact of the teacher expectations upon the behaviour, working and progress of the children through a case study presented below:

Case study

Hari, a new entrant in class VI, happened to be a good student in terms of his past academic achievement and behaviour. However, his brother Mohan, a past student of the school happened to be quite terrible in the eyes of the class teacher. Because of his experiences with Mohan, teacher had some prior assumptions about his brother Hari that absolutely coloured his expectations for him. On the very first day, when he was taking attendance and called the name of Hari, he get confirmed from him about his being the brother of the ex-student Mohan. In the middle of taking attendance, the teacher observed that some back benchers (where Hari was also sitting) were whispering to one another. He, without verifying the fact, singled out Hari for making noise. It was simply due to his belief and

expectation from Hari that he is a potential trouble maker. The teacher expectations then started a chain of vicious circles and as a result after sometime, Hari actually began playing the role as per expectation of his teacher.

As illustrated, the incident described in the case study may be an eye-opener for bringing a naked truth before us how the teachers' expectations take their roots and how the students live up to the expectations that teachers have from them.

Process underlying teachers' expectations

The question arises what works behind teachers' expectations from their students and what is that process by which teachers' expectations affect student performance? Good and Brophy (1973, p. 75) have described a five step process for this purpose as outlined below:

1. The teacher expects specific behaviour and achievement from a particular student.
2. Because of these expectations, the teacher behaves differently toward different students.
3. This treatment by the teacher tells each student what behaviour and achievement the teacher expects from him or her and affects the student's self-concept, achievement, motivation, and level of aspiration.
4. If this teacher treatment is consistent over time, and if the student does not actively resist or change it in some way, it will shape his or her achievement and behaviour. High-expectation students will be led to achieve at high levels, but the achievement of low-expectation students will decline.
5. With time, the student's achievement and behaviour will conform more and more close to what was originally expected from him or her.

In case, we try to think over the five step process related with the origin, execution and outcome of the teacher's expectations from

their students we can come to the conclusion that teacher's expectation is based upon:

1. Their own perception and subjective evaluation, primarily based on their beliefs and past experiences.
2. Their expectations about the abilities, capacities, achievement and performance as well as the behaviour of student which may turn out to be: ·almost identical with their expectations, ·much above or below their expectations
3. There is no problem and everything goes quite smoothly as the students fit into the expectations of their teachers. Here it leads to a stage of self-fulfilling prophecy—what teachers expect students to achieve becomes what students actually do achieve. The problem actually arises when it does not happen.
4. In case the teacher has a low or negative expectations, due to one reason or the other (e.g., his erroneous thinking about the student's potentiality, or ways of behaviour just as happened with the teacher for Hari in the illustrated case study) than it is sure that he will try to express his low or negative expectancy (directly or indirectly) through his verbal or non-verbal actions and will definitely affect the student's way of working, behaving, achievement and performance most often in negative way. If we term a student stupid, hopeless or below average, he will be drifting psychologically and physically in that very direction. In some cases, however, it may also be possible that the student may take it in another way. Instead of tuning with the expectations of the teacher he can accept the challenge for proving the teacher wrong.
5. In case the teacher's level of expectation is much higher (forecasted on the basis of the actual potential, abilities and capacities possessed by the student) than, here, may arise two situations as follow:
 - It may persuade the student to work hard and behave in the way as expected from him. His efforts

may attract more attention; care and directions on the part of his teacher and this may result in continual progress and improved performance on the part of the student for fulfilling the expectations of his teacher.

- It may bring disappointment and frustration for both the student and teacher. Teacher may comment adversely and curse the student for not coming up to his expectations. The student may feel guilty or develop complex, fear, anxiety and frustration for not coming up to the expectations of his teacher.

What needs to be done by teachers in relation to their expectations?

Expectations are the required platform on which the desired structure of magnificent and useful building can be laid down. These provide the direction to which the teacher's actions should be moved for guiding the path of their students. These expectations work as the desirable goals to which teacher's and student's efforts may be purposefully directed. However, they may bring negative impact and prove detrimental to the progress and welfare of the students if these are based on erroneous beliefs and judgements about the potential and behavioural functioning of the students. It is, therefore essential for teachers to act wisely in making their expectations or opinions about the goodness or badness, strength, weaknesses, fine or poor achievement and behavioural performance of their students. In doing this, the following things may prove fruitful to them:

1. **Never try to underestimate or overestimate the abilities and capacities of the students** just by having subjective decision based on the past experiences or beliefs or casual observation of a single incidence.
2. **Avoid trying to base your expectations on the traditional beliefs and assumptions such as:**
 - Talkative students having wide area of social interest are poor in academics.

- Girls are poor in the subjects of abstract academic nature like mathematics, science and engineering, where boys are inferior in humanities, artistic and aesthetic subjects.
- students belonging to lower caste and tribal areas cannot progress as smoothly as their counterparts belonging to upper castes and urban areas.
- The students belonging to English medium are superior than their counterparts using Hindi or other regional languages.
- The submissiveness, obedience and conformity, all are the signs of good behaviour and good discipline. These children are good achievers and sign of hope than the children who ask questions and do not like to travel on the beaten path.

3. **Remember that the teacher's expectations have a strong potential to make a difference:** In case you aspire more from your students, you have to work accordingly for making them so. On the other side, if you have low expectations, then it will be definitely beneficial to you to offer the kinds of instructions, care, guidance and assistance that students need to improve and it is the only way to help them appropriately in spite of your negative thinking and low expectations from them.

4. **It is always better to bring positive outlook to your expectations:** Negative outlook or negative face of the teacher's expectations is neither desirable nor beneficial. Obviously a teacher must refrain himself from taking a contrary view by his verbal or non-verbal behaviour and communicate that he is good for nothing and so nothing can improve him. Rather, he should always try to think and act in a positive way by resorting to the means as below (Slavin, 1991, p. 336).

- *Waiting for students to respond:* Students can come up to the expectations of their teacher only when they are given proper time and opportunities to respond and behave. It can help all types of

learners. Longer wait times may communicate proper signals of their coming up to the level of teacher's expectations irrespective of whether they belong to a higher or lower achievement group.

- *Avoiding unnecessary performance distinction among students:* It is not proper to get students differentiated and classified in a particular class or section by adopting the practice of ability grouping guided through the teachers expectations for the students. It is no denying of the fact that teachers and students both know who is good or poor in the class, but it is quite desirable as well as essential on the part of the class teachers that he should always try to communicate the expectations that all students irrespective of their potentials, abilities and capacities are capable to learn, develop and progress.
- *Treating all students alike:* What ever expectations the teacher may have for their students, he should try to demonstrate and follow the principle of natural justice, equity and equality in dealing with students. All students, irrespective of their achievement level and differences in their academic and social behaviour, must be given equal treatment at the hands of a teacher. He should try to do away with his all biases and prejudices aroused due to his pre-conceived notions or cultural bias against ethical groups, minorities, castes, colour or sex, etc.

In this way, if handled properly, the mechanism of teachers' expectations may work well in the interest of both the teachers and students for the accomplishments of the desirable teaching–learning goals.

Teacher personality

Teacher personality is a quite an important attribute or component of the teacher behaviour. His behaviour as a teacher, in all

circumstances, is guided and dominated by the things and characteristics lying in his personality. However, personality, as we know, in its broad sense and comprehensive meaning may be seen as sum total of what is possessed by an individual as a whole. It includes everything related to the person's self—his physical, mental, emotional, social, moral and spiritual make-up and totality of behaviour towards himself and others. Allport, the famous psychologist has defined the term personality as *a dynamic organisation within the individual of those psycho-physical systems that determine his unique adjustment to his environment*.

In this way, when we talk about *teacher personality*, we must try to view it from its two aspects, the term *personality* in general and the personality attributes that are mainly attributed to the individual as teacher. Therefore, the term *teacher personality* carries something more than the term *personality* in general. A teacher differs from other persons belonging to other walks of life. His behaviour, temperament, intellect, physique, character, motivations, aspirations, ideals and ways of adjusting to himself and others related to his profession certainly need to be little different than those of others. God, mother and teacher are the only three entities on which an individual from his early childhood can have blind faith and believes them most of the time. Teachers are the ideals to be followed and models to be copied for the students especially in the school age. It is in this respect that *teacher personality* is to be taken as a great influencing force, inspiring source as well as a recognised and accepted figure to be observed and imitated in all its appearances, actions, ideas and beliefs.

Caring for the adequate and desirable personality development is thus a necessary demand to be fulfilled on the part of the individuals who opt for the teaching profession. In all, what they need for this purpose may be visualised through the description of few important truth and attributes of a worthwhile teacher personality as below:

- Good physical and mental health.
- Reputation as a man of knowledge and vision.

- An adequate adjustment to himself and the environment comprising his personal and professional adjustment.
- Intellectually sound and cognitively developed for being capable of open thinking, reasoning and creative as well as constructive imagination.
- A good communicator both in verbal and non-verbal aspects.
- Social, believing in social interaction, mutual understanding, cooperation and democratic values of life.
- Emotionally mature having a sound emotional intelligence.
- Morally, a figure of ideas and model to be copied. The traits like honesty, integrity, sincerity, duty boundness, punctuality, truthfulness, fair dealing, must be an essential part of his personality for leaving the desired influence on students.
- Love and respect for the profession with service orientation and positive attitude.
- Love and respect for the individuality of children and zeal and enthusiasm to help children at his maximum irrespective of any individual differences, strengths and limitations.
- A fair and impartial attitude in his dealing with the students of a group/class with the least consideration of their status and his own expectations for them.
- His reputation as being ready to help, inspire and guide his students at every cross road where they need his help.
- Possession of all what is needed on his part for establishing his reputation as a good teacher, i.e. a good knowledge of the subject and its communication with no differentiation and discrimination among his students.
- Lastly but not the least, avoidance of all that may work negatively in projecting him an ideal figure of a good teacher. His clothes, eating habits, day-to-day routine, personal and social relationships, care for personal and environmental hygiene, attitudes, concerns and sentiments towards community, nation and humanity at large need to be tailored so as to cast good modelling effects on the

tender minds of children.

Teaching style

The teacher's main role and responsibility lies in the task of his teaching. Teaching as we discussed earlier in this text is a quite complex phenomenon and serious activity needing a lot of preparation on the part of teachers in terms of sufficient knowledge, expertise in the use of various teaching skills, devices and strategies and managerial abilities regarding the proper organisation of the suitable teaching-learning environment and facilities. The most notable requirement in this direction for the success of his mission related to teaching is the knowledge of what is to be taught and the skillful way of its communication, i.e. teaching. The way and manner in which a teacher tries to perform the act of teaching is known by the term *style of teaching* or *teaching style*. As with other many behavioural phenomenon, individual differences as well as variations exist in the adoption of teaching styles depending upon the teacher's own individuality, learning styles of his students and similar other environmental situations available at the time of teaching.

The various *teaching styles*, in general, may be classified and discussed under the following modes:

Teaching styles as a function of teacher's personality and behavioural functioning: According to this mode of classification *teaching styles* may be grouped as:

1. **Autocratic or authoritarian teaching style:** In this style of his teaching, a teacher acts as an autocrat and plays a quite dominating authoritarian role. His words must be treated as the last words, his instructions should be obeyed and when this does not happen, he is found to lose his temper. Actually, this style is often adopted by the teachers who, in spite of lacking in their teaching competency and managing abilities, try to cover up their deficiencies through their over dominance and yelling at students to get them back in line.

2. **Democratic or interactive teaching style:** In this style of his teaching, a teacher acts and adopts democratic dealing with his students. His approach to teaching here is learner centered rather than teacher dominated and subject centered. The learners are the key figure and thus teaching is moulded according to the needs and interests of the learners. The decision regarding the planning of learning activities, their execution and evaluation, etc. are always taken in consultation with as well as in view of the welfare of the students. The flow of interaction between the teacher and students and also among the students is also properly maintained in this style for having smooth exchange of ideas, gaining useful learning experiences and inculcation of democratic values among the students.
3. **Permissive or student-friendly teaching style:** In adopting permissive teaching style, the teacher while proclaiming himself a friend and well-wisher of the students, allows them full freedom to go on their own ways and do whatever they like in terms of their learning. In his classroom behaviour, the teacher may plead with students to raise their hands or follow other simple rules, but fails to establish a firm classroom management or teaching plan. The students, although like such relaxed friendly and permissive attitude of the teacher, yet they doubt his resourcefulness and competency as a teacher.
4. **Detached teaching style:** Detached teaching style reflects the display of utter carelessness and irresponsibility on the part of a teacher with regard to his teaching and teacher behaviour. It seems that a teacher, here, has no concern for the students. He is desensitised to the classroom management as well as his methods and ways of teaching. Such teachers may be found to sit behind their tables while students are working and do their own work/grade papers during class or when on duty. They have quite insignificant relationships and interaction with the students in the class or work situations and thus have negligible achievement motive and aspirations for turning them as the efficient and

effective teachers.

5. **Authoritative and managerial teaching style:** In detached style where teacher remains unattached and careless for the teaching-learning and classroom management, the authoritative and managerial teaching style works contrarily by providing due care and attention for everything connected with teacher's teaching and classroom management. Here a teacher demonstrates his authority on the subject and methods of teaching. He has an orderly classroom, a strong discipline plan and is capable of demonstrating his concern, care and support to the learning and welfare of the students. Students have quite high opinion about the style of his teaching as well as his behaviour as a teacher. They respect the teacher and believe that he is there for the solution of their problems and guiding their paths. In fact this type of teaching style is an ideal and admiration to be achieved.
6. **Teaching styles as a function of projecting himself before the student:** Anthony Grasha in his publication *Teaching with Style* (1996 : 154) has classified *Teaching Styles* into five groups namely, *Expert Style*, *Formal Authority Styles*, *Personal Model Style*, *Facilitator style* and *Delegator Styles*. The characteristics, advantages and disadvantages of these styles discussed by him may be summarised in the manner given ahead in Table 16.8.

Table 16.8 Styles of Teaching

Teaching style	Characteristics	Advantages	Disadvantages
Expert style	In this style of teaching, teacher demonstrates his expertise and command over the subject. He usually displays and furnishes information and knowledge in an extensive detailed way.	It makes the teacher well prepared in the matter of having command over the subject and provide a challenge	If over used, the display of expertise and knowledge can intimidate and frustrate less capable students.

	It expects that students will be well prepared for receiving the knowledge and they will also come forward for enhancing their knowledge and competence.	before the students for making them more knowledgeable.	
Formal authority style	In adopting this style, a teacher may be seen to demonstrate his formal authority as a teacher to his students particularly in relation to providing positive and negative feedback; establishing teaching-learning objectives, expectations from the students and rules of their conduct; framing the acceptable and standard ways of doing things on the part of students and providing them the needed structure for their learning, etc.	It is helpful in providing a clear focus on the expectations from the students and acceptable ways of doing things. Teacher is capable of having his hold on the behaviour of the students including the teaching-learning process.	A strong and over use of this style may lead to rigid, standardised and less flexible ways of managing students and their concerns.
Personal model style	This style of teaching involves <i>teaching by personal example</i> and provides the students a model for their appropriate thinking and behaving. The teacher here has full opportunity to oversee, guide and direct the learners by showing how to do the things and behave. His behaviour and ways of doing things is then observed and emulated by the students.	It proves helpful in the observational learning—to observe and imitate the behaviour of the role model, i.e. teacher or able peers.	It becomes a rigid and closed approach. Teachers may insist to follow them as model. The inability to do so may develop insecurity among some students.
Facilitator	In this style of teaching,	Students here	Since the role

style	teacher plays a role of facilitator in terms of providing students the needed opportunities and facilities for coming ahead for their own learning and constructing knowledge. It aims to develop among students the capacity for independent action, initiative and responsibility for the attainment of the teaching-learning objectives. Here the teacher is always available to the students for facilitating and smoothening their independent or group-learning task or project.	may get due help and environment to pursue the course of learning through their own initiative and efforts both on the individual and group basis.	of a teacher is limited to a facility provider, he may become lethargic and careless by leaving everything on the students. With lack of experience and other related factors, students may waste their time in unproductive things.
Delegator style	In this style of teaching, teacher assign or delegates his powers and functions to the students for becoming totally independent in terms of acquiring their knowledge and attaining learning objectives. It is therefore concerned with the development of students' capacity to function in an autonomous way. The students here enjoy full autonomy in their learning whether on individual or group basis. In fact, they are their own teachers, the teacher is available to them only at their	Here students can enjoy full auto-nomy in terms of their planning and execution of their learning task individually or in a group. It makes them to be quite independent in terms of becoming their own guide and masters of their learning.	All students are not so capable of attaining the desired teaching-learning objects quite independently. Many of the students may go astray or become nervous and anxious when they are left on themselves.

	request in the capacity of a resource person.		

Mixed models used for the classification of teaching styles:

In addition to the two main modes of classifying teaching styles discussed above, the teaching styles have also been classified or grouped by the educationists and thinkers in many other ways summarised below:

1. We may classify these as:
 - i. A didactic teaching style (a teacher controlled style characterised by lecturing on the part of the teacher and notes taking or listening on the part of students).
 - ii. A Socratic style (A teacher directed style involving the use of questions responded by the students).
 - iii. A facilitative style (limiting the role of the teacher as a main facilitator and making the students responsible for their own learning).
2. We may classify these as:
 - i. Teacher centered, book or content centered styles.
 - ii. Student centered, teaching–learning objectives centered styles.
 - iii. Individual v/s group learning, cooperative learning or constructivist learning centered styles.
 - iv. Guided learning, exposition, inquiry or discovery learning centered styles.
 - v. Rote memory, understanding and reflective level learning centered styles.
 - vi. Enactive, iconic and symbolic stage learning centered styles.
 - vii. Concrete and abstract concepts representation learning centered styles.

SUMMARY

1. The process of teaching carried out by a teacher is well meant for making the students learn the essentials for the accomplishment of the pre-determined teaching or instructional objectives. In this way, there may be seen three clear-cut variables or components working side by side in the process of teaching namely, (i) The teaching task with its clear-cut objectives (ii) The learner and his entry behaviour (iii) The teacher and his teaching behaviour.
2. The term *teaching* or *instructional objectives* stands for those well-meaning definite statements that are used for expressing the instructional outcomes in behavioural terms, i.e. outlining the definite changes in the behaviour of the students through the study of a particular topic.
3. For the classification and description of the educational/instructional objectives of the various subjects of the school curriculum related to all the three domains of behaviour, various taxonomies have been developed by different scholars. In the taxonomy provided by Bloom and his associates, the objectives related to cognitive domain have been classified into six categories, namely *knowledge, understanding, application, analysis, synthesis* and *evaluation*. Similarly, in the taxonomy related to *affective domain* given by Krathwohl, Bloom and Masia, the objectives have been classified into five categories, namely *receiving, responding, valuing, organisation* and *characterisation by a value or value complex*. For the classification of objectives in the *conative domain* of the behaviour, we can mention two important taxonomies. In one of these taxonomies given by Simpson and Harrow, the objectives have been classified into six categories, namely *reflex movements, basic fundamental movements, physical abilities, perceptual abilities, skilled movements* and *non-discursive communications*. In the other taxonomy given by R.H. Dave, the objectives have been classified into five categories,

namely *imitation, manipulation, precision, articulation* and *naturalisation*.

4. All these taxonomies suffer from a serious limitation that these are not capable of stating the instructional objectives in terms of the terminal behaviour of the learners. The approaches like Robert Mager's approach, Robert Miller's approach and RCEM approach can be adopted for overcoming this limitation. While Mager's approach is used for stating objectives of *cognitive and affective domains* in the behavioural terms, Miller's approach works for stating objectives of conative domain in behavioural terms. In both these approaches, separate lists of action verbs (based on the taxonomies given by Bloom and others) have been provided for stating a particular objective in the behavioural terms. The third approach developed by RCEM may be considered a good approach in stating the objectives belonging to any domain of the behaviour in the behavioural terms. It makes use of mental processes or mental abilities stated through the different seventeen statements in place of action verbs in the writing of instructional objectives besides using of its own taxonomy of objectives for this purpose.
5. As far as the writing of instructional objectives related to any topics in a subject of the school curriculum in behavioural terms is concerned, in our usual classroom situations, we can proceed by classifying those into five categories, namely *knowledge and understanding, skill, application, attitude, interest and appreciation objectives*, and then making use of any one of the three approaches provided by Mager, Miller or RCEM for writing them in behavioral terms.
6. The other major or say, the most significant variable of the teaching process is the learner. Since, what is done by the teacher in the accomplishment of his teaching task is exclusively meant for bringing essential changes in learner's behaviour. For carrying out a process of teaching, a teacher has to know his learner well in terms of his potentialities well before initiating and planning his teaching journey with the learner. This task is concerned with knowing about the entry

behaviour of the learner in terms of his existing potentialities concerning the teaching topic, i.e. previous knowledge about the teaching topic; his interest, attitude, level of motivation, and inclination for the learning of the topic; level of maturity and development in the physical, mental, social, emotional and communicational areas along with the possession or non-possession of the skills needed for the learning of the topic. Decidedly, the knowledge and awareness about all these potentialities related to the initial or entry behaviour of the learner may help the teacher well in turning the process of teaching a grand success.

7. Teacher and his behaviour also work as a major deciding factor for the success of the ongoing teaching process. The term *teacher behaviour* here denotes a type of behaviour that is assumed or expected from a teacher for fulfilling his duties and responsibilities as a teacher with his students in order to seek their desirable development and welfare. In a general way, the things or attributes like (i) Teacher competence, (ii) Teacher expectations, (iii) Teacher personality, and (iv) Teaching styles may be found to describe well the behaviour and functioning of a teacher in carrying out his responsibilities as a teacher with his students.
8. By the term *teaching competence* of a teacher, we mean his overall efficiency and effectiveness as a teacher. It can be well reflected through the presence of such desirable teacher behaviours of the teacher that help him in fulfilling his responsibilities as an efficient and effective teacher. As examples of these desirable behaviours, we may name the behaviours associated with the demonstrable abilities like (i) mastery over the subject of teaching, (ii) skilled in terms of using appropriate teaching skills, methods and strategies, (iii) ability to communicate, interact, guide and assist the students well in their learning pursuit, and (iv) working as a role model and providing effective leadership for the essential development and well fare of the students, etc.
9. By the term *teacher expectations* here, we mean the

expectations—higher or lower, good or bad, kept by teacher for a student in respect of his behaviour, present potential and future outcomes. These expectations do not only colour the perception of the teacher about a student and thus play a significant role in shaping the behaviour of the teacher and teaching activities for the student but in turn also affect the mode of interaction, interrelationship and the progress as well as welfare of the student as a whole. In response to the expectations of teachers from them, students may begin to view themselves in the same frame and learn to live up to these expectations. Accordingly, they may develop themselves as brilliant, creative, and all-rounder and also dull, slow, and hopeless as being framed by their teachers. In this way, the *teacher behaviour* in the shape and form of its nature of expectations from the students may be found to work as a quite important factor in influencing and affecting the learning outcomes, development and progress of the students.

10. *Teacher's personality* is quite an important attribute or component of the teacher behaviour. His behaviour as a teacher, in all circumstances, is guided and dominated by the things and characteristics of his personality making him a good or bad, effective or non-effective teacher in terms of fulfilling his responsibilities as a teacher. In fact, by virtue of their positions, teachers are the ideals to be followed and role models to be copied for their students especially in the school age. It is in this respect that teacher personality is to be taken as a great influencing force, inspiring source as well as a recognised and accepted figure to be observed and imitated in all its appearances, actions, ideas and beliefs by their students. It is why, the teachers are well advised to take care of the things that can be helpful in shaping their personality in a desirable *teacher behaviour* form for influencing the teaching process and guiding their students in the most appropriate way.
11. The way and manner in which a teacher tries to perform the act of teaching is known by the term *style of teaching* or

teaching style. The teaching styles adopted by the teachers may take various forms and shapes like (i) Autocratic or authoritarian teaching style, (ii) Democratic or Interactive teaching style, (iii) Permissive or student-friendly teaching style (iv) Detached teaching style, (v) Authoritative and Managerial teaching style. In its usual form, a teacher is well known and found to be popular with his students with his style of teaching and in this sense, the styles adopted by the teachers for their teaching may be seen to work as an important attribute and influencing component of the teacher behaviour. The form and shape of a teaching style may also found to work as a good influencing force for shaping the direction and nature of the teaching–learning process carried out by the teacher with his students for their required development and welfare.

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Principles and Maxims of Teaching

INTRODUCTION

Teaching is a skilled job and a complex task. By all means, it is done for the benefit of the pupils, i.e. to bring desirable changes or improvement in their behaviour. Success of this operation depends upon a good planning and masterly execution of the same. The educationists, psychologists, researchers and the teachers working in the fields have tried to establish some general principles, psychological principles and maxims of teaching which may prove quite helpful in making the task of teaching quite effective and purposeful. In the coming pages, an attempt will be made to present these in details.

GENERAL PRINCIPLES OF TEACHING

There are some general principles of teaching that have emerged from the general experiences, traditions and new researches in the field of education and pedagogy. Some of these broad principles can be summarised with the help of Figure 17.1.

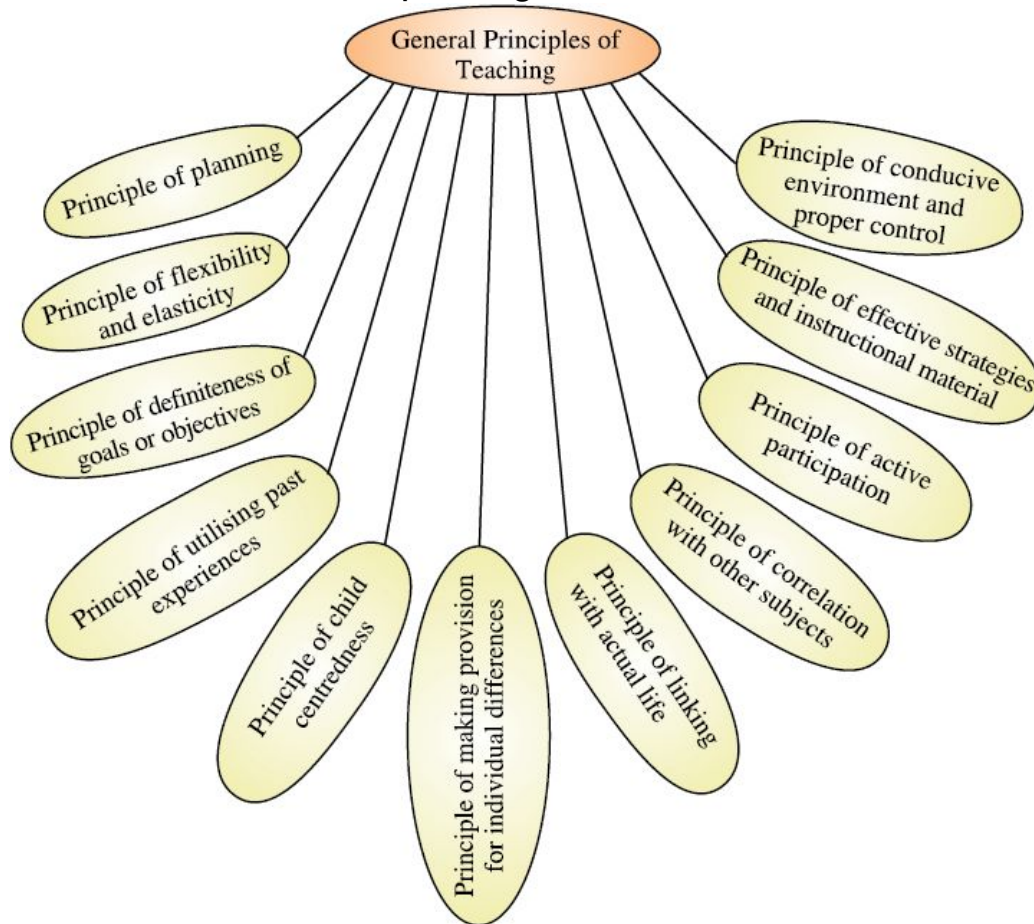


Figure 17.1 General principles of teaching.

Principle of definiteness of goals or objectives

A teacher without having clear knowledge of the goals or purposes of his teaching is similar to that sailor who does not know the destination of his boat moving in a vast ocean. The knowledge that he has to run 100 metres or 400 metres from a marked place to another marked place makes the task of a racer quite definite, purposeful and stimulating. Similarly, if a teacher knows his task in terms of well-defined instructional or educational objectives or goals, he may win half the battle. Definiteness of the goals helps him at

every step, phase or act of teaching. He may plan, execute and evaluate all the aspects of his teaching in the light of the stipulated objectives. With the help of definite clear-cut objectives, he always remains on track and never goes astray, and consequently the possibility of a good teaching is always enhanced by observing the principle of definiteness of goals or objectives.

Principle of planning

The success of any task or activity depends upon the quality of pre-planning. The desired goals in a teaching act may be achieved smoothly and effectively through proper planning. A teacher, therefore, should try to plan and prepare the details of his lesson in the form of lesson notes before its delivery. The planning must include the establishment of instructional objectives in behavioural terms and the relevant subject matter and its organisation into proper units. The method, techniques or strategies of presentation, interaction and evaluation should also be clear-cut. In brief, the teacher should very carefully plan the details of the journey that he is going to make with his students in the classroom or some other teaching environment.

Principle of flexibility and elasticity

The teaching act requires proper planning beforehand but it does not mean that it should become rigid and stereotyped. Teaching is a complex task and a live phenomenon. At the execution stage, the possibilities of alteration in planned situations or environment cannot be ruled out, therefore, the principle of flexibility and elasticity needs to be observed for enabling the teacher to deal effectively with the aroused situation. He must be quite resourceful, imaginative, original and creative for adapting himself as well as his teaching to the requirements of the students and teaching–learning environment.

Principle of utilising past experiences

Past experiences may be regarded as a base or foundation on which the structure of a new knowledge can be safely built. Therefore, what a teacher teaches should be properly linked with the already acquired knowledge and experiences. This facilitates the teaching act and helps in achieving the stipulated objectives with great ease

and economy. There is no state like complete vacuum in the process of teaching. At any stage there exists an entry behaviour which provides a base and starting point for bringing desirable changes or further improvement in the behaviour of the child. What is already known or experienced by the child should therefore be always made the starting point of acquainting him with what he does not know or ought to know.

Principle of child-centredness

Teaching is aimed to bring desirable changes in the behaviour of a child. Therefore, it is essential to adopt child-centred approach in all aspects of teaching. The planning, implementation and evaluation of a teaching act should invariably centre around the child. The curriculum, methods and techniques, management of teaching-learning environment and evaluation, all should serve the cause of the students.

Principle of making provision for individual differences

Nothing is alike in nature. We all vary in terms of the innate and acquired traits, abilities and capacities. Some are slow learners and others are quite fast. In the continuum of growth and development, entry behaviour and acquisition of abilities in the conative and affective domains, all children occupy different positions. Therefore, a good teaching should make adequate provision for individual differences. The teaching which does not cater to the needs and abilities of individual child, cannot be expected to achieve specific goals of bringing desirable changes in the behaviour of all children. Therefore, by all means, teaching is to be designed, performed and evaluated in view of the principle of individual difference.

Principle of linking with actual life

If education is for living and aimed to prepare the child to lead life happily and progressively in a social context, then every teaching should be essentially linked with the necessities and happenings of actual life. Teaching should never be confined to the classroom or school boundaries, but should invariably be linked with actual life.

Principle of correlating with other subjects

Different subjects of the school curriculum serve same goals or objectives. The artificial division of knowledge in the form of different subjects stands for facilitating the task of teaching and therefore, should not be taken as watertight compartments in themselves. There exist intimate links among various subjects. The study of a particular subject definitely helps the learning of many things in other subjects. Valuable energy and efforts of the teacher and pupils may be saved if the principles of *correlation* and *transfer of learning* are utilised properly. For example, a teacher of history should never hesitate to point out the possibilities of the transfer of the knowledge of history to other disciplines and should himself utilise the knowledge of geography, mathematics, basic sciences, economics and other subjects for bringing efficiency in his teaching.

Principle of effective strategies and instructional material

The products are the outcome of the processes, and processes depend heavily on the types of strategies, tactics and means chosen and employed. Teaching process, for its success, also demands effective strategies, means and material. They all vary with the variance in the goals and purposes, human material and teaching–learning environment. What is suitable for the teaching of a particular subject, topic or sub-topic to a student in a particular situation may or may not suit in other situations. Therefore, great care should be taken to choose an appropriate strategy and a set of instructional material.

Principle of active participation and involvement

A good teaching should always be a two-way traffic, making the task of teaching, a cooperative effort of the teacher and the taught. Teaching is like a current flowing in a wire with the teacher and the taught at its two ends. A teacher who is trying to transmit the current of knowledge without the involvement of the student is unnecessarily wasting his energy and the resources of the community. A good teacher, for effective results, always tries to seek active participation of the students in the teaching–learning process. Besides his sincere involvement in the teaching act, he persuades, inspires and involves the students for realising the objectives of his teaching.

Principle of conducive environment and proper control

The role of a *conducive and effective management* or control of the teaching–learning situations can never be denied in teaching. Environmental factors like proper seating arrangement, ventilation, light, classroom interaction and group dynamics, discipline and tone of the school always influence the teaching–learning process, and therefore care should be taken for their desirable arrangement and control.

PSYCHOLOGICAL PRINCIPLES OF TEACHING

Psychological principles of teaching are different from the general ones, which have resulted through the experiments and researches in the field of psychology and learning. Directly or indirectly they stimulate and influence the teaching process and make it more effective. Some of the important psychological principles are summarised as follows:

Principle of motivation and interest

Motivation and *interest* are the two central factors in any process of teaching and learning. The theories of motivation, interest and laws of learning, like the law of readiness, have established the validity of these two factors. Motives are the potent forces that energise or activate all behaviours of an individual. The objective of bringing desirable changes in the behaviour can only be achieved if one is motivated to try or accept that *change* in his behaviour. Similarly, interest provides key to learning and desired changes. The saying that *You can take a horse to water but you can't make him drink* fits equally well with a child who is made to learn something for bringing desirable changes in his behaviour.

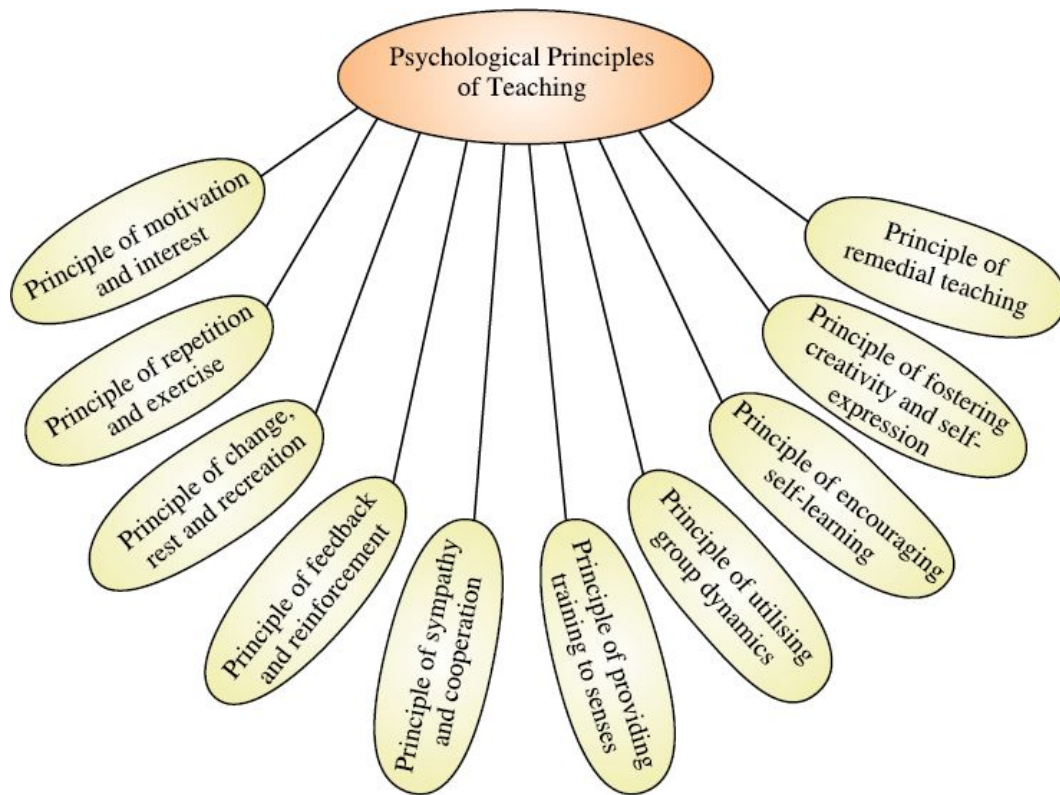


Figure 17.2 Psychological principles of teaching.

Attention capturing and attention giving, the essential elements of a teaching or learning act, can only be accomplished through a well-planned scheme involving arousal of motivation and interest of the pupils in the teaching–learning process. Therefore, a teacher should always take care of the factors of motivation and interest for seeking the child’s readiness and involvement in the teaching–learning act.

Principle of repetition and exercise

It was Thorndike who tried to put experimental evidences in favour of the utility of repetition and exercise in the process of teaching-learning. It has now been clearly established that the desired changes in behaviour may occur frequently and effectively through the use of the principle of repetition and exercise. The saying that *practice makes a man perfect* applies well in the acquisition of knowledge, skills, attitudes and interests. The teacher who believes in providing practice, revision, recapitulation and application of what has been taught by him may successfully achieve the objectives of his teaching.

Principles of change, rest and recreation

Psychological experiments in learning have demonstrated the ill-effects of monotony, fatigue, and lack of attention in any learning task. The remedy in the form of stimulus variation and other types of changes in the contents, methods and teaching-learning environment and provision of appropriate rest and recreation have also been proved quite effective. Therefore, a wise teacher should essentially plan and implement the provision of change, rest and recreation in his teaching act.

Principle of feedback and reinforcement

Learning theories have well established the role of reinforcement and feedback devices in any task of teaching and learning. The immediate knowledge of the results and positive reinforcement in the form of praise, grade, certificates, token economy and other incentives may play wonder in making the task of learning, a joy, a thing to do again and again and an experience that is retained for long. The behaviour modification, a major goal of the teaching-learning process, may be properly achieved through the observation of the principle of feedback and reinforcement.

Principle of sympathy and cooperation

A good teacher is a friend, philosopher and guide. He is not to dictate or direct the students but walk along with them on the track of learning. He is to provide adequate encouragement and guidance by seeking their *sympathy* and *cooperation*. He is to become a part and parcel of the group that he is supposed to lead. He is the one who can be relied on and approached by the students for overcoming their difficulties. The task of teaching can never accomplish its objectives, if a teacher does not try and secure active participation of the students. The classroom environment becomes live and fruitful when the teacher and students work on the same platform, sympathising and helping each other in the major task of teaching and learning. Therefore, a good teacher should always take care of the principle of sympathy and cooperation.

Principle of providing training to senses

Senses are said to be the gateway of knowledge. Researches in the field of learning have clearly established the importance of senses in acquiring any type of learning experiences. The results are more encouraging when an experience is acquired through the use of a combination of senses—sense of hearing, sight, taste and touch. For this purpose, one has to train and use one's sense organs in an effective way. Defective sensation may lead to disastrous results. The power of observation, discrimination, identification, generalisation and application may only be made appropriate through the effective functioning of senses. Therefore, a teacher should make proper arrangement for the training of the senses of his students for the realisation of better results.

Principle of utilising group dynamics

Groups behaviour and group dynamics play an effective role in the attainment of the objectives of teaching. Under the influence of group behaviour, individuals think as the group thinks, feel as the group feels, do as the group does. The group leader, the interaction process between the group and the leader and among different members, the effect and counter effects of other groups—all work towards the creation of a particular educational environment and also exercise their force to bring changes in the behaviour of the students. A wise teacher should try to utilise the essential aspects of the group psychology for the attainment of better results.

Principle of encouraging self-learning

A good teacher should be able to inculcate the habit of self-study, independent work and self-learning among the students. There is no end of knowledge in this world and one cannot even get a fragment of this vast ocean through spoon feeding or direct instruction from a teacher. He has to learn this way of acquiring the knowledge and seek the path of self-learning in order to learn essentials of life for his adequate adjustment. Therefore, a teacher should always work for creating the environment of self-learning by providing suitable opportunities and training to his students for this purpose.

Principle for fostering creativity and self-expression

Good teaching does not involve unintelligent learning, cramming or exact reproduction of the facts. By all means it should be able to develop the creative aspects of one's personality. It should work as an effective medium for self-expression so that students may be able to develop their hidden talents and abilities. It should call upon the originality, novelty, inventiveness of the students for the self-expression and creation. Students should be made to learn exploration of the things, events and find cause-effect relationship in the happenings, and thus set their energies for creating and doing something new for the development of the society and humanity.

Principle of remedial teaching

A teaching act aims to bring some stipulated behaviour changes in the students. The task is not so simple as it seems to be. There are many intervening variables and obstructions. It may be realised soon by the teacher that when he has not been able to achieve his objectives, definitely, there has been something wrong with his objectives, contents, and methods or his interaction with the students. A particular student may not be able to learn due to his specific limitations. The teacher has to find out where the fault lies and then think for the possible remedy. He may arrange for the remedial education to any particular student or a group of students for removing their specific difficulties and providing them adequate opportunities for proper growth and development.

MAXIMS OF TEACHING

Experience is said to be a good teacher and a trusted guide. Educationists and teachers engaged in the task of actual classroom teaching have evolved certain simple notions and working ways based on their own experiences which may prove quite helpful in the task of teaching. These are known as maxims of teaching. They are quite trustworthy, time honoured and universal. Let us try to discuss some of the important ones.

From known to unknown

The *unknown* is usually feared while the *known* is trustworthy. Hence, known can always prove a reliable base for making acquaintance with the unknown. A known friend or an individual may work as a source for acquaintance with other people. Similarly, previous knowledge of a particular subject or topic may help us to collect new information and explore the *unknown*. After acquiring knowledge and skills in solving the problems on addition and subtraction, one can learn easily the essentials of multiplication and division. A wise teacher should always plan his teaching on the principle of proceeding from the *known to the unknown*. He should first try to acquaint himself with the entry behaviour, previous experience and all that is known to the pupil and then proceed on his task of teaching new things or bringing changes in the behaviour of his pupil.

From definite to indefinite

A good teaching should always lead from *definite to indefinite*. One can always trust the tested or definite and therefore *definite things, concepts, events* or *knowledge* may be easily approached for catching the *indefinite ones*. Definiteness of the known facts in a multiplication table may help a student to acquire the knowledge or skills concerning thousands of odd combinations related to multiplication, division, square or cube roots. Similarly, definite rules of the grammar may help a student learn the concerned language effectively.

From simple to complex

It is always better to begin with the relatively simpler things than to fight with the unnecessary difficult and complex ones. Proceeding from *simple to complex* or *easy to difficult* always provides an appropriate learning order or sequence. Such properly graded sequence may work as the schedule of automatic reinforcement as the grasp and understanding of simple ones not only motivates an individual to aspire for little more difficult but also equips him with the understanding and mastery of the difficult and complex concepts and phenomena in the course of learning.

From concrete to abstract

Abstract is confusing, difficult to understand and subjective. One may be easily bored, fatigued, perplexed and lose one's patience while attending to an *abstract phenomenon*. It is difficult to be remembered and applied in practical situations. In contrast, concrete is relatively simple, understandable or objective. Acquisition of a new knowledge or skill may become a simpler task when it is supported with concrete examples, objects and events. A good teaching should lead from concrete to abstract. The concrete material is to be shown, living examples are to be given and the children should be given maximum opportunities for acquiring direct experiences in order to make them able to learn the abstract concepts and acquire experiences at the later stage.

From actual to representative

Actual or real objects, a piece of knowledge, principle and theorem are always better than their replica or representation in any process of teaching and learning. An on-the-spot experience of the thrills and life of a mountain lake, lonely desert, whistling trees and chattering birds is unmatched in terms of direct influence and educative value. Visit to an airport is going to have lasting impression and clarity in thoughts and concepts in comparison to mere talking about aeroplanes and aerodrome verbally or through illustrative aids. Therefore, a wise teacher should always lead his students from actual phenomenon to the artificial representation.

From particular to general

Generalised facts, principles, concepts and phenomena are quite abstract in nature and therefore should not be presented in the beginning of a teaching. A teacher who begins by saying that matter has weight and then presents particular examples or provides demonstrations related with particular solids, liquids or gases is placing horse before the cart. One cannot generalise without facing or acquainting oneself with the particular instance leading to the generalisation of the fact or behaviour. Therefore, a teacher should always begin with the learning or experiencing of the particular cases, facts or instances and then persuade his students to generalise or conclude.

From whole to parts

Whole is always not only greater than the parts but also more understandable, motivating and effective. Therefore, beginning should always be made with the whole, and then step-by-step its various parts or constituents should be presented before the students. For example, in teaching the topic *parts of the flower*, the beginning should be made with the actual presentation of the whole flowering plant and then gradually the knowledge of the elements and functioning of the different parts should be presented. Similarly, a model of the water pump and the actual working of this pump should be demonstrated as a whole and then the study and working of its different parts should be taken step-by-step.

From induction to deduction

Induction is a way of proving a thing or statement by arguing if it is true for a particular case, and then it should be true for the next similar case, and so on. While employing it in teaching, a teacher is required to place particular instances, examples of facts or experiences before the students. On the basis of similarities of properties and repetition of a phenomenon, the students are thus made to generalise a concept, principle or rule. On the other hand, *deduction* is the net result of induction. Here the beginning is made by placing the generalised fact, principle, formula or rule before the students and then they are asked to verify the truth of the

generalisation by applying it in particular instances or examples. It is needless to say that all good teaching begins with induction and ends at deduction. Knowledge is formative and induction is a way of discovering the knowledge. Deduction is the result of such discoveries. Therefore, a teacher should always proceed from induction to deduction in his teaching.

From analysis to synthesis

Analysis refers to a process of breaking or separating out a thing into the simpler parts, elements or constituents in order to understand its structure or composition. It is a sort of operation or investigation that is carried out to know the hidden aspects of a problem, the causes of an event or behaviour or understanding the complex nature of a thing or phenomenon. For example, to understand the structure and working of a machine, the structure may be disassembled in terms of its various components or parts and then one can gather knowledge for these components. To know the composition of a salt (compound or mixture) it may be analysed into its elements and then knowledge about the composition or properties of various elements may be acquired. On the other hand, *synthesis* works quite opposite to analysis. It refers to the process of combining different elements or parts of a thing in totality. In comparison to synthesis, the process of analysis represents a systematic and natural way of investigation and discovery. It is a formative approach quite applicable to the beginning of a learning or teaching act. Therefore, good teaching should always begin with analysis and lead to synthesis.

From empirical to rational

In a teaching–learning process, it is always safe to begin with what we see, feel and experience than with what we agree, generalise or explain. The former approach is empirical while the latter is rational. Development of the rational point of view is a goal, a result of a process of empirical findings. The concrete facts or empirical evidences are the rock bottom of a conclusion or rational knowledge. The rational thinking is not the product of empty ideas or lofty ideals having no naked truth or concrete happenings. A teacher has to place facts, evidences, direct or indirect experiences, examples and

instances full of objectivity and validity to arrive at some conclusion or develop a rational point of view in understanding the nature and concepts of the objects, people, events and phenomena. Therefore, in good teaching one should always lead the student from empirical to rational goals.

From psychological to logical

Psychological point of view emphasises the importance of psychological principles of learning and teaching in the process of education. Here, the child is the centre of education: his needs, interests, abilities and capacities are the deciding factors for the planning and organisation of the teaching activities. The instructional goals are made to serve the cause of the child. The curriculum, teaching strategies, aid material and teaching–learning environment, all are set in view of the psychology of the child and teaching–learning. But it should not mean that a teacher has to go unplanned or move haphazardly in his teaching act. What is to be taught, although based on psychological footing, should have some logic. The proper organisation and sequencing of teaching activities in terms of the organisation of learning experiences, teaching strategies, evaluation activities and feedback devices are very much essential for the effectiveness of a teaching act. Therefore, a wise teacher cares for a beautiful integration of psychological principle to logical agreement in his teaching. He is to move on a psychological track, keeping in view the logic behind sequences of his activities.

SUMMARY

1. The scholars and educationists working in the field of education and pedagogy (science of teaching) have arrived, through their investigations and experiences, at some generalised principles for the successful execution of the task of teaching. These generalised principles are termed as the general principles of teaching in the language of educational technology. The mentionable ones of these general principles are; *principle of definiteness* of the educational objectives, *principle of planning*, *principle of flexibility*, *principle of utilising* the previous or past experiences, *principle of child centeredness*, *principle of individual differences*, *principle of correlating teaching* with other subjects and the real life, *principle of utilising appropriate methods, devices and strategies* for teaching, *principle of seeking active participation* of the students and *principle of creating appropriate learning environment*.
2. Besides the general principles of teaching, there exist a number of principles developed through the work done by some great psychologists that can be quite effective in making the task of teaching a success. The mentionable ones on this account may be named as the *principle of interest and motivation*, *principle of repetition and exercise*, *principle of change and rest*, *principle of feedback and reinforcement*, *principle of sympathy and cooperation*, *principle of providing training to senses*, *principle of utilising group dynamics*, *principle of encouraging self-learning*, *principle of fostering creativity and self-expression*, and *principle of remedial teaching*.
3. Experience is said to be great teacher in itself. The teachers working in the field of education through their own experiences have evolved a number of generalised notions, ideas, work mode and practices that can be properly employed for getting desired success in the tasks of teaching. In the language of educational psychology, these

are referred to as *maxims* of teaching. The notable ones among those are: proceeding from *known to unknown*, from *definite to indefinite*, from *simple to complex*, from *concrete to abstract*, from *actual to representation*, from *particular to general*, from *whole to parts*, from *analysis to synthesis*, from *empirical to rational*, and from *psychological to logical*.

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Theories of Teaching

INTRODUCTION

Any task, for its effective outcome, has to be dealt with properly in terms of its theoretical layout and practical implementation. Theory, in general, provides a framework, useful planning and schedule incorporating effective steps to be taken for performing a task or executing any activity as successfully as possible. Teaching, as defined and understood earlier in Chapter 1 of this text, is a serious activity undertaken by a teacher to produce desirable changes in the behaviour of the students. For performing this task effectively, a teacher surely needs some pre-planning and theoretical understanding of a number of activities that are desirable to set his behaviour in tune with the task performed by him. *Theories of teaching*, supply and equip him with such theoretical understanding and framework. However, for understanding the meaning and nature of the theories of teaching properly, let us first understand and define the terms *theory* and *teaching* separately.

WHAT IS THEORY?

The term *theory* has been defined by eminent scholars in the following ways:

Kerlinger (1964 : 11): *A theory is a set of interrelated concepts, definitions and propositions that presents a systematic view of phenomena by specifying relationships among variables with the purpose of explaining and predicting the phenomena.*

Goode and Hatt (1952 : 9): *Theory refers to the relationship between facts and ordering of them in some meaningful way.*

Douglas W. Matheson and others (1970 : 8): *A theory specifies the relationship between events for the purpose of explaining the occurrence of the events and predicting future events.* Understanding this way, a theory related to a subject refers to a well-organised theoretical framework for the understanding of a particular phenomenon or process. It helps in understanding the mechanism and interrelationship among the variables involved in that phenomena or processes. Theories have predictive value. The results of the particular phenomenon or process can be known in advance with the help of theories. Thus, in case one makes advances according to some theoretical framework supplied by a theory, we can predict his future success or failure to a great extent.

WHAT IS TEACHING?

In Chapter 1 of this text, we have already defined and explained the meaning of the term *teaching* quite extensively. As a conclusion here, we can repeat that *teaching* is a quite serious task or activity undertaken by the teachers to produce desirable changes in the behaviour of their students. It is a process that is aimed for helping the students in their learning activities, and during this process teachers are supposed to maintain a particular type of behaviour called *teacher behaviour* and engage in the activities called *teaching activities*.

MEANING AND NATURE OF 'THEORY OF TEACHING'

After defining the term *theory* and *teaching*, now it is appropriate to think about the meaning and nature of the term *theories of teaching*.

Teaching involves a set of activities called teaching acts: teacher behaviours and a number of variables that form part of the teaching process. A *theory of teaching* must provide a theoretical framework for the proper planning, organisation and control of the teaching tasks or *teacher behaviours* and manipulation of all the involved variables in order to realise the stipulated educational and instructional objectives as effectively as possible. It must help the teachers to make their students learn, i.e. to bring desirable changes in their behaviour and actualise their potentialities to the maximum.

In a nutshell, *theory of teaching* must provide the answer to all queries and questions related to teaching for efficient and effective learning. Contrary to theories of learning which pertains to the behaviours of the learners and the factors, conditions and situations in which they can learn effectively and also the outcomes of learning, *theory of teaching* must invariably deal with the behaviours of the teacher and their teaching aimed for better learning.

Let us now reproduce the views expressed by some educationists regarding the term *theory of teaching* to understand how they define and describe the term.

B.O. Smith (1963), an American psychologist, described theories of teaching as *an attempt to describe teaching variables involved in the teacher behaviour in terms of their existence and possible interrelations for predicting the outcomes of teaching*.

Smith, through his description, thus tries to point out that *theory of teaching* needs to incorporate the following three elements:

1. It must mention the different teaching variables involved in the teacher behaviour.

2. It must describe the possible relations among these variables.
3. It must predict the impact of teaching.

According to N.L. Gage (1964), *theory of teaching* must invariably answer the following three questions related to the teaching process:

1. How do teachers behave?
2. Why do they behave as they do?
3. What are the effects?

Considering in this way, *theories of teaching* are aimed to improve the *teaching behaviours* for achieving the desired teaching objectives. In other words, with the help of a teaching theory, a teacher can plan, perform and control his teaching activities and ways of behaviour for exercising desirable impact on the learning behaviour of his students. A *theory of teaching*, as Gage visualises, also has its predictive value. The learning performance of the student shows high correlation with the teacher effectiveness, i.e. the effective teacher behaviours and this effectiveness is gained through the knowledge and study of teaching theories.

Bruner (1966) termed *theories of teaching* as nothing but explanation of general methodology of teaching, and therefore these ought to be derived from the general theories of learning. A method of teaching points out the way or the activities undertaken and behaviours performed by a teacher for accomplishing his teaching objectives well. In this way, according to Bruner, *theory of teaching* is concerned with the most efficient ways and means for optimum learning. Speaking in this tone, it must specify and ensure the arrangement of the most effective learning experiences, learning environment and learning methods for the optimum learning outcomes.

Mitra (1972) considered the theory of teaching as a sort of a derivation from the theories of psychology, i.e. theories of learning,

motivation, intelligence and individual differences. A *theory of teaching*, in his opinion, prepares the teacher to perform his teaching responsibilities as effectively as possible. As a teacher one has to maintain a sort of contractual relationship between himself and his students. Through his teaching, he has to materialise this contract and for this purpose he is bound to engage in specific teaching acts like analysis of the teaching task, setting of teaching objectives, identifying the entering behaviour of the students and selecting the most appropriate teaching methods and strategies for the attainment of the set objectives.

Judging in this way, a theory of teaching can be described as *the application of knowledge of theories of psychology for improving classroom teaching practice and the teaching skills of a teacher*.

With all what has been understood as the meaning and definition of the term *theories of teaching*, we can summarise its nature in the following ways:

1. Theory of teaching is directly linked with the psychology of instruction. However, it may draw its material from various theories of learning, and motivation, etc. In real sense, theories of teaching have evolved out of the logical insight of the learning process and logical analysis of the tasks.
2. Theory of teaching explains and describes the behaviour of the teacher typically in the classroom in order to help the students in better learning.
3. In contrast to learning theories which are psychological in nature, a teaching theory is predominantly social in nature.
4. A *theory of teaching* is much more than a *theory of learning*. While the scope of a learning theory is limited to describe and explain the nature of learning, teaching theory prescribes the factors, conditions and strategies for ensuring effective learning.
5. *Theory of teaching* presents a systematic view of teaching by specifying relations among variables of teaching process.
6. *Theory of teaching* equips a teacher with proper theoretical

background and training for accomplishing his teaching task.

7. A *theory of teaching* answers three basic questions: How do teachers behave, why do they behave so, and with what effects?
8. A *theory of teaching* points out the proper way of effective knowledge, skill or attitude of the students.
9. *Theory of teaching* helps in the implementation of a contractual relationship between the teacher and the taught.
10. *Theory of teaching* can be safely used to manage teaching in terms of its planning, control and prediction.
11. A *theory of teaching* describes, justifies, explains and suggests the most appropriate way of manipulating the elements of variables involved in the teaching process.
12. A *theory of teaching*, working well in a particular teaching–learning situation, may not be found suitable in others. Moreover, as teaching is a complex phenomenon comprising too many diversified activities, no single teaching theory can be prescribed for all the teaching–learning situations.

NEED AND SIGNIFICANCE OF THEORY OF TEACHING

In the process of teaching, our aim is quite clear. We, as a teacher, want to help the students in their development and learning tasks. For the realisation of this aim, we have to equip ourselves as adequately as possible. Our responsibilities in the shape of teaching activities are quite practical in nature, which needs a lot of theoretical support. For building a bridge, the men who are busy in its construction need theoretical guidance, pre-planning and a lot of preparation before actually operating on it. Similarly, a teacher has to understand his nature of job, teaching tasks and many other responsibilities that he has to carry out in an attempt to build his students' future and develop their potentialities. The need of a *theory of teaching* may be felt due to the following purposes served by it:

1. It helps in understanding the nature and process of teaching by describing (i) what is teaching, (ii) analysis of teaching, (iii) relationship between teaching and learning and (iv) conditions and factors affecting teaching–learning, etc.
2. It helps in the proper formulation of teaching objectives, defining these objectives in behavioural terms and explaining how these objectives, in general and particular, can be effectively achieved by suggesting appropriate teaching techniques and strategies.
3. It helps in understanding the role of different variables involved in the teaching process, their interrelationships and manipulation in order to achieve maximum learning.
4. It helps in developing proper teaching models, teaching and instructional designs, and teaching systems for a particular teaching–learning situation.
5. It helps in explaining and understanding the mechanism of teacher behaviour. It also suggests means and devices for its suitable modification and improvement in order to

develop the required teaching effectiveness.

6. It helps in the effective management of the task of teaching in terms of its planning, organisation and control.
7. Its value also lies in its predictive nature. We can predict, to a reasonable extent, the outcomes of the process of teaching–learning structured by a teaching theory.
8. It helps in planning the essential ingredients and basic material for the organisation of the courses and activities of the in-service and pre-service teaching training.
9. It helps in the scientific and systematic study of the problems faced by the teachers in their day-to-day teaching activities as well as concerning further improvement of the teaching and instructional technology.
10. It helps, in its own way, to transmit the fruits of extensive research carried in the area of teaching and teaching technology to the subject-teachers and educational administrators.

SCOPE OF TEACHING THEORY

By *scope of a teaching theory*, we usually mean to answer the type of questions as follows:

1. What is its field of operation in terms of its uses and significance?
2. What does it stand for or deal with? What type of subject material does it possess? What are its limits and boundaries?

The answers to all such questions related to the *scope of teaching theory* can easily be located in what has been already described in the preceding pages under different heads such as meaning, nature, need and significance of the theory of teaching. However, let us summarise it below:

Teaching theory provides a proper theoretical framework for explaining and discussing all the aspects and problems related with the process of teaching and tasks of teaching. Consequently, its scope is bound to include the topics as follows:

- Nature of teaching and its relationship with learning.
- Analysis of teaching into its components, behavioural activities and teaching skills.
- Teaching variables, their roles in teaching process and interrelationship.
- Teacher behaviour and its impact on pupil's learning, the task of its modification leading to required teaching effectiveness.
- Teaching objectives and their formulation in behavioural terms and specific teaching activities.
- Discussion about the teaching variables and teacher behaviour with reference to psychological and social situations.
- Management of teaching in terms of its planning,

organisation and control.

- Prediction about the effect of teaching in relation with the known teaching–learning situations.
- Teaching–learning environment and its effective management for student learning.
- Teaching strategies, devices, designs and systems of instructions and teaching.
- Common problems faced by the teachers in their teaching tasks and their possible remedies.

In this way, teaching theory tries to equip the teachers with all the essential knowledge, facts, principles and theoretical understanding related to their teaching tasks, behaviours and teaching process. It provides general as well as specific directions for the teachers to be followed in their teaching path for helping them to become effective teachers.

The *scope of teaching theories*, in this way, is more comprehensive than the learning theory. The learning theory is almost confined to the process of learning describing nature of learning, factors affecting learning and methods of learning, etc. A teaching theory, on the other hand, while discussing all the variables and aspects of teaching also points out the ways and means of managing and controlling the variables, conditions and processes of learning. The aim of teaching is to induce proper conditions for effective learning, and therefore a theory of teaching must always discuss and point out what is essential for the effective learning and development of the students. Consequently, the scope of teaching theory covers the whole range of teaching–learning process, the variable involved in this process and their interaction and impact on the student's learning, teacher behaviour in relation to students' behaviour and management of the teaching tasks or activities. After all, as we have already pointed out that teaching consists of very complex skills and teaching activities are too varied in their range and specialisations and, moreover, there is knowledge explosion and the social psychological teaching–learning situations are in the constant state of change, then how can it be possible for teaching

theories to remain in a non-flexible stage. As a general rule, theories of teaching have to strive hard for analysing and structuring the growing tasks of teaching and, consequently, the expansion in the scope of teaching theories cannot be banned. Day-by-day new problems are emerging in the field of teaching and instructional technology, students' classroom behaviour and teachers' teaching. To face these problems, new facts, ideas and principles have to be incorporated in the teaching theories. That is why, we cannot limit the boundaries of the teaching theories. Their scope cannot be confined to a specific boundary of the concepts and principles. It has to be kept free for meeting the requirements of the constant changes and trends emerging in the field of teaching tasks, teacher behaviour and teaching activities.

TYPES OF TEACHING THEORIES

A *theory of teaching*, as described in the preceding pages, provides a theoretical framework to the teacher for carrying out their teaching activities as effectively as possible. The range of these teaching activities is varied and teaching-learning situations for the performance of these activities are also quite heterogeneous. There are number of subjects, diversified subject material and learning experiences that are to be provided by the teachers to the learners of varying capacities and age groups. Therefore, it is quite important that there cannot be a single theory applicable to all types of learners, learning experiences and teaching-learning situations. Consequently, a number of teaching theories developed by educationists and psychologists are available for enabling the teachers to select and plan their own way of teaching according to the needs of the situation. These theories can be properly discussed by broadly classifying them into the following three groups:

1. Formal theories of teaching.
2. Descriptive theories of teaching.
3. Normative theories of teaching.

Let us now discuss the theories lying under these groups (Figure 18.1) one by one.

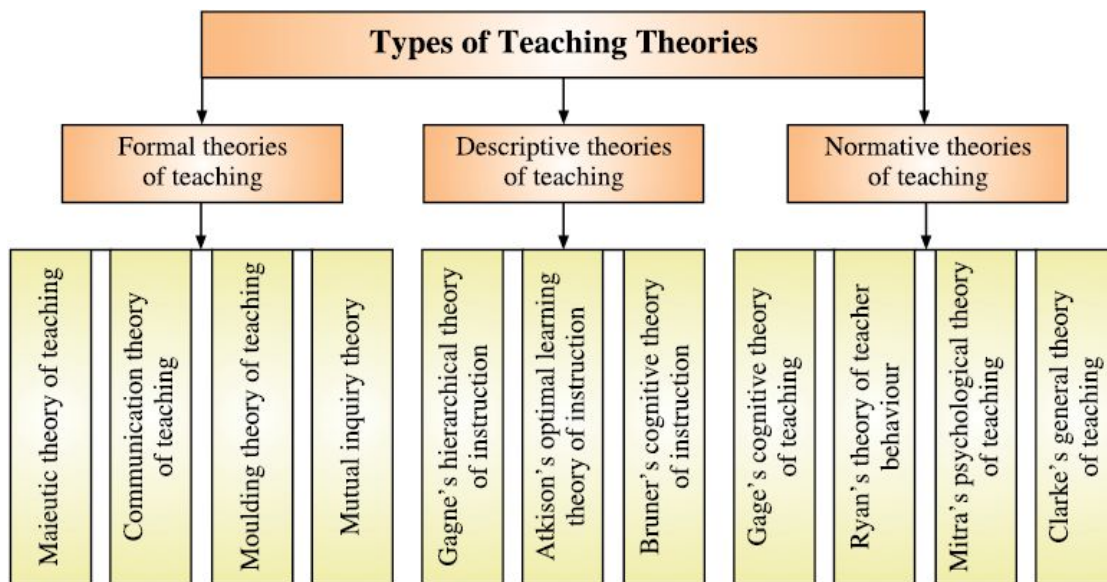


Figure 18.1 Types of teaching theories.

Formal Theories of Teaching

These theories are based on certain principles of thought, science of knowledge and philosophical assumptions and, that is why, these are also termed as *philosophical theories of teaching*. The following four theories are included in this category:

Maieutic theory of teaching

It is the earliest philosophical theory organised from the ideas and methodology of teaching put forward by the ancient Greek philosophers Socrates and Plato. It also reflects the essentials of the educational philosophies of great Indian educationists such as Vivekanand and Gandhi. The essence of these philosophies lies in the assumption that all knowledge rests within the individual child and the task of teaching is to unfold the knowledge. As a teacher, one has to draw out the best in the child's body, mind and spirit. He does not have to put or induce anything from outside. The knowledge is already there in the child's mind. The teacher's job is to help the child in the recollection of the stored knowledge. In other words, child has all the inherent potentialities like a seed to grow into a useful plant. All what has to be done by the process of teaching is to provide adequate opportunities for the proper germination and

growth of these potentialities. The special feature of this theory, in this way, can be summarised as follows:

1. The knowledge to be gained by the child through education already lies within him in the shape of forgotten knowledge. The task of teaching is to help the child in its proper recollection.
2. Every child is born with inherent capacities and abilities. The teacher's job is to help the child in actualising these potentialities and converting it from internal to external.
3. In the upbringing and education of the child, this theory puts more emphasis on hereditary than environmental influences.

Communication theory of teaching

Quite contrary to Maieutic theory, this theory believes that the child has nothing with him like forgotten knowledge or inherent capacities which needs to be reproduced or unfolded through teaching. That is why, what is given to him in terms of knowledge, skills, attitudes or interests is always affected from outside. It is not the child but the teachers who are pre-equipped with knowledge and skills at the time of teaching and it is their duty to communicate the same to the child by adopting proper methods for his welfare and development. The teacher may use a variety of methods and devices like narration, explanation, demonstration, and experimentation for making his communication as effective as possible. In this way, quite appropriate to its name, this theory considers teaching as a way of effective communication. The extent to which a teacher is able to communicate well to his students for bringing the desired changes in their behaviour, he is said to be an excellent teacher.

On philosophical lines, this theory is considered to be conceived through the Herbartian assumption of apperceptive mass, i.e. assimilation of new experiences to a mass, already existing in the mind (consisting of past experiences and old ideas). Consequently, communication theory advocates that while communicating with their students (i) teachers must make use of their past experiences, (ii) as

methodology, they should make use of explanation, narration and demonstrations activities, (iii) they should try to make maximum use of their students' sensory and perceptual abilities, (iv) in planning their lessons it is advisable to follow the five famous Herbartian steps, namely preparation, presentation assimilation, organisation and recitation. The main features of communication theory may be summarised as follows:

- What is to be taught to the child lies outside him and not within the child.
- Teacher has to provide the knowledge and skills to the child by utilising the communication strategies involving telling, showing and doing activities.
- Sensation and perception play a key role in the process of communication.
- For better communication, the new knowledge should always be linked with the past experiences and old knowledge possessed by the students.
- Hereditary and environmental factors, both should be provided due importance in the process of teaching.

Moulding theory of teaching

This theory considers *teaching as a process of behaviour modification* or a way of shaping and moulding the students' behaviour and personality in a desired pattern. It is the outcome of the ideas propagated by the school of behaviourism and involves the principle of stimulus response theories including *operant conditioning*. As a result, in the teaching advocated by this theory, environmental influences hold the key and thereby the whole attention is paid towards setting the proper environment for the teaching and arranging the most appropriate learning experiences leading to satisfactory and rewarding results. Due care is also taken to provide immediate reinforcement for the shaping of sound conduct, attitudes, beliefs along with the assimilation of right knowledge and useful skills.

The essential features of this theory may be summarised as follows:

- Environmental influences play a great role in the shaping and moulding of human behaviour and personality.
- Teaching is nothing but an attempt for the proper organisation of environmental influences to help the child in shaping and moulding his behaviour in a desirable way.
- In the process of behaviour modification carried out through teaching, due care should be taken to maintain proper link between the stimulus and response by arranging relevant learning situations.
- The teacher's main task lies in arranging proper learning situations and providing reasonable freedom to the child for learning and developing his potential in a desired way.

Mutual inquiry theory

This theory believes that *a child is very curious by nature* and he is in the habit of acquiring knowledge by putting questions or making inquiry about many things and happenings. Therefore, teachers' main duty lies in arranging the learning situation in such a way that helps the child to discover the knowledge by himself through inquiry. However, in doing so, he has to inquire or investigate about:

1. the nature, interest and basic potential of the child.
2. the nature of the subject matter or learning experiences to be acquired through inquiry.
3. the method of enquiry suited to the nature of the subject and needs of the learners, and
4. the nature of the environmental settings that can be helpful in making use of such inquiry and problem-solving approach.

In other words, according to this theory, teaching becomes a cooperative enterprise in which both the learner and the teacher engage in the process of inquiry and achieve the desired

instructional objectives by adopting inquiry and investigating approach. Here, the task of acquisition of knowledge by the learner becomes possible through a proper environment setting in which the child is helped to achieve the desired instructional objectives with limited guidance from the teacher. He is helped in discovering the knowledge by himself instead of its mere telling by the teacher or reproduction by the learner. The teaching–learning process is shared by the learner and teacher through mutual inquiry by raising questions, sharing the discovery of new knowledge and arriving at the new and novel ways of solving the problems. The main features of this theory thus may be summarised as follows:

- Knowledge is best acquired through inquiry and investigation.
- Better teaching involves the organisation of teaching–learning situations in such a way that helps the child to discover knowledge with limited guidance from the teacher.
- Teaching–learning is a cooperative enterprise in which both the teacher and the learner have to participate by adopting inquiry and problem-solving approach.
- The teacher and the learner both should try to select the most appropriate method for the enquiry and investigation depending upon the nature of the subject matter, available environmental settings and stipulated instructional objectives.
- In a nutshell, this theory recommends the use of methods promoting mutual inquiry such as inquiry training method, heuristic or discovery method and problem-solving method.

Descriptive Theories of Teaching

The theories of teaching that try to describe the variables involved in the process of teaching in terms of their interrelationships and predicted effectiveness are called *descriptive theories of teaching*. Their so-called description is based on empirical evidences and objective observations. Due to their predictive and prescriptive

nature, these theories are also termed as *prescriptive theories of teaching*. They prescribe and point out the proper ways of organising instructional process to achieve the desired instructional objectives, and consequently these are responsible for giving birth to a number of theories of instruction as follows:

1. Gagne's hierarchical theory of instruction.
2. Atkinson's optimal learning theory of instruction.
3. Bruner's cognitive theory of instruction.

Let us now discuss these theories one by one.

Gagne's hierarchical theory of instruction

Robert Gagne (1970) provided a theory of instruction based upon his own ideas about the types and conditionings of learning. The main ideas of his theory of instruction are summarised as follows:

1. First of all Gagne provided following eight types of learning and arranged them in a hierarchical order proceeding from simple to complex:
 - i. Signal learning
 - ii. Stimulus response learning
 - iii. Chaining
 - iv. Verbal association
 - v. Discrimination learning
 - vi. Concept learning
 - vii. Rule learning
 - viii. Problem solving

The types of learning arranged in a hierarchical order clearly set the way in which a child learns by following the maxim *simple to complex*. Accordingly, Gagne through his theory of instruction asserted that the teacher must place his instructional strategies to suit the sequential order of hierarchy of learning for leading the child from simple to complex on the path of learning.

2. Gagne, along with his associate Briggs (1974), identified

five learning outcomes associated with his eight types of learning. These are *motor skills*, *verbal information*, *intellectual skills*, *attitudes* and *cognitive strategies*. They arranged them in a hierarchical order. Based on this hierarchy, Gagne proposed that the instructional procedure must be planned to suit the hierarchy of learning outcomes. In other words, the child should be made to learn the motor skills and be provided with verbal information before he is taught intellectual skills and other cognitive strategies.

3. Gagne (1977, 1979), working on the similar lines, also proposed conditions that must be satisfied if learning is to take place. He named these conditions as events or phases of learning. These conditions or events are very much instrumental in the process of learning. A child has to pass through these events in a hierarchical order while he is engaged in a learning task. Since instruction is meant for helping the child to learn, the events of instruction or instructional strategy should essentially be linked with the events of learning. The events of learning as proposed by Gagne in his theory of instruction have been presented in a hierarchical order in the Figure 18.2.

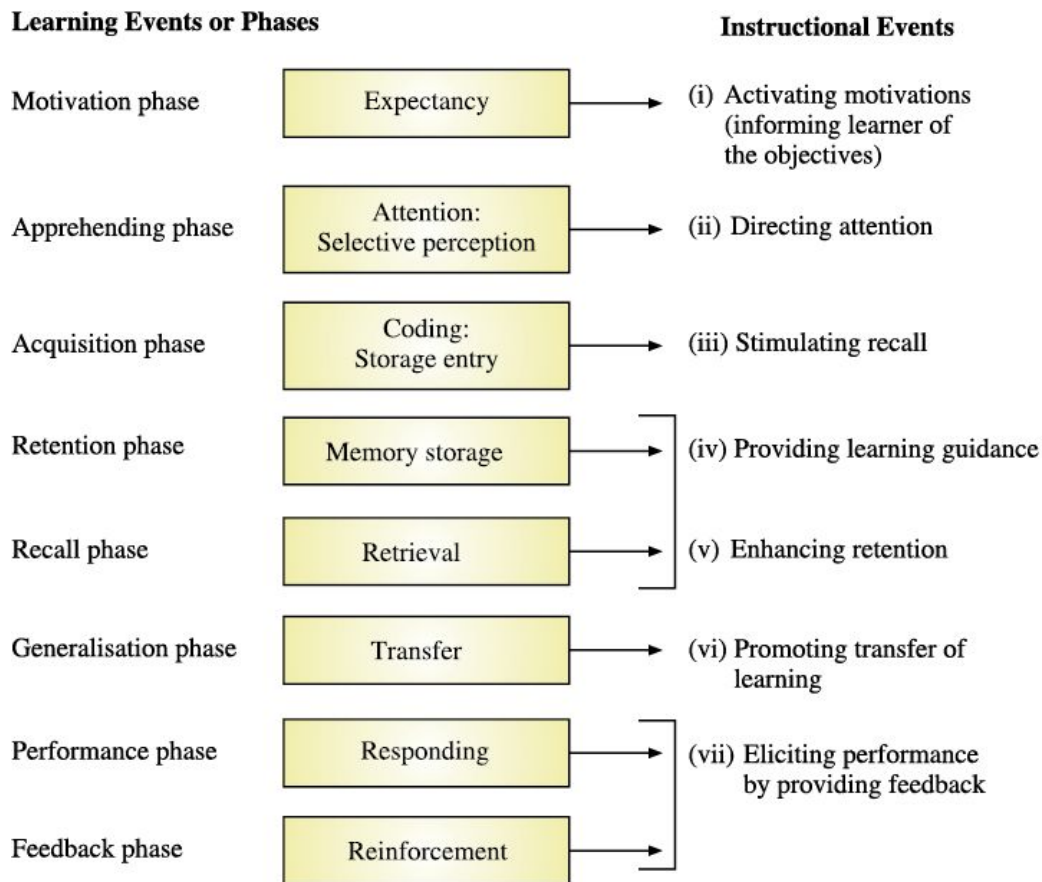


Figure 18.2 Events of learning.

Gagne's theory of instruction suggests to lead students through a series of instructional events that have been identified as being associated with learning events and conditions essential for learning.

The diagram in Figure 18.2 illustrates that an act of learning, according to Gagne, consists of eight phases. Each of these eight phases includes external conditions or events that are to be structured by the learner or teacher. For example, at the motivational phase, the learner needs to be motivated. It may be done by the learner himself or the teacher has to take pains for creating events or conditions for motivating the learner in a desired way. Each external condition or event of learning is associated or paired with the internal events or conditions, the process going on within the learner's mind. For example, the events of motivation are associated with expectancy, the desire to expect or achieve something as an outcome of learning. These internal events associated with the external events or phases of learning counterparts are given in the rectangular boxes. While discussing the phases or events of learning

in the process of learning Gagne pointed out the different instructional events in hierarchical order that do take place in a process of instruction. Accordingly, Gagne's theory of instruction planned the instructional strategy adopted by the teacher through the following steps:

1. Get the students motivated to learn. It can be done by creating student's interest in the learning task. To inform the learner about the learning outcomes or objectives attained may prove to be a good motivating force.
2. Make the students attend to presented learning material.
3. To assimilate new learning material by stimulating recall of the previous related learning.
4. To provide sufficient learning guidance for learning and memorising the presented material.
5. To help the learners for the retention of newly acquired learning experiences.
6. To help the students to transfer or generalise the facts, principles or concepts to new situations.
7. To help the students demonstrate their achievement or performance and to provide them with immediate feedback.

Atkinson's optimal learning theory of instruction

Richard C. Atkinson (1968), while working with the computer for the computer-assisted instruction for dealing effectively with the problem of individual differences in learning, came out with a theory of instruction leading the students to optimal learning. An instructional strategy, according to his theory, is composed of the following steps:

1. The teacher first must lay out instructional objectives specified in behavioural terms.
2. The teacher should then chalk out a model of the teaching-learning process by specifying the necessary instructional activities.
3. A proper strategy should be chalked out by measuring the attainment of each instructional objective by designing

suitable measurement scale.

Bruner's cognitive theory of instruction

J.S. Bruner proposed a theory of instruction which is very different from earlier psychologists. This theory was based on his own ideas and assumptions summarised as follows:

1. Learning is not simply a stimulus-response (S.R.) conditioning or R.S. reinforcement but rather a cognitive process. As a cognitive process, it involves the following three simultaneous acts:
 - i. Acquisition of new knowledge or information.
 - ii. Transformation of knowledge that one already possesses.
 - iii. Checking the pertinence and adequacy of knowledge one has.
2. Curiosity is the basic instinct possessed by every individual. Right from the period of infancy, knowledge is gained due to the curiosity about the things, objects and events surrounding us and our attempts to involve ourselves in the knowledge-getting process.
3. Conceptualisation or categorisation is the first major step in the process of learning. We as human beings, have a tremendous capacity to discriminate objects or events in the environment, categorise or classify them in a particular or generalised way. However, the child should be helped in the formation of right concepts from the very beginning. J.S. Bruner advocated the use of concept attainment model devised by him for his purpose.
4. The development of cognitive abilities in human beings is a continuous process. It takes place quite systematically by involving the three developmental stages as follows:
 - i. The enactive mode or stage
 - ii. The iconic mode or stage
 - iii. The symbolic representation mode or stage.At the enactive stage, the curious child gets access to

some aspects of reality by resorting to motor responses. Thus, the first stage in our learning consists of motor manipulation of the objects or events surrounding us. Learning through manipulation of concrete objects or doing things should thus be an initial step in any instructional strategy adopted by the teacher.

At the iconic stage, the individual is able to think about the objects or events through his own mental images. Thus, he is now capable to represent reality of the objects or events through a set of images or graphics, like representation of a room through rectangular diagram.

By the third stage of symbolic representation, the individual starts using symbols in place of images. Here language and symbolism play the key role in representing the reality of objects and events. It is the highest stage where concrete reality can be represented and manipulated through pure abstraction.

5. Knowledge is important. However, it cannot claim itself as the sole power. It is the acquaintance and mastery over the process of knowledge getting what matters much for the proper development of the individual. For this purpose, a theory of instruction, according to Bruner, should take into account the following things:
 - i. Nature of individual children.
 - ii. Nature of the knowledge to be received by the children.
 - iii. Nature of the knowledge-getting process.
6. Children should not be made to repeat, reproduce and present the ideas, concepts and principles, but should be encouraged to learn on their own and discover things by themselves. For this purpose, they should be given proper opportunities for their own active involvement in the knowledge-getting process. Emphasising this, Bruner (1966: 72) writes, *We teach a subject not to produce little living libraries on that subject, but rather to get a student to think ... for himself, to consider matters as a historian does, to take part into process of knowledge getting. Knowledge*

is a process, not a product.

For giving such ideas a practical shape, Bruner advocated the use of discovery learning in his cognitive theory of instruction. By this approach he wanted the students to learn through their own active involvement in the process of learning, to develop their independent problem solving skills, to analyse and manipulate information rather than to simply absorb it and to engage in the task of discovering or rediscovering and understanding the things by themselves.

7. According to Bruner, teachers should keep in mind such a theory of instruction which helps them achieve both the goals of knowledge and knowledge-getting process, simultaneously. For this purpose, he advised them to cover the following four major aspects in their process of instruction:

Predisposition to learn: Before starting the process of teaching, the teacher should make all attempts to make the child willing and able to learn what he is going to experience through the given instruction.

Structuring the knowledge: Learning experiences to be given or contents to be taught should be so effectively structured that these enable the students to grasp and relate the knowledge as effectively as possible. It is difficult to teach everything about anything to the students; it is, therefore, necessary to make the students understand the basic generalised set of basic ideas or principle to be used in both present and future learning situations. Bruner used the term *coding* for such generalisation. For improving their instruction, the teachers should try to seek the best coding system which may help them in teaching the subject material in a way that ensure maximum opportunities to generalise. A code built upon generalisation will thus help their students for a full grasp and comprehension of the subject.

Sequencing of the presented material: A teacher should take care of proper and effective sequencing of the subject matter and learning

experiences to be given to his students. Since learning follows the sequence of enactive, iconic and symbolic representation of reality, the subject matter should be tailored and sequenced according to the sequence and order of these modes of representation. Moreover, the presented material should match the needs of the growing mind at their respective age levels. In this way, the theory of instruction put forward by Bruner emphasises first to convert knowledge into a specific structure within the grasp of the students of various ages and then to sequence this structured material into a proper form fitting well with their existing modes of representation.

Providing due reinforcement: According to Bruner's theory of instruction, teachers should pay due consideration to the mechanism of proper reinforcement in the process of instruction. In doing so, more emphasis should be paid to the intrinsic reinforcement, i.e. the internal satisfaction and self reward. The so used measures of extrinsic reinforcement, especially in the form of rewards and punishments adversely affect the students' attempt of self-learning and independent problem solving. When reward and extrinsic motivation tends to increase the chances of repetition of the same kind of behaviour, the punishment, on the other hand, leads to the disruption of the behaviour rather than providing an instrument for its correction.

With all these views, Bruner termed his theory of instruction, *descriptive or prescriptive as well as normative; prescriptive or descriptive* in the sense that it tries to prescribe or describe rules and normative in the sense that it sets the norms before the teachers in the form of necessary teaching-learning conditions for achieving the desired teaching objectives. Bruner was a cognitive psychologist. He concentrated on devising ways and means in his theory of instruction for the development of cognitive abilities of children by emphasising on independent problem solving and discovery learning. The major points or guidelines suggested in his theory of instruction and discovery approach may be summarised as follow:

1. Try to make the best use of the students' natural interest and instinct of curiosity.

2. Encourage students to think and learn independently. Instead of giving them reading material, let them discover or rediscover it through their own efforts.
3. Set the learning situations or conditions in such a way that (i) arouses children's curiosity and motivation, (ii) minimises the risk of failure, and (iii) remains as relevant as possible for the attainment of teaching–learning objectives.
4. Never resort to spoon-feeding. Discourage the students for resorting to mechanical practice, repetition and reproduction of ideas. Their level of cognitive abilities and modes of representation of reality should be given due consideration while providing them any piece of instruction.
5. Help the students in the proper identification and categorisation of objects and events in a particular and generalised way. Take help of a suitable model like concept attainment model (invented by Bruner himself) for the proper concept formation in children.
6. Try to help the students to learn the ways to acquire knowledge and thus get them acquainted with the knowledge-getting process besides acquiring useful and relevant knowledge.
7. Arrange the learning material into a proper structure and sequence it properly for its adequate grasping and understanding on the part of students.
8. Properly reinforce the learning behaviour of the students by concentrating on the measures of suitable intrinsic motivation or self-reward.

Normative Theories of Teaching

Like animal learning, human learning cannot take place under rigidly controlled conditions. We usually have normal conditions and set-up for our teaching–learning activities. Therefore, there is a great need of theories which can explain, guide and control the variables involved in the process of teaching under normal classroom conditions. Normative theories serve such purpose. These theories properly throw light on the relationship among the teaching variables

on the basis of observations carried out in normal teaching conditions. They set out the norms for the teaching–learning conditions best suited for achieving the desired teaching–learning objectives. The findings of these theories are applicable for more generalised set of situations or conditions available in a normal classroom set-up. The following four theories may be classified as normative theories:

1. Gage’s cognitive theory of teaching.
2. Ryan’s theory of teacher behaviour.
3. Mitra’s psychological theory of teaching.
4. Clarke’s general theory of teaching.

Let us discuss these theories one by one.

Gage’s cognitive theory of teaching

N.L. Gage’s theory of teaching is influenced by the ideas propagated by the school of cognitive psychology. Cognitive psychology does not allow the teacher to resort to simple stimulus-responses (S-R) mechanism or habit formation but asks them to make use of the principles of cognitive learning such as meaningful organisation of the perceptual field, information processing, independent problem solving, etc. for utilising the cognitive abilities of the learners to the maximum. The views expressed in Gage’s theory of teaching may be summarised as follows:

1. Teaching task is mainly concerned with helping the students in proper comprehension or meaningful learning of the content material.
2. They can have proper comprehension if this content material is organised, arranged and presented in a proper way by following the principles of cognitive learning. The programmed learning material can be cited as an example of such well-structured and organised material.
3. Teaching task consists of many activities that needs to be planned and organised according to the available situations

and circumstances given as follows:

- i. The type of role to be played by the teacher such as philosopher, motivator, counselor, demonstrator, supervisor, etc.
- ii. The type of educational objectives to be achieved.
- iii. The type of learning in which the learner is to be engaged just in motor learning, concept learning, problem solving, etc.
- iv. The type of the stage or components of learning such as preparing students to learn, sustaining their attention and interest, helping in proper comprehension, reinforcing their learning or evaluating their learning outcomes.

Ryan's theory of teacher behaviour

D.G. Ryan put forward a theory of learning based on the concept of teacher behaviour. According to it, teaching is greatly influenced by the verbal and non-verbal behaviour of the teacher demonstrated by him in the classroom in order to induce learning. Therefore, the improvement in teaching and classroom instruction is dependent on the quality of the teacher behaviour demonstrated by the teacher in the classroom activities. There are certain basic assumptions attached with the teacher behaviour as follows:

1. Teacher behaviour is a function of a situational factors present at the time of teaching and personal characteristics of the individual teacher.
2. Teacher behaviour is observable and thus can be measured in terms of desirable or undesirable behaviour for the purpose of a good teaching.

Based on these assumptions, the theory of teacher behaviour emphasises as follows for bringing improvement in the teaching process:

1. The teaching–learning conditions must be designed to help

the teachers in maintaining proper teacher behaviour.

2. The teachers must pay due attention for picking up the desirable behaviour and personal characteristics helpful in good teaching and appropriate classroom interaction.
3. Since teacher behaviour is observable and can be measured to a reliable extent, good technique of its observation and measurement like Flanders' *interaction analysis* may be practised for providing *pre-service* and *in-service* training to the teacher. Teachers may also adopt these techniques for their self-evaluation resulting in the improvement of their verbal and non-verbal behaviour.

Mitra's psychological theory of teaching

This theory put forward by Sahib K. Mitra, a former Director of NCERT, is an attempt to apply the psychological principles in the field of teaching. The main ideas propagated by this theory can be summarised as follows:

1. Teaching needs to be restricted to the formalised instructional situation. However, it may take place in and outside the classroom and school.
2. For teaching to take place, there must be at least two persons, one the teacher and the other the student. These two persons need to be bound by a contractual relationship. The teacher has a responsibility of influencing the behaviour of the taught or pupil in order to lead him from his entry behaviour to the set terminal behaviour.
3. Teacher should formulate his teaching task based upon his knowledge of the psychological principles related to the psychology of individual differences, learning, intelligence, personality, aptitude and achievement. The teaching task so formulated may include activities like (i) analysing teaching task, (ii) identifying entry behaviour of the pupils, (iii) defining teaching objectives, and (iv) selecting teaching strategies.

Clarke's general theory of teaching

This theory has been propagated by S.C.T. Clarke (1970). It is termed as the *general theory of teaching* due to its very general nature outlined as follows:

1. It considers teaching as a generalised phenomenon or process instead of specific ones.
2. It takes into account the teaching–learning situation, in general, common to all types of learning.
3. The principles in this theory are generally applicable to all types of teaching carried out at different stages for attaining general teaching objectives.
4. It gives due significance to all the variables, in general, involved at different levels in the process of teaching.
5. It talks about the general strategies adopted by a common teacher to deal with all types of learners in varied teaching–learning situations.

The views expressed by Clarke in his general theory of teaching can be summarised in three different heads, namely (i) concept of teaching, (ii) variables of teaching, and (iii) levels of teaching. Let us discuss these heads.

Concept of teaching: Clark's theory of teaching considers teaching as a general phenomenon rather than a specialised one. According to it, teaching refers to activities (general in nature) that are designed and performed to produce change in student's behaviour.

Variables of teaching: According to Clarke's theory, teaching process, in general, involves the following three types of variables:

1. Independent variable: The teacher
2. Dependent variable: The learner
3. Intervening variables: The teaching–learning situations, curriculum, teaching aids, strategies, evaluation devices, etc.

Levels of teaching: This theory mentions following three levels in a process of teaching:

1. *Level one:* It sets the stage for starting the act of actual teaching.
2. *Level two:* The stage of actual, and active teaching.
3. *Level three:* The stage of appraisal and evaluation of the product and process of teaching.

Besides mentioning these levels, Clarke's general theory of teaching provides the following rules and principles to be observed for carrying out a number of activities at the different levels.

Principles to be observed at the level one: According to , a teacher has to keep in mind the following principles for creating necessary conditions to initiate the process of teaching:

1. Proper opportunity must be provided for the communication between teacher and students and among students.
2. Attempt should be made for developing such teacher-pupil relationship that may induce better learning.
3. While teaching a group of students, care should be taken to build up a social environment helpful in-better learning.
4. Teacher must ensure that the students are sufficiently motivated to learn.
5. The teacher must also ensure that the students are quite active in the process of teaching–learning.

Principles to be observed at the level two: Level two represents the stage of action and is related with actual teaching and learning. Clarke's general theory of teaching provides the following broad guiding principles to be observed by the teacher:

Teacher must make use of such appropriate teaching strategies that are common with

1. the needs and characteristics of the learners,

2. the learning theories, and
3. the specific curricular objectives.

Principles to be observed at the level three: Teaching activities at level three are related with the reinforcement and evaluation of the activities carried out at level two. Clarke's teaching theory provides the following guiding principles to the teachers at this level:

1. Teacher must have a proper assessment and evaluation of students' progress in terms of the realisation of set objectives.
2. Based on this assessment and evaluation, he must accordingly plan for re-teaching, modifying and substituting the teaching strategies, bringing modification and alternations in the teaching objectives, etc.
3. For proper evaluation the teacher must take care of the definiteness of the instructional objectives. Each of these objectives should be stated in definite behavioural terms incorporating the minimum level of performance demonstrated by the pupil at the end of the teaching activity.
4. Student must be able to get proper feedback from the results of such assessment and evaluation.

Conclusion about different theories of teaching

The different types of theories put forward by various thinkers and educationists described here, may persuade us to think that each of these theories try to explain the nature of teaching and point out the various measures helpful in better teaching and instruction in their own ways. They have their own strengths and weaknesses as a theory of teaching. None of these can be called absolute and comprehensive either in explaining the nature of teaching or describing the necessary teaching activities for the purpose of effective instruction. To speak the truth, there exists no theory of teaching as such. What is available in the form of teaching theory are only models or paradigms of teaching. At the best, these are

able to present the different styles of teaching activities carried out in an instructional procedure or may point out the effect of teaching-learning situations or teacher behaviour on the learning of the students. There is still dearth of a comprehensive, objectively-based scientific theory to explain all what we need in understanding the nature of teaching, role of the teaching variables and overall improvement in the process and products of teaching.

SUMMARY

1. A *theory of teaching* can be described as the application of knowledge and understanding of the theories of psychology for improving classroom practices and the teaching skills and behaviour of a teacher. It describes, justifies, explains and suggests the most appropriate way of managing teaching in terms of its planning, organisation, leading, control and prediction. It is much more than a theory of learning. While a learning theory is limited to describing and explaining the nature and process of learning, a teaching theory while dealing with the task of teaching prescribes all what is needed for effective learning.
2. A theory of teaching is needed by the teacher for accomplishing his task of teaching properly and effectively in the same way as some theoretical knowledge and understanding is always needed on the part of a person who has been entrusted with the task of building a bridge or a highway. Theory gives a better insight and understanding for the men in action for accomplishing his work in a more appropriate way and it is equally true for the teachers who need the help of a teaching theory for managing their teaching task as effectively as possible.
3. The scope of a teaching theory covers the whole range of teaching–learning process, e.g. the variables involved in this process, their interaction and impact on the student's learning, teacher behaviour in relation to students' behaviour and management of the teaching tasks or activities. Since the range of teaching–learning process is an expanded phenomenon as new things are always emerging in the field of instruction and education, we have to give way for the new facts, ideas and principles in the body of a teaching theory. Hence, it is quite desirable for having the boundaries of a teaching theory open for meeting the requirements of the constant changes and trends emerging in the fields of teaching tasks and teacher behaviour.

4. A number of teaching theories developed by educationists and psychologists are available. A teacher can select any of these theories for planning and organising their teaching in their own ways as required in a particular teaching–learning situation. These theories may be broadly classified into three groups, namely formal theories of teaching, descriptive theories of teaching and normative theories of teaching.
5. Formal theories of teaching present certain specific principles of thought, science of knowledge and philosophical assumptions before the teachers which they can observe formally in their task of teaching and teacher behaviour. As examples of these theories we may name the theories like *Maieutic theory of teaching*, *communication theory of teaching*, *moulding theory of teaching* and *mutual inquiry theory of teaching*. *Maieutic theory of teaching* is the earliest philosophical theory advocating that all knowledge rests within the individual child and the task of teaching is to unfold this knowledge. Contrary to *Maieutic theory*, *communication theory of teaching* believes that the child has nothing with him like forgotten knowledge or inherent capacities that needs to be reproduced or unfolded through teaching. It is not the child but the teacher who is preoccupied with knowledge and it is the duty of the teacher to communicate the needed knowledge to the student at the time of teaching. *Moulding theory of teaching* considers teaching as a process of behaviour modification or a way of shaping and moulding the students' behaviour and personality in a desired pattern. According to the *mutual inquiry theory*, teaching is to be regarded as a cooperative enterprise in which both the learner and teacher try to engage in the process of inquiry and investigation for the realisation of the desired instructional objectives.
6. Descriptive theory of teaching are those theories of teaching that describe the variables involved in the process of teaching in terms of their interrelationships and predicted effectiveness. As examples of these theories, we may name the theories like *Gagne's hierarchical theory of instruction*,

Atkinson's optimal learning theory of instruction and *Bruner's cognitive theory of instruction*. Gagne's *hierarchical theory of instruction* provides an organised hierarchical structure for the instructional process carried out by a teacher in the classroom by leading his students through a series of instructional events that may be properly associated with learning events and conditions essential for learning. *Atkinson's optimal learning theory of instruction* helps a teacher in leading his students to optimal learning by chalking out an appropriate model of teaching–learning process for the attainment of the specified teaching–learning objectives. *Bruner's cognitive theory of instruction* advocated the use of discovery learning for helping the students to learn the way of acquiring knowledge and thus get acquainted with the knowledge getting process, besides acquiring simultaneously a useful and relevant fund of knowledge related to a particular piece of instruction.

7. Normative theories of teaching are those theories that can explain, guide and control the variables involved in the process of teaching under normal classroom conditions. As examples of these theories, we may cite the name of *Gage's cognitive theory of teaching*, *Ryan's theory of teacher behaviour*, *Mitra's psychological theory of teaching* and *Clarke's general theory of teaching*. *Gage's cognitive theory of teaching* emphasises the use of the principles of cognitive learning such as meaningful organisation of the perceptual field, information processing, independent problem solving, etc. for utilising the cognitive abilities of the learners to the maximum. *Ryan's theory of teacher behaviour* emphasises on bringing qualitative improvement in the teacher's behaviour (both verbal and non-verbal) demonstrated by him in the classroom in order to produce better outcomes of the classroom teaching. *Mitra's psychological theory of teaching* attempts to apply the psychological principles for influencing students' behaviour in order to lead them properly from their entry behaviour to the desired terminal behaviour. *Clarke's general theory of teaching* considers teaching as a general

phenomenon rather than a specialised one. According to it, teaching refers to activities (certainly general in nature) that are designed and performed by a teacher to produce desired changes in student's behaviour.

8. All the teaching theories, put forward by their respective propagators, try to explain in their own ways the nature of teaching and the measures helpful in carrying out the task of teaching. None of these theories may work well in a generalised way in all the teaching–learning situations. Therefore, a teacher, while proceeding on his path of teaching, should try to incorporate the essence of all these teaching theories in his teaching depending on the requirements of the teaching–learning situations he faces at that time.

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Teaching Strategies

WHAT ARE TEACHING STRATEGIES?

The term teaching strategy in its simple meaning stands for the type of strategy used by teacher or trainer in carrying out his teaching or instructional work. The word *strategy*, in its etymological derivation, owes its origin from a Greek word *Strategia* and may be defined as plan and specific ways devised and employed for the realisation of a goal. Strategy, as a term is quite in vogue in military science and warfare. Here it stands well for the effective plans, means and ways derived and employed for winning a war. A chess player may also be said to employ effective strategies for winning his game. In the same way a teacher, trainer or instructor may also need the use of strategies for carrying out his task of teaching and training as effectively as possible. The term *teaching* as popularly known, stands for a purposeful activity performed by the teacher for guiding, directing, and showing the right path to the learners in their pursuit for the realisation of the set teaching–learning objectives.

Thinking in this way, we may now be in a position to view the term *teaching strategy* in the following words:

Teaching strategies may stand for the plans, means and specific ways especially devised and employed by the teachers for guiding, directing and showing path to the learners for the realisation of the set instructional or teaching–learning objectives.

A similar meaning for the term *teaching strategies* has also been attributed by the famous writers E. Stones and S. Morris (1972) in their book *Teaching Practice: Problems and Perspectives*.

They write, *Teaching strategy is a generalised plan for a lesson which includes structure, desired learner behaviour in terms of goals of instruction and an outline of planned tactics necessary to implement the strategy.*

SPECIAL FEATURES AND CHARACTERISTICS

Based on the discussion on the meaning of the term *teaching strategies*, we can draw the following conclusions about the special features, characteristics and nature of teaching strategies:

1. Teaching strategy stands for a generalised plan, ways and means for carrying out the task of teaching, i.e. more specifically for teaching a particular lesson.
2. Teaching work/lesson is directed towards the realisation of the set teaching–learning objectives.
3. Teaching strategy is devised and employed to help the learners in the realisation of the set teaching–learning objectives.
4. Teaching strategy brings out a scheme, some programme or teaching–learning structure, which, if followed, may help in the better realisation of the set teaching–learning objectives.
5. The strategy requires a number of well-planned tactics for its effective implement-ation. In other words, teaching tactics are the essential components of a teaching strategy.
6. The teaching–learning structure set through a teaching strategy may be well represented through Figure 19.1 shown below:

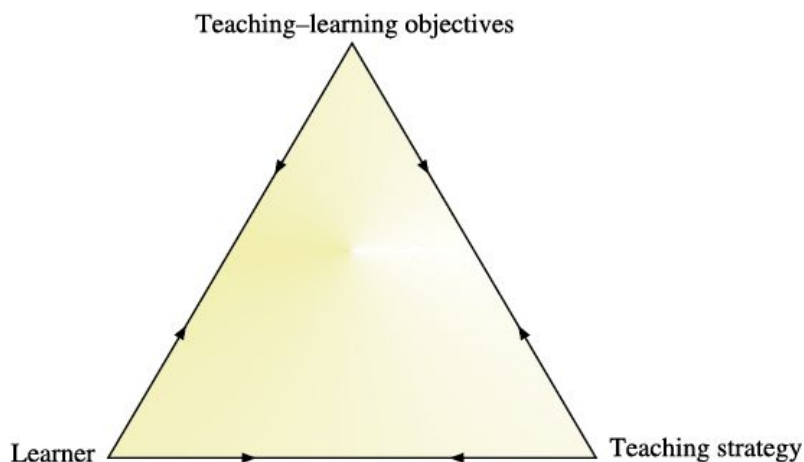


Figure 19.1 Teaching–learning structure and teaching strategy.

The diagram in Figure 19.1 representing teaching–learning structure may reveal the following facts:

- A teaching strategy is devised and employed for enabling the learner to realise the set teaching–learning objectives.
- A teaching strategy is always devised and employed in the light of the needs, interests and abilities of the learner, the facilities and learning environment available to the learner for carrying out his efforts for learning and the prefixed learning objectives.
- Teaching strategy remains open for further modification and improvement in the light of the feedback received from the learner.
- Teaching–learning objectives make central point and goal of the teaching–learning structure. These also are dynamic and not static, we can bring desirable modification in the objectives in the light of the feedback received from the learners, teaching–learning environment, and teaching strategies.

DISTINGUISHING TEACHING STRATEGIES FROM TEACHING METHODS

We are familiar with the term *teaching method* as we make use of different methods like *lecture method*, *demonstration method*, *inductive method*, *deductive method*, *heuristic method*, *problem-solving method*, and *project method* in our presentation of the subject matter to the students. Any method that we use is always selected and directed to serve our purpose of presenting the subject material as effectively as possible. Any method we use, thus, reflects a particular mode of presentation of some specific contents of a curricular subject. Strategy, on the contrary, is selected not only for the effective presentation of some specific subject material but also for the realisation of the predetermined teaching–learning objectives. In this way, strategy, as a term, is more comprehensive in its scope as well as structure in comparison to a method. The distinction between the two can be summarised as shown in Table 19.1.

Table 19.1 Difference between Teaching Method and Teaching Strategy

Teaching method	Teaching strategy
1. A teaching method stands for the effective presentation of the specific contents of a subject in such a way as may be properly grasped and understood by students.	A teaching strategy stands for the creation of appropriate teaching–learning environment leading to help the students in the realisation of the set teaching–learning objectives.
2. The term <i>method</i> , relatively an old term, is related with pedagogy.	The term <i>strategy</i> is relatively a new term belonging to military science and educational technology.
3. The nature of the subject matter decides the selection of a method for carrying out teaching task.	The nature of the teaching–learning objectives is the deciding factor for the selection of a suitable teaching strategy.
4. A teaching method is based on the assumption that teaching is an art.	A teaching strategy assumes that teaching is science and quite technical in nature.
5. The effectiveness of a teaching method is evaluated in terms of mastery over the subject matter by using achievement tests.	The effectiveness of a teaching strategy is evaluated in terms of the realisation of the set objectives by using criterion-referenced tests.
6. In a teaching method, emphasis is laid over the teaching steps taken for the proper presentation of the subject matter.	In teaching strategy, emphasis is laid over teaching activities for the proper organisation of teaching–learning environment.
7. The steps taken in <i>teaching methods</i> are quite rigid and fixed. Generally, it is quite	<i>Teaching strategy</i> is quite flexible in its application. It is always subjected to modification in the interest of the best

difficult to bring changes in the style and steps represented by a method.	realisation of the set objectives in the present circumstances.
8. A teaching, method may make use of teaching techniques and aid-material for its effective implementation.	In this regard, a teaching strategy is more comprehensive as it may make use of different methods, techniques, aids and equipment, and tactics for organising the teaching-learning activities and environment in an effective way.

The distinction made between these two terms sometimes get quite narrower as both serve as the means and tools for carrying out the task of teaching as effectively as possible. That is why, we have many common names included in both the categories such as lecture, demonstration, question-answer, problem-solving, heuristic, project, etc. However, the line of demarcation is quite clear. All of these may be referred to as strategies when utilised as a means for the realisation of the well-defined objectives. However, when their field of application or role is limited only to the presentation of the subject matter and they serve only as a mode for such presentation, these are referred to as methods and not strategies.

DISTINGUISHING TEACHING STRATEGIES FROM TEACHING TACTICS

We employ a number of tactics for the effective implementation of a teaching strategy in the same way as we employ appropriate teaching techniques and teaching aids for the effective implementation of a teaching method. Teaching tactics as a term have been very comprehensively defined by E. Stones and S. Morris (1972) in the following words:

Teaching tactics are goal linked, influenced or influencing behaviour of the teacher, the way he behaves in the instructional situation in working towards the development of the strategy; units of teaching behaviour through which the teacher fulfils his various instructional roles with the students of his class from moment to moment; the components of teaching behaviour through which the teacher, the students and subject-matter interact.

The analysis of the above definition may reveal the meaning and nature of tactics in the following ways:

- Teaching tactics represent those behaviours or activities of a teacher which he works out and uses for the development of a particular *teaching strategy*.
- Teaching tactics may be taken as fundamental or basic units of teacher behaviour helpful in creating suitable learning structure for the realisation of the set teaching-learning objectives.
- Teaching tactics help the teacher for playing various instructional roles from time to time in connection with the implementation of a teaching strategy.
- Teaching tactics may include all those activities and teaching behaviours—verbal or non-verbal—which may be helpful in making a healthy triangular interaction among the teacher, taught and the subject-matter.
- Teaching tactics help is the creation of appropriate learning structure for enabling the learner to achieve the determined learning objectives.

On the basis of the above analysis we can differentiate between the term *teaching strategy* and *teaching tactics* shown in the Table 19.2.

Table 19.2 Difference between Teaching Strategy and Teaching Tactics

<i>Teaching strategy</i>	<i>Teaching tactics</i>
1. <i>Teaching strategy</i> is always goal directed and the goal is the realisation of the set teaching–learning objectives.	1. <i>Teaching tactics</i> represent those activities and behaviour of the teacher which help in devising and implementing a suitable strategy for the realisation of the set objectives.
2. <i>Teaching strategy</i> includes the activities both on the part of learners and the teacher for creating appropriate teaching–learning environment for the realisation of the objectives.	2. <i>Teaching tactics</i> are concerned only with the behaviours and activities of the teacher responsible for creating suitable learning structure.
3. Teaching objectives and task analysis are quite fundamental to a teaching strategy.	3. Creation of an appropriate learning structure is a central theme for teaching tactics.
4. <i>Teaching strategy</i> is a quite comprehensive term in comparison to teaching tactics. It includes all what may be available with the teacher in fulfilling his task of teaching, i.e. realisation of the set teaching–learning objectives. In this way, a teaching strategy may be seen to include teaching methods, teaching techniques, teaching aid material and teaching tactics, etc., for framing such a broad teaching–learning structure as to help the learner in the realisation of the set objectives.	4. <i>Teaching tactics</i> is quite a small and limited term in comparison to the teaching strategy. It is in fact a small segment, component or a limit of the teacher behaviour helpful to him for the realisation of his teaching objectives.

THE TYPES OF TEACHING STRATEGIES

Teachers may use different types of teaching strategies in different teaching–learning situations for the effective realisation of their teaching objectives. These strategies may be broadly classified as autocratic teaching strategies (content centered and teacher dominated) and democratic teaching strategies (student centered and democratically organised) as below:

	<i>Autocratic strategies</i>		<i>Democratic strategies</i>
1.	Lecture strategy	1.	Group discussion strategy
2.	Demonstration strategy	2.	Question–Answer strategy
3.	Tutorial strategy	3.	Discovery or heuristic strategy
4.	Narration strategy	4.	Problem-solving strategy
5.	Description strategy	5.	Project strategy
6.	Explanation strategy	6.	Independent study strategy
7.	Illustration strategy	7.	Home work or assignment strategy
8.	Programmed instruction strategy	8.	Drill or practice work strategy
9.	Role-playing strategy	9.	Excursion strategy
		10.	Strategy of employing A.V. aid
		11.	Brain storming strategy.
		12.	Sensitivity training strategy
		13.	Computer-assisted instruction strategy

Let us try to know in detail about some of the above-mentioned autocratic and democratic teaching strategies.

Lecture Strategy

Lecture as a method and strategy is the oldest one that has been used by the teachers to teach almost all the subjects of the curriculum at all grade levels. It belongs to the category of *autocratic strategy* as teacher here, plays virtually the role of a monarch and autocrat controlling each and every function of the classroom teaching. In its simple meaning this strategy may be defined as *a mode or planned scheme devised and employed by the teacher for presenting a segment or unit of the desired content material of a*

subject to a group of learners through lecturing (verbal communication of ideas) aiming to attain specific teaching–learning objectives related particularly to the cognitive and affective domains of the learner’s behaviour.

Advantage: Lecture as a teaching strategy has the following credit points on its side:

1. Lecture strategy provides a quite long rope to the teacher for controlling and monitoring the teaching–learning activities of the classroom by remaining a central point of the teaching–learning process. He has ample opportunity and scope for keeping all the students of his class before his eyes and thus enabling himself to manage and control the classroom activities according to his wish.
2. Lecture strategy can help not only to realise the lower cognitive objectives like information and development of understanding but also to attain higher cognitive objectives like development of power of analysis, synthesis, evaluation, reflective thinking, etc.
3. Lecture strategy provides a cheapest means for the formal education system. A lecturer with a very limited resources at his command can teach a number of students at a time involving least financial commitment on the part of an institution.
4. Lecture strategy proves a quite flexible teaching strategy as it can help the teacher to plan and mould his teaching according to the needs of the subject-matter, interests and levels of the students, time-limit and teaching–learning environment available in a very short notice.
5. Lecture strategy proves quite economical in terms of saving time and energy of the teacher. One can teach a large number of students at a time and cover a wide area of content material and many other aspects of the curriculum in the limited time of the class period and days of the session.
6. Lecture strategy may help in maintaining a proper channel

of motivation, enthusiasm and interest in the classroom. While teacher may get reinforcement from the students when he finds that students are listening and caring for his communication, the students also get motivated and reinforced through the verbal and non-verbal behaviour of the teacher in the form of praise, gestures and postures, movement, will power and sense of humour, etc.

7. Lecture strategy helps in following logical sequence in teaching as facts and information get pre-organised. One can proceed from ideas to ideas, concepts to concepts in a chained sequence by organising the subject-matter at his command.
8. Lecture strategy may prove an ideal source of inspiration and personal touch. A lecturer may leave quite lasting impression on the listeners not only through his inspired talk but his behaviour and personality also communicate well for bringing changes in the affective behaviour of the students.

Shortcomings and limitations

Lecture as a teaching strategy is attacked and condemned due to its following limitations and drawbacks:

1. Lecture strategy centres round the content or subject-matter. Here, the presentation of the subject-matter is the main task. The teachers usually provide the crammed stock of information to the students without caring for the attainment of specific teaching–learning objectives.
2. Lecture strategy pays little or almost no attention to the needs, interests and abilities of the students. Here subject-matter is more important than the students. With a sole purpose of finishing the courses in time, teachers pour the content material through uninteresting and lengthy verbal communication.
3. Lecture strategy makes the teaching–learning process totally a one-sided affair. Here the teacher talks and

students listen or are made to sit before the teacher with or without their attention and interest. In this way, this strategy leaves almost no scope for the activities or participation on the part of students. They usually remain silent spectators and passive listeners ready to bear the consequences of a boring lecture.

4. Lecture strategy in its present form has no place for any practical activity, observation, experimentation and demonstration, etc. Therefore, it is not suitable to teach many subject areas needing practical understanding and application of the facts and principles as well as development of practical skills, and psycho-motor abilities.
5. Verbal communication is successful only when it is understood and grasped by the listeners with the same speed. The youngsters in the lower classes do not happen to have attained such maturity of mind as well as mastery over the oral communication. Therefore, lecture method remain a failure with the students of lower classes.
6. Lecture strategy is a group strategy of verbal communication. There is no scope of meeting the requirements of individual learners in this type of teaching.
7. Lecturing always leaves gaps in understanding. What a teacher says is not conveyed or understood by the students in the required form. It may prove costly as the students may pick up incomplete and wrong information or develop many misconceptions about the contents of the subject.
8. Lecture strategy provides full freedom to the teachers to speak at their will. They are in the habit of over speaking and in many cases they usually drift away from the real teaching issues. Beating about the bush or irrelevant talking may result into unnecessary wastage of the classroom time costing dearly to the students.
9. All teachers are not good speakers. They also lack in preparation as well as depth and knowledge of the delivered lecture. Some are in the habit of providing very routine and crammed knowledge through their lecture providing no attraction to the students for listening to it. In

this way, the class period becomes too tired, boring and uninteresting giving birth to so many disciplinary or behavioural problems and leading to develop a distaste and hatredness towards the subject and the teacher.

10. Lecture strategy is not at all helpful in organising the teaching–learning act as the reflective level. We cannot expect the development of proper reasoning and thinking power, power of observation, discrimination, creative thinking, and problem-solving behaviours, etc., with the use of this strategy. Even understanding objective may also not be realised with the help of this strategy. It may thus meet the need of organising teaching–learning on a very low level, i.e. memory level.

With the shortcomings and limitations listed above for the lecture strategy, we should not presume that lecture strategy is quite absurd and we should not make its use in our teaching. It is true that it may not be suitable for certain subjects and teaching–learning situations. But on the other hand it is also true that it proves quite effective in many other situations like (i) to introduce and explain new concepts, (ii) to build larger logical structures through smaller units of information, (iii) to provide further insight with the already presented concepts, (iv) to expand the knowledge and understanding span of the students, (v) to review and summarise the content material, etc. Moreover the limitation of providing information or fulfilling limited cognitive objectives on the part of lecture strategy does not arise due to the defects and drawbacks of this strategy. It is the result of the lack of proper knowledge of the subject-matter, understanding and required skills on the part of its users. Let us try to improve the present state of affairs by taking care of the following things at the different stages of teaching–learning process.

Suggestion for bringing desirable improvement in lecture strategy

Planning stage: At this stage the users of lecture strategy need to care for the following:

1. The purpose or goal of the lecture strategy should be properly identified. What do you want to communicate? The type of information, knowledge, understanding or reflective thinking, etc. you want to develop among your students should be very clear to you before planning for the use of *lecture strategy*.
2. The nature of the learners along with their learning potential should be properly identified. It will definitely help you in taking proper decision about the contents of your lecture as well as mode of its delivery.
3. Try to acquire sufficient mastery over the subject-matter and contents going to be delivered in the classroom through your lecture. It will make your task easier by providing necessary confidence and understanding about the subject-matter.
4. Consult useful reference books, current journals and books other than the prescribed textbooks for preparing your lecture notes. Try to give the students something extra and useful not provided in their textbooks.
5. Plan and develop your lecture by identifying a few key concepts. Choose the appropriate language. Try to prepare notes for highlighting the key concepts, sub-concepts or points to be clarified during your lecture. Try to work out for the appropriate examples and illustration, etc. to be used for presenting the various concepts.
6. Have in your mind the total teaching–learning environment (the physical set-up of the class, available resources, social and cultural environment of the students, etc.) available to you for the proper planning of your lecture.
7. In support of your lecturing, you may need to apply various tactics and techniques like question-answer, demonstration, use of blackboard, use of proper display material and A.V. aids, etc. Try to have proper preparation for their effective use at the right time.
8. Try to think properly for the measures you will employ for creating and maintaining interest and enthusiasm in your

lecture.

Presentation stage: This stage requires the following considerations:

1. Try to motivate your students for attending to your lecture not only in the beginning but to maintain it throughout. It needs careful attention and deliberate efforts on the part of a teacher. His lecture should not lose strings at any time. The students should never be allowed to feel bored or fatigued. They should also neither be frustrated nor be left unchallenged.
2. Always show your enthusiasm for the teaching and keep your students fresh and enthusiastic about your teaching.
3. See that the subject-matter, style and language of the lecture should be quite communicable from the angle of the students. What is interesting and suitable to the students from the angle of the mental level and previously acquired knowledge in the subject should always be kept in mind.
4. Mind that the success of lecture strategy depends on the effectiveness of your communication skill—verbal or non-verbal. For this purpose take special care of the following:
 - i. Try to exercise reasonable control over your voice. It should neither be too low nor be too shouting. Each and every student of the class should be able to listen to your lecture. If needed, the help of the audio devices like microphone may be taken for making your voice listened.
 - ii. Try to introduce humour for reinforcing ideas and concepts by providing interesting examples and illustrations.
 - iii. Try to make use of the skill of *stimulus variation* by introducing the elements like pausing, changing voice tone, using gestures and physical movements, adopting multi-media approach, etc.
5. Try to care for the proper organisation and sequencing of

the presented subject-matter. Always try to provide it in meaningful small units or steps focussing on a single concept or line of thought.

6. Try to make your presentation as interesting and understandable to the students as possible. You may make use of other strategies, tactics and techniques like narration, exposition, description, explanation, illustration, demonstration, making use of A.V. aids, etc. for this purpose.
7. In order to compensate the limitation of the lecture as a teaching strategy, it is better not to confine to mere lecturing but to use this strategy with suitable variations in the shape of lecture-cum-demonstration strategy, lecture-cum-blackboard strategy, lecture-cum-question-answer strategy, etc.
8. Try to avoid turning your face from the learners in the class even on the occasions like writing on the blackboard, showing maps and charts, etc. Try to attend to every student of your class by maintaining eye contact with them.
9. Do not waste your time in irrelevant facts and unnecessary detailed explanations. Be relevant, exact and to the point. However, do not miss any important idea or thing by making hurry.
10. Do not turn your lecturing into mere paper reading or notes dictating task. It does not only expose your weakness as a teacher but also proves boring for the students.
11. Do not make your teaching through lecturing, a one sided affair. Always encourage and involve the students for participating actively in the process of teaching–learning.
12. Try to summarise the key points of the presented material at the end of your lecture. It can be done orally as well as in the form of writing on the blackboard, using overhead projector, display charts or making the students summarise them.

Evaluation stage: This stage comes not necessarily at the end of the lesson. A teacher may evaluate the outcomes of his lecturing any time during his lecture as and when he feels the need for doing so. It is quite essential for monitoring the progress of his teaching and exercise desirable control over the learning of his students. For getting desired success in this task, the teacher must try to pay attention to the following:

1. He must always keep in mind the goals and objectives of his teaching and evaluate his teaching outcomes in the light of the realisation of the set objectives.
2. At the end of the coverage of a particular unit or segment of the content and before proceeding to the next point in his lecture he must try to evaluate the students' understanding of the presented material.
3. He must try to monitor, control and evaluate the progress of his teaching by maintaining a proper flow of question-answer.
4. The evaluation task, at the end of the lesson or in mid-course, may be performed either orally or by presenting response sheet, questionnaire or a pro forma to be filled in by the students.
5. Besides evaluation of the students' learning, attempts should also be made to assess the effectiveness of the lecture strategy by seeking opinion of the students through questionnaire or rating scale, etc. This task can also be entrusted to any fellow teacher who may sit in the class and give his opinion about the strength and weak points of the lecture. A teacher himself may have self-evaluation about the effectiveness of his teaching through the adoption of lecture strategy. The results of such evaluation should be properly utilised for providing appropriate feedback to improve the processes and products of lecturing as a teaching strategy.

In this way if we keep in mind the above-mentioned suggestions for the improvement of the lecture strategy at the different stages of teaching, we can surely improve the effectiveness of lecturing as a teaching strategy.

Demonstration Strategy—Meaning and Definition

Demonstration, as a teaching strategy, *refers to the visual presentation* of the action and activities or practical work related to the facts and principles of a delivered lesson by the teacher in the classroom, aiming to facilitate the task of teaching and learning. A teacher, while using this strategy, demonstrates, in a practical form, the objects, instruments, phenomenon, actions and events related to the teaching of his lesson. All students of the class simultaneously gain practical, richer experiences with the common demonstration exhibited to them by the class-teacher. As a result, such demonstrations help them in understanding the facts and principles in their proper form, practically as well as theoretically.

Uses and importance of demonstration strategy

Demonstration as a teaching strategy, *helps the teacher in his teaching task* to a great extent. He can make his student understand and grasp the contents of his lesson with great care by saving a lot of time and efforts for achieving the desired objectives. Demonstration brings the necessary seal and enthusiasm in the students for learning the facts and the principles in a proper way. The knowledge and experiences, so gained, help them to remember these facts and principles for a long time and to use them practically. Moreover, the demonstration helps in cultivating genuine interest and attention of the students in the class activities. It makes the students active participants in the teaching–learning process and provides them opportunities for the development of their mental faculties like faculty of observation, reasoning, deep thinking and creative imagination. With all such advantages drawn with its use, it is not uncommon to find that demonstration strategy proves quite helpful in the teaching–learning of almost all subjects of the school curriculum,

including work experience, fine arts, music, games and other co-curricular activities and hobbies.

In the teaching of languages, a teacher may successfully use demonstration as a teaching strategy for explaining the meaning, feeling, emotional touch and latent expression covered by a word or sentence for example, shyness, anger, fear, laughter, and sadness can be successfully demonstrated for learning the true meaning of these words. Weeping and laughing in their various forms—lighter, mild, stronger and excessive—can also be successfully demonstrated. In the teaching of social sciences, there also arise many occasions for the use of demonstration strategy. A teacher may demonstrate the process of electing people's representative in a civics lesson. He may demonstrate clothes, ornaments and other items related to a particular civilisation and regime in a history lesson. In a geography lesson, effects and principles related to the relative position and movements of the various planets, the movements of the earth and its impact, the phenomenon of lunar and solar eclipse, volcanoes, flowing of the rivers, etc. can be successfully demonstrated. In mathematics, topics related to demonstrative geometry and practical arithmetic as well as trigonometry can be successfully taught with the help of demonstration device. In the teaching of science, this strategy has a tremendous scope. Science lessons need a lot of activity and practical work which can be successfully demonstrated through the use of this device. For example, the teacher can demonstrate the construction and working of a water pump, diesel or petrol engine, human eye or heart, for the required teaching and learning. In this way, various facts, concepts and principles related to physical and life sciences may be first demonstrated through their actual shape, aid material and relevant experiments and then students may be helped to generalise and learn them. In other subjects, where we aim to develop certain skills among the students like music, dancing, games, or work experiences, the planned demonstration of the various objects, instruments and activities may serve very useful purpose in making the students acquire the desired knowledge and skills.

Limitations and defects

The demonstration strategy suffers from the following defects and limitations:

1. All the topics related to various subjects cannot be demonstrated. Therefore, this strategy cannot be applied for the teaching of all the topics and subjects of the school curriculum.
2. Demonstration strategy, for its use, requires competent teachers well acquainted with the theoretical concepts and their related practical demonstration. In the absence of such skilled teachers, we cannot expect good results through the use of demonstration strategy.
3. The success of demonstration lies in its proper observation on the part of the students. It requires small number of students in a class, proper equipment and material, facilities to make the demonstration visible to whole class and keen attention and alertness on the part of students throughout the process of demonstration. Since all such requirements are hardly fulfilled in the present classrooms of our country, the desired success in the use of demonstration device cannot be achieved.
4. Demonstration strategy only demonstrates the action but does not provide actual opportunities for learning by doing or self-experimentation for the students. Consequently, the desired knowledge and skills cannot be properly acquired, as often claimed by the use of this strategy.
5. Demonstration, if not tackled properly, may also lead to the wastage of time and energy of the students and the teacher with quite insignificant gains in terms of achieving the desired objectives related to the teaching of a lesson.

Suggestions for the effective use of demonstration strategy

The teacher should take care of the following things for effective use of demonstration as a teaching strategy:

1. The teacher should carefully plan the demonstration work

carried out in the class. In the delivery of his lesson, first of all, he must mark where he has the need and scope for demonstration. Then he should look into the resources including his own ability to arrange for such demonstration. In the light of all these considerations, he should have an advanced rehearsal of the demonstration before actually doing it in the class.

2. The teacher must have the definite objectives to be achieved by him through the use of demonstration as a teaching strategy.
3. The demonstration carried out in the class should be in perfect tune with the topic taught, teaching objectives to be achieved, and the needs, interest, mental level and previous experiences of the students, and the teaching–learning situations prevalent in the class at the time of demonstration.
4. The teacher should always keep in mind the *principle of integration of theory with practice*. Accordingly, the students should be given proper theoretical knowledge along with the practical side covered by the demonstration.
5. The teacher should try to acquaint the students with the material apparatus and equipment to be used in the demonstration work.
6. The teacher must ensure that all the students of his class are able to observe the things and events demonstrated to them in a proper way without any interruption.
7. Each and every step related to demonstration should be made clear to the students in reference to the basic questions—what, why, how of the ongoing activities. The students should be given proper freedom to put such questions which should be clearly responded by the teacher from theoretical as well as practical aspect.
8. The necessary precautions to be observed in the demonstration activities by the teacher should be made clear to the students.
9. The teacher should attract the attention of his students in

his demonstration just like a magician and keep it sustained throughout.

10. The students should be active partner in the demonstration process instead of remaining mere observers. They should be provided the adequate opportunities to handle the things and apparatus connected with demonstration work and, if possible, should be allowed to repeat the experimental work done by the teacher.
11. The teacher should take all precautions and care for the successful demonstration. However, in case he fails to do so, he should not get perturbed but try to involve the students for finding the cause of the failure of the experiment in demonstration. In such case, he should attempt afresh or postpone it for another occasion.
12. The material and apparatus to be used for the demonstration should be kept in such a place that can be located and used with convenience when needed.
13. Demonstration strategy, for better results, should be supplemented with other strategies like questioning-answering, exposition, narration, explanation and using aid materials like charts, pictures, models, graphs and slide as suitable in a particular situation.
14. In addition to the above, the teacher should make use of the blackboard for writing out the main points related with his demonstration work including sketches of apparatus and procedures involved.
15. Every demonstration should have a proper evaluation session. The teacher should ask proper questions concerning theory and practice of the presented facts and principles. He should also encourage the students for clearing their doubts, filling up the gaps in their studies or knowing more on the topic.

Group Discussion Strategy

Meaning and definition

In its simple meaning, the term *group discussion* stands for the discussion held within a group. In this sense, group discussion as teaching strategy may be defined as *some sort of discussion, i.e. interchange of ideas between students and the teacher or among a group of students, resulting into active learning for the realisation of the predetermined teaching-learning objectives*. This group discussion, in no way, occurs occasionally or incidentally but is planned and organised with deliberate efforts on the part of the teacher and students for achieving the set goals.

The organisational procedure

In this strategy, students of a class may form a group along with the subject teacher. The teacher is the leader of this group due to his status, functions and responsibilities fulfilled by him in the organisation of *group discussion*. Usually the following three stages and steps are involved in the employment of *group discussion* at a teaching strategy:

1. Planning and setting the proper stage for discussion.
2. Ensuring active, democratic and useful participation of the group members.
3. Evaluating the outcomes of the discussion in the light of the realisation of objectives.

At the first stage, the teacher induces the need of holding group discussion and sets the stage to make necessary assignment for facilitating the application of *group discussion* as a teaching strategy.

At the second stage, an environment for the proper implementation of the strategy is ensured. The teacher, at this stage, ensures that every member of the group plays active role in the group discussion. The discussions are held in a perfectly democratic style providing full and free exchange of ideas within the group. The teacher, as a group leader controls and monitors the progress of the discussion in a perfectly democratic way with his least involvement in the discussion. The aim remains to make the members engaged in

useful discussion for achieving the desired teaching–learning objectives.

As happens with all the methods and strategies, the group discussion strategy also carries strengths and weaknesses as pointed out in the following way:

Advantages of group discussion strategy

Group discussion strategy has the following advantages:

1. It ensures the active participation of the students in the process of teaching–learning.
2. It trains the students for carrying out group activities and cooperative tasks. The qualities linked to proper social development and democratic living is also developed with the adoption of this strategy.
3. It provides opportunities to the students for imbibing the qualities of a good listener as well as an effective leader. When a group member speaks, others listen to it with patience and try to show respect for his opinion, but at the same time they may also put up their own views in a quite democratic way.
4. Here, students may be able to develop their abilities and skills regarding critical thinking, analysing, synthesising, evaluating, inferring, problem solving, and also the abilities like understanding others opinions, initiating and supporting the shy members of the group, waiting for their turn to put their own viewpoints, reacting patiently to negative and opposite remarks, and working cooperatively for the attainment of the proper results of the discussion. It may also help in developing desirable interests, attitudes, ideas and other social and moral traits. Thus, group discussion strategy proves to be quite effective for the realisation of objectives related to higher cognitive and affective domains of the learner's behaviour.
5. It teaches the students not to accept any idea blindly but to weigh it with all its pros and cons and consequences before practising.

6. It provides good training for verbal communication, expression of ideas and creative and constructive thinking.
7. A free and democratic discussion provides proper check over the wrong information, ideas and ways of problem solving.

Drawbacks and limitations

Group discussion, as a strategy, may suffer from the following drawbacks and limitations:

1. The teacher, as a group leader, may take all initiative in his hand by unnecessarily interfering in the thought process of the members or talking too much.
2. The group discussion may go out of track by paying little considerations to the set objectives.
3. The group members may clash with each other cutting loose and negative personal remarks.
4. Any member of the group may dominate the whole discussion leaving little or no chance to others for expressing their views.
5. The shy or inactive members may not show any interest in the discussion or they may feel neglected or depressed due to the lack of ability for initiative and expression.
6. A group in discussion may be divided into cliques. They then adopt non-compromising postures and thus may create problems for arriving at useful decisions and conclusions.

Suggestions for the effective utilisation of group discussion strategy

Following suggestions may prove quite useful for bringing effectiveness in the adoption of group discussion strategy:

1. The goals and objectives to be achieved through group discussion should be made quite clear to the members.

2. The topic and theme for discussion should be quite useful and interesting. It should be linked to the needs, abilities and interests of the students.
3. The students should have proper background and experience related to the topic of discussion so that they may be able to express their views or understand other's views on this topic.
4. The tone for discussion should be properly set by the teacher, i.e. the leader of the group. He may initiate it by posing a problem for its solution or he may ask question for which there is no ready answer. It must be definitely linked with certain educational objectives to be derived through group discussion.
5. The teacher, although acting as a leader, should never dominate or hold the key of discussion by acting as a gatekeeper or dictator. His role should be changed from giver of information to facilitator of interaction. For this purpose, he must try:
 - i. to encourage student-to-student dialogue without going through him.
 - ii. to avoid putting questions to the students in between their discussion and exchange of ideas.
 - iii. to refrain from commenting after the views expressed by members of the group.
 - iv. to listen carefully and actively to the exchange of ideas among the group members.
 - v. to show sufficient interest and enthusiasm through verbal or non-verbal clues for the discussion held in the group.
 - vi. to monitor and control the discussion to proceed on the right track.
 - vii. to see that all students take part in the discussion by following a democratic pattern for the realisation of the set objectives.
 - viii. that while the most vocal ones should be controlled and checked for their over-activeness and enthusiasm, the shy and backbenchers should be

encouraged to come forward for putting up their views.

6. Students must be trained for the proper utilisation of group discussion strategy by pointing out to them some of the following rules:
 - i. See that you are required to listen actively while someone is talking or putting up his ideas.
 - ii. Allow your colleagues to express their ideas; do not talk, interfere or put questions to him until he finishes.
 - iii. Do not make personal remarks or killer statements leading to hurt the members.
 - iv. See that others are also there to express their views. Be brief and to-the-point. Once you finish, do not try to take the floor every time. Talk only when you have something extra or more knowledgeable to say.
 - v. Try to help the group to reach to some conclusion. Never make cliques or take tough uncompromising stand without proper and reasonable base.
 - vi. Have patience for listening to other's opinion, if disagreed, try to put your views as politely but firmly as possible.
7. The outcomes of the group discussion strategy should be evaluated from time to time in the light of the realisation of the act objectives through the help of the adoption of some evaluation pro forma or the decision and conclusions arrived at through the end of the discussion. The whole proceeding of the discussion should be carefully recorded by the leader or the member secretary for deriving necessary educational benefits and realisation of the set teaching–learning objectives.

Narration Strategy

Meaning

Narration, as a teaching strategy, stands for presenting a well-ordered and well-sequenced verbal account of an object or event,

recount some past experience or incident, tell stories and the like, to pupils in such an interesting and creative way that it may be able to produce a clear, vivid, interesting and orderly picture in the minds of the pupils for their quick understanding and easy grasping of the subject matter. For this purpose, a teacher may narrate his own experiences regarding the object or event or he may be competent enough to reproduce the experience or stories of others effectively or he may use his own creative imagination for making plots of his own either from his life experiences or from fictions and history which he has read somewhere.

Use and importance

The importance of *narration strategy* lies in its ability to produce a well-ordered and sequenced verbal account of the objects and events in the most interesting way. The children are very fond of listening and when they listen to the narration of a good teacher, they find themselves completely lost with the narration and soon they find themselves living in imagination either as spectators or actual participants of the narrated incidents or events. In this way, narration, for the teacher, provides an art of telling or verbal representation of the things and events at the right time in the right way and, on the part of the students, it presents a practical media of learning interesting things in an interesting way. That is why narration, as strategy, can be used to teach almost all the subjects of the school curriculum. A language teacher may make its use in presenting the account of the ancient and cultural past as well as the live experiences related to his prose, poetry and composition lesson. A science teacher may take the help of the art of narration for elucidating the cause and effect relationship. He may also create interest in his lesson while narrating the relevant incidents from the biographies of the scientists. However, in the subject of social sciences (history, geography, political science, civics and economics), narration as a teaching strategy becomes a big asset to the teacher. The material, incident and events related to these subjects can be beautifully and interestingly portrayed by a good narrator in an orderly and sequenced way.

Limitations and defects

Narration, as a teaching strategy, may suffer from the following limitations and defects:

1. *Narration* is an art and a skilled job. It expects that a teacher besides knowing his subjects should be a skilled narrator. In the absence of such qualities, it may not be a successful device for a teacher.
2. Narration, if not tackled properly, may turn into a simple telling involving no enthusiasm and interest on the part of the teacher as well as the learners.
3. There lies danger that narration may turn the teaching–learning process into a one-sided affair, i.e. the teacher narrating and the students simply listening to him as inactive and passive recipients of the knowledge.
4. In narration, the narrator may go astray. He may talk irrelevant, side-tracking the main objectives of his lesson, and, in his way, a lot of valuable time may be wasted without any significant gains.
5. Use of this strategy is limited to the learning at memory and understanding levels. It does not help in the learning at the reflective level.
6. Narration as a strategy has its limitation in the use of describing the whole incident and events in its total and true form. Here the narrator colours the events according to his own angle and taste and tells only what he thinks suitable for the purpose.

Suggestions for the effective use of the narration strategy

The following things should be kept in mind by the teacher while resorting to *narration strategy*.

1. The language used for narration should be simple and easily understandable by the students. In addition to language, one should also learn the art of good communication through appropriate gestures.
2. The art of narration requires from the teacher to narrate at

the right time in the right way. Therefore, a teacher must resort to this device only when it is required by the students. He should also keep in mind that the interest of the students should be continuously maintained in his narration. He should also keep his narration within the track and never talk irrelevant things by side-tracking the main objective of his lesson.

3. The pace of the narration should be taken care of. The teacher should not make undue hurry for narrating the incidents and events as it takes time on the part of the students to listen, record and think about them. On the other hand, he should not be too slow to bore the students.
4. A teacher must have a thorough knowledge or imagination about the objects and events narrated by him so that he may be able to project the required picture before his students in a commanding and interesting way.
5. The teacher must demonstrate a reasonable confidence and patience at the time of narration. He must try to involve the student in his narration by making them disciplined, good listeners and active participants in the thinking, imagination and creative process related to his narration plot.
6. The teacher should carefully plan and prepare himself for the use of the narrative strategy. He must carefully select various places and opportunities in his lesson, effectively handled with narration device. Then, he should plan for the relevant stories, incidents, objects and events and think about the ways and means of making his presentation simple, vivid and interesting.
7. The material for narration should be carefully selected. The use of only one type of the material may cause monotony and dullness. Therefore, a teacher should try to draw his narration material from a variety of sources and present it in a variety of ways—creative, informative or factual—suited to the needs and interest of the students and the objectives of his lesson.
8. The name of the objects, places and other important points

concerning the narration should be written on the blackboard for providing easy recall and proper wings to the imagination and understanding of the students.

9. Narration, for its effectiveness, may be supplemented by other strategies like demonstration, dramatisation, illustration, and questioning. Its value may be enhanced by the use of relevant teaching aids and by providing opportunity to the students for gaining direct experiences of the narrated things with the help of excursions, museum, library, visits to places, etc.
10. The teacher must try to put the essence of storytelling and the art of dramatisation in his use of narration strategy. He must try to arouse the emotions and sentiments of the students as needed for the clear mental visualisation of the events and happenings.
11. The teacher should never resort to endless narration without any break. It creates unnecessary monotony and disinterest. He should involve the students in his narration by providing them opportunity to raise question, remove their doubts and test their creative imagination. He must also put questions to the students for evaluating the outcome of his narration and making them attentive and disciplined.

Brainstorming Strategy

Meaning

Brainstorming, as the name suggests, implies storming of the brain, i.e. to evolve or generate a number of ideas and the thought lines as quickly as possible without paying consideration about their validity and appropriateness. As a strategy it was popularised by A.F. Osborn (1963) through his writing *Applied Imagination*. According to him, this strategy can be used with a group to explore a number of ideas related to a situation or solution of a problem without passing any judgment or censure. This strategy is specially useful for the development of higher cognitive abilities like reflective thinking,

creative imagination and problem solving. It is also helpful in the attainment of the learning objectives related to affective domain.

Rules to make use of brainstorming as a method or strategy

Brainstorming, in all its aspects and shapes, emphasises on the part of all those who take part in a brainstorming session to put their ideas freely without any inhibition. While they are doing so, attempts are seriously made to postpone any sort of evaluation, discussion and criticism of their ideas until all possible suggestions have been made. For the proper organisation of such a *brainstorming* session, John Bacr (1997, p. 43) has suggested the following rules to be followed by the participants and the organisers (i.e. students and the teacher in a small group discussion):

1. Defer judgement.
2. Avoid ownership of ideas. When people feel that an idea is *theirs*, egos sometimes get in the way of creative thinking. They are likely to be more defensive later when ideas are critiqued, and they are less willing to allow their ideas to be modified.
3. Feel free to *hitch hike* on other's ideas. This means that it's Okay to borrow elements from ideas already on the table, or to make slight modifications of ideas already suggested.
4. Encourage wild ideas. Impossible, totally unworkable ideas may lead someone to think of other, more possible, more workable ideas. It's easier to take a wildly imaginative bad idea and tone it down to fit the constraints of reality than to take a boring bad idea and make it interesting enough to be worth thinking about.

The rules like above may prove quite beneficial for engaging in a brainstorming session to the individuals or group for generating new and novel ideas to create something new, helping in finding out the solution to faced problems or getting new ideas and information for the learning of the topic in hand.

The organisation procedure

The procedure for using brainstorming as a teaching strategy may be outlined as follows:

1. To start with, a small group of students (say 10 to 15) is formed. They are asked to sit in a group and provided with a focus, e.g. a particular problem like *student unrest, growing unemployment in India or how to check truancy in our school*, etc.
2. Teacher, as a leader of the group, then asks the group members to think about the solution of the problem and give their ideas one by one as rapidly as possible. They are advised to attack the faced problem without any inhibition from many angles; in fact, literally storming it with all possible ideas and solutions. For providing these ideas, they may be instructed as follows:
 - You are faced with this problem, now think about the possible solution or solutions as you may think proper.
 - Come out with as many ideas or solutions as possible. Don't care for the criticism. Provide your suggestions and ideas without any hesitation even if they seem to you quite novel, unusual and unorthodox ones.
 - Don't criticise others' ideas, but you are free to make alteration, enlargement and synthesis in the ideas or solutions given by others.
 - You are also free to alter or improve your own ideas and solutions given by you earlier in this session.
3. In this way, students are encouraged and inspired for giving many ideas or solutions as possible. The group members and the leader are supposed to receive these responses in the light of the following precautionary measures or norms:
 - All ideas are to be encouraged and appreciated; therefore, no criticism is allowed during the brainstorming session.
 - Ideas are to be listened and accepted patiently, without passing any judgement or comment of any

sort until the session is over.

- Members are not restricted to new ideas but are also encouraged to enlarge upon ideas put forward by other fellow students.
 - All the ideas and alterations are to be recorded properly (preferably written on the blackboard or displayed on the screen).
4. At the end of the brainstorming session, all the solutions and ideas received from the members are discussed in a free and frank democratic environment. Out of this discussion (wisely guided by the group leader) the most viable ideas are accepted for the solution of the problem in hand.

Advantages of brainstorming strategy

Brainstorming strategy is credited with the following advantages:

1. It discourages spoon feeding and information given tendency or rule on the part of the teachers. Students become active and independent enquirer and discoverer of the knowledge instead of remaining passive partners in the teaching–learning process.
2. It provides opportunity to think, reason, analyse and synthesise and thus it proves helpful in the development of higher cognitive abilities among the students.
3. The main advantage of this strategy is to help students in the development of their creative and constructive potentialities. The originality and novelty of the ideas, the varied responses marked with divergent thinking, the removal of fear of being ridiculed or criticised, may always encourage and inspire the students for developing their creative imagination and problem-solving ability.
4. It encourages the group activities on the part of students for finding out the solution of a problem of common interest. It makes them cooperative and teaches them to have respect for other's ideas and points of view.

Demerits and limitations

Brainstorming strategy may suffer from the following limitations and drawbacks:

1. All the members of the group may not be equally interested in the solution of the problem.
2. The group may not be homogeneous with respect to general mental level or knowledge and skills required for the solution to the problem.
3. The group members may not come forward for putting up their ideas.
4. The brainstorming session may not yield into convincing solutions. The members may clash with each other and indulge in verbal conflicts.
5. The concluding session may not result into useful conclusion or solution to the problem.
6. The members may waste their time and energy without getting opportunity for the realisation of cognitive or affective objectives.

However, we must not get discouraged by the above cited limitations and drawbacks of the brainstorming strategy. These are very poor barriers and, if proper care is to be taken by the teacher in making use of *brainstorming* as a strategy, one may be able to achieve the desired purposes and advantages served by this strategy.

In addition to these three teaching strategies discussed above, we have many more strategies that can prove quite beneficial to a teacher for providing effectiveness to his teaching task. We will be discussing in detail two of such important teaching strategies named as *simulation* and *team teaching* in the next two chapters of this text.

Role Playing Strategy

Concept and meaning

Role playing may be considered a kind of an assumption or initiation of a particular appearance or form. When a male child puts the beard and moustaches on his face and the little girl serves the dishes to him they are said to be engaged in role playing, i.e. imitate the acts of their parents and elders. Through such role playing, the children get the opportunity of learning or training themselves for the activities of future life. For the players, the essence of role playing is the personal experiencing of emotions and perceptions by assuming a role in a defined situation and acting out its relevant behaviour.

In the classroom situations, we may consider the *role playing* as a teaching–learning technique or strategy in which a well-planned situation is dramatised by a group of students by playing specific roles, under the direction of a teacher for deriving useful educational experiences. For example, the students for learning the working of a parliament or legislative assembly may dramatise the scene of the parliament or assembly by playing specific roles of speaker, ministers, ruling and opposition parties MPs or MLAs, Marshals, etc. Similarly for acquainting students with the problems and ill effects of over affection, and protection given to a male child by his parents, the situation may be enacted by the students by playing the roles of parents, brothers and sisters, child and other family members and companions, etc. The *role playing* strategy thus represents a spontaneous, unrehearsed life like presentation of some situation for gaining insight of a specific problem or deriving useful educative experiences.

However, *role playing* as a sociodramatic educational strategy in the classroom differs from the *role playing* which often occurs spontaneously in socialisation and from the *role playing* used as a therapeutic techniques, as in *psychodrama*. In *psychodrama*, the actor generally portrays himself and relives his own role in dramatic incidents in his past. The direction of this type of role-playing calls for a therapeutic background which most educators do not have. Sociodrama, on the other hand, deals with generalised roles and situations in which the actor is not called upon to represent himself. It

is this distinction which allows the teacher without therapeutic skills to assume responsibility for directing a *role playing* sequence.

For making *role playing* strategy in the classroom distinct from the *role playing* through socialisation, we may cite the examples of the development socialisation of early childhood of the nature *I will be the daddy, and you be the mommy*. However, in the classroom situation, the students will be playing these roles of daddy and mommy with greater sophistication *if you were the parents of these two children how would you have reacted and told them.....*

For making *role play* strategy to attain its desired objectives, it is essential to meet the following conditions:

- i. The students who engage in *role playing* must understand clearly the situation and the roles to be played by them for depicting the scene of that situation.
- ii. The roles must be portrayed or played with quality.
- iii. The role or situation must have a real-life quality.
- iv. All the members of the group should closely and actively be attached to the *role playing* either as role players or observers.

Phases or steps involved in role playing

The *role playing* strategy, according to Joyce and Weil (1980), may follow the nine specific phases or steps in any classroom situation. These are:

1. **Warming up stage:** Concerning with the creation of a problematic situation or citing of a problematic experience.
2. **Selection of the role-players:** Concerning with the selection of students for playing the specific roles as demanded by the situation.
3. **Setting of the stage for role-playing:** Concerning with making necessary environmental setting for *role playing* activities.

4. **Preparing of the observers:** Concerning with the assignment of the roles of observers to the students who are not acting as specific role players.
5. **Enacting the story, roles and situation:** Concerning with the actual role playing process, here the role players may be asked to enact their specific roles as demanded in the situation.
6. **Discussion and evaluation:** Concerning with free and frank discussion about the qualities of the roles.
7. **Enacting again:** Concerning with re-enaction of the role playing activities in the light of the modification suggested in the Phase 6.
8. **Re-discussion and evaluation:** Concerning with the discussion about the specific roles, their effects as generating responses and deriving useful implications leading to solid conclusions and educative experiences.
9. **Deriving generalisation:** Concerning with making relevant generalisation and learning useful lesson applicable to real-life situations.

However, the steps given by Joyce and Weil for the use of *role playing* strategy in the classroom situation are only suggestive. These are not binding. A teacher in the capacity of the director of the *role playing* strategy may modify those according to his convenience as well as the demands of the situation.

In case, we follow the above nine steps given by Joyce and Weil, the role playing may be illustrated through the following example:

1. **Warming-up stage (Selecting the situation or theme):** At the beginning stage, a teacher in his social studies class may arrive at the following situation for the purpose of *role playing*.
The process of election in a democratic society. For providing instruction about this topic, he may propose to enact the situation by asking the students of a class to elect

their class representative.

2. **Selection of the role players:** In this role playing situation, there may be two or three students wishing to be elected as class representative. These may be assigned the role of candidates fighting election. For the election process, the different roles like presiding officer, polling officer, and other officials helping in the election process, besides the role of voting may be assigned to different students of the class.
3. **Setting of the stage for role playing:** After assigning the roles, the necessary arrangement related with the voting process will be made for creating a scene of election process as naturally as possible. There will be ballot box, ballot papers, ink, stamp, furniture, list of the voters, etc., at their respective places as happens usually in an actual election process.
4. **Preparing of the observers:** Students who are not being assigned any specific role in the election process will be asked to watch closely the election process.
5. **Enacting the story, roles and situation:** In this step, the role players as well as observers may be asked to enact their respective roles as demanded in the election of the class representative.
6. **Discussion and evaluation:** After enacting the process of election of the class representative, there will be a free and frank discussion of the whole process of role playing with a view of critical judgement of the qualities of the roles played, difficulties experienced and lesson drawn, etc.
7. **Enacting again:** Since there have been many gaps and shortcomings regarding the stage, and *role playing* by the students, these may be rectified by providing fresh opportunity for enacting the specific roles. Here the teacher may point out the requirements essential for a free and fair election and the precautions to be taken for this purpose.
8. **Re-discussion and evaluation:** The re-enacting of roles may further be discussed and evaluated in the light of the final objectives to be realised for such *role playing*.

9. **Deriving generalisation:** After going through the above activities, the students may be made to derive useful generalisation about the process of election, the significance of a free and fair election, the essentials for holding a democratic election and thus learning finally the way of electing their representative.

However, it is not at all essential in the all role playing situations to provide opportunities for re-enacting and re-discussion. Therefore the steps involved in *role playing* may be reduced and condensed as below:

1. Selecting the situation for *role playing*.
2. Setting the stage and assigning the roles.
3. Preparing for action (planning).
4. Enacting the roles (execution).
5. Discussion and Evaluation.
6. Generalisation.

The *role playing* strategy may be well utilised for providing training to the pupil-teachers and thus modifying their behaviour for imbibing teacher-like skills and other traits. The utilisation of *role playing* strategy in a simulated (artificial teaching–learning set up) conditions for the training of teachers is known by a technical term *simulated teaching*.

Advantages of role playing

The *role playing* strategy carries the following advantages:

1. It provides opportunities to the students to learn about a subject from the inside. It gives them to feel the intensity of the situation by enacting it through *role playing*.
2. It increases students' interest, motivation and efforts for learning about a subject or phenomenon.
3. Students derive useful, real life like experiences through

playing specific roles of the players or observers which in turn prepares them for their future life activities.

4. It provides training in verbal and motor communication of the behavioural acts by expressing as spontaneously and freely as possible.
5. The students get opportunity to imbibe useful qualities for social participation and co-operation by giving due regard to others' feelings and points of view.
6. It can provide due insight into real-life problems and develop problem-solving abilities of the students.
7. It can be used for illustrating and explaining the various phenomena and incidents related to classroom teaching of various subjects.

Demerits and limitations

The *role playing* strategy suffers from the following demerits and limitations:

1. The students may not understand the problems or the situation for playing the roles with needed effectiveness.
2. The role play strategy becomes effective only when the players and observers truly believe in the story or the situation to be enacted. Usually the students do not believe in what they are doing with their roles as players or observers. In such a situation, *role playing* strategy loses its impact and significance.
3. Students, who may enact the assigned roles effectively, are not easily available for making the strategy a success.
4. The *role playing* strategy expects too much from the teacher as he is one who has to create a life-like problematic situation or story plot, prepare and draft the *role playing* activities, select the role players, watch and direct the role playing activities for some useful educative gains. There is quite dearth of such capable and trained teachers and in such a situation, we cannot expect desired results with the use of role playing strategy.

Gaming Strategy

Defining gaming

Gaming as an instructional strategy may be defined as a specially designed strategy or teaching–learning situation in which planned and organised playway activities and games are utilised for deriving useful educational purposes.

However, playway activities and games are generally known as *something enjoyable involving competition for specified objectives and observing rules* (Nesbitt, 1968, p.5). In this sense, the essential properties of a gaming act may be cited as:

- i. a small fixed number of players.
- ii. a common goal to be achieved by the players.
- iii. the rules for playing the games.

Although, all games are bound to share the above qualities. However, there may lie a great variation in terms of their structure and composition like relative amount of physical and mental activity or of skill and luck to win, the number of participants and the degree of competition involved and the mode of designating a winner, etc. However, in all the play activities and games, whatever nature and objectives they may possess, one thing is quite common that they have enough potential for providing valuable learning experiences in a relaxed, spontaneous and evaluative situation.

Simulated and non-simulated gaming

Playing of games may involve both simulated and non-simulated situations. Simulated situations, as we already have an idea about them, may be defined as the selective representation of reality (desired artificial condition) for playing the player's role as desired by the situation.

In a simulated situation, the students try to simulate the real-life situation through the playway activities and thus experience the intensity of experiences related to a subject or area by themselves. Use of non-simulated games can also help in deriving many educational benefits. There are many such gaming techniques

available for learning facts, principles and applications of these are related to almost all the curricular and non-curricular areas. Both verbal and non-verbal stimulus material may be used in such technique. For instance, in verbal transaction of ideas, children may be engaged in: (i) quiz competition, (ii) puzzles and riddles competition, (iii) oral problem-solving competition, (iv) exploring creative ideas regarding a thing, idea or a phenomenon.

In non-verbal transactions, they may be engaged in thinking, problem-solving and *role playing* games like:

- i. building a pattern with the help of given material.
- ii. construction or completion of a picture or design.
- iii. building and constructing something or anything out of the raw material given to them.
- iv. constructing as many words as possible with the help of given alphabets.

These games may be played either individually or in a group. Group game strategy is always thought better because it develops co-operative feelings. It also saves the students from frustration suffered due to winning of games always by a few more able students.

Computer gaming

Computer and teaching machines have almost revolutionised the gaming strategy. These are in a position to provide both simulated and non-simulated situations for gaming. A student may now try out different alternative situations, ways and means by playing a game with a set of players and rules. These can ask puzzles and quizzes, put up the problems in funny styles and situations for answering individually or in group.

There is no dearth of software programmes providing computer educational games in the curricular and co-curricular fields. Languages, mathematics, basic and applied science, arts and crafts can now be well conceptualised and taught through these games in

a quite interesting style. Series are available from nursery, kindergarten, grade 1, grade 2 and onwards.

Games are also available for the development of thinking skills like logical thinking, creative thinking and constructive thinking among the children.

Let us illustrate the role of a computer game in providing varying teaching–learning situations and experiences through a well-known classical computer game known as *sailing ships game* useful for the learning of many geographical concepts.

This game calls for skilful navigation around the oceans. The players has to choose a beginning and a finishing port from the six ports, i.e., London, Rio-de Janeiro, Chile, Sydney, Captown and Shanghai for playing the game. The position of a ship at one time or the other is indicated on a world map displayed on the monitor screen of the computer, which also records the line of the ship's voyage from the leaving port. As soon as the player types the name of the starting port, the latitude and longitude of that place are displayed on the monitor. It then asks the player to indicate the day and month of the intended voyage. The player has to reach the destination port in the shortest period of time by skillfully sailing his voyage from all the odds like storm and drifts due to wrong selection of the day and the month.

The experience gained through the computer game is helpful in providing rich educational experience, related to the following knowledge and skill areas: (i) basic facts about sailing ships (ii) direction of the compass (iii) latitude and longitude (iv) knowledge and application of the world map (v) name and size of the oceans (vi) name and location of the various ports around the world (vii) seasonal shifts and major monsoon winds (viii) the effects of the winds and seasons on navigation (ix) development of proper reasoning and thinking skills.

Similarly many science linked games may help the children to learn useful facts, principles and applications related to science-subject areas. They can provide rich thrilling experiences in developing laboratory and other applied science skills among the children. Mathematical games are helpful in the learning concepts,

skills and application of the body of mathematics. Similarly the language learning and adventure games have enough potential to spark the imagination of children along with the development of the necessary communication skills like listening, talking, reading and writing through a wide varieties of activities.

Educational advantages of gaming

Gaming as an educational devices has many points on its credit side such as:

1. There is a greater scope for generating greater motivation and interest, more focussing of attention and less withdrawal from the learning situation in the gaming activities utilised for educational purposes.
2. Learning and retention of factual material is much greater from games than from textbooks, lectures and other traditional modes. It happens because the effective games for a particular course are designed in view of the degree of success in the game, related with the basic knowledge and skills involved in that course.
3. The gaming device makes the learner's role an active one: He is bound to remain an active participant, independent and active enquirer in the process of learning instead of a passive listener or motionless observer.
4. Gaming activities are self-disciplinary and self-judging in nature. All must obey the rules if gaming is to continue. Similarly, the outcomes of the gaming are enough to indicate who has won or lost. One can thus easily evaluate his role in respect to his playing the games, i.e. acquiring the learning experiences. One can win or lose due to his own actions and this is enough to teach the children that their self efforts are the guiding factors in the acquisition of learning and success.
5. Gaming, as a model of actual processes, is helpful in linking the school world with the outside world. The children here, acquire very useful learning experiences for playing

the related roles in their actual life. Moreover, games with simulated environments or role playing have been found to possess tremendous capacity to provide the children valuable opportunities to experience life situation, that for various reasons, cannot be provided to them quite directly.

In this way gaming, especially computer gaming of these days, has almost every possibility of being utilised as a potential tool for providing curricular and co-curricular experiences in almost all the areas of information and fields of studies. It has greater scope for utilising as a tool for enhancing the knowledge, skills, application as well as influencing and modifying the behaviour of the learners simply due to its greater appeal to the interest, motives and nature of the learners irrespective of their age, grade, culture and society.

Remedial Teaching Strategy

What is remedial teaching ?

The term *remedial teaching*, as the name suggests, stands for the teaching or instructional work carried out to provide remedial measures for helping the students (or an individual student) in getting rid of their common or specific weaknesses or learning difficulties diagnosed through diagnostic testing or some other measures carried out for such diagnosis.

Diagnosis, thus, provides a solid base for hypothesising the general and specific cause underlying the weaknesses or learning difficulties of the students of a class/group for a particular student. It is thus true that both diagnosis and remedy are necessary for the removal of the difficulty. Thus, depending upon the general or specific nature of the weaknesses or learning difficulties of the students, we have to take appropriate step for the organisation of remedial teaching for the needy students.

Organisation of remedial teaching

Remedial teaching in the subject can take various forms as follows:

1. Class teaching
2. Group tutorial teaching
3. Individual tutorial teaching
4. Supervised tutorial teaching
5. Auto-instructional teaching
6. Informal teaching

Let us discuss all these forms and aspects of remedial teaching.

Class teaching: In this system, or schedule of remedial teaching, the usual composition and structure of the class is not disturbed. The teacher here teaches a particular lesson/unit, emphasises a point again and again, repeats the work activities and experiments or uses some specific teaching aid in order to remove the difficulties and deficiencies of the learners in terms of the acquisition of the desired learning experiences. The class as a whole is benefited by such type of *remedial teaching*. It proves particularly useful in the removal of the weaknesses and learning difficulties of the general nature.

Group tutorial teaching: Here the students of the class are divided into some homogeneous groups called *tutorial groups* on the basis of their common learning difficulties and identical weaknesses or deficiencies. These groups are, then taught separately by the same teacher or different teachers according to the nature of the difficulties and deficiencies. The tutor in-charge of a tutorial group then tries to solve the difficulties collectively on group basis. The weak areas or aspects of the curriculum identified through diagnostic testing are properly attended by the teacher according to the needs and requirements of the pupils of the group. In case it is related to a particular work, due care and proper attention is now paid by the teacher over his own demonstration work as well as on the practical and project work done by the students in their respective groups.

The group tutorial teaching proves advantageous over the class teaching in many aspects. Here the students who have common problems and difficulties in their learning are helped more in

overcoming their difficulties and deficiencies. It makes the task of teaching–learning quite interesting and goal oriented. In class teaching, there remains a lot of chances that the time and energy of many of the students who do not suffer with a certain learning deficiency or difficulty will go in vain by attending to the remedial, teaching not at all needed by them. Moreover, the number of students in group tutorial teaching is comparatively reduced. It results in making the task of teaching more convenient and effective for providing better coaching and practice in terms of the needed remedial education.

Individual tutorial teaching: In this schedule, every learner who feels learning difficulty of some nature in the subject *social studies* is attended individually for overcoming his deficiencies or weaknesses. It is one-to-one coaching, help and guidance that is rendered by the teacher to the learner as and when needed by him in order to actualise his potentialities to the maximum. Therefore, in this type of remedial teaching, maximum consideration may be provided to the principle of individual-difference in the direction of the best results in the task of teaching and learning. Here the students may progress according to their own pace, abilities and capacities and get adequate help, individual attention and reinforcement for coping up with their deficiencies and difficulties on the path of learning.

Supervised tutorial teaching: In this schedule of remedial teaching, the responsibility of overcoming the learning difficulties and removing deficiencies in some learning areas is handed over to the learners themselves. They have to work on their own for removing their difficulties and deficiencies. The role of the teacher is confined to observe and supervise the learning activities and provide as much help as necessary in their path of self-learning and self-correction. This type of supervision can be made on the individual as well as tutorial group levels. The students may opt to work individually or in the group for solving their difficulties and overcoming their learning deficiencies.

Audio-instructional teaching: This type of remedial teaching consist of auto-instructional programmes and activities. Here the learner is provided with basic auto-instructional learning material and equipment like programmed learning textbooks and package, auto-

learning modules, teaching machines, and computer assisted programmed instruction. This mechanism helps the pupil to gain sufficient practice and drill work in the areas of his weakness and acquire necessary confidence in overcoming his difficulties and deficiencies through an appropriately programmed self-instructional material.

Informal teaching: Informal education and teaching, suitably planned and assimilated with the formal education of the school, may go in a big way to act as a source and means of remedial education to the needy students. The activities connected with such informal education in the form of excursions or trips, collecting material for the school subjects, museum and improvising apparatus, working on useful projects, engaging in socially useful hobbies, establishing resource rooms, nature study corner in the school campus, and participating in the subject club activities, make the study of a subject, a joyful event. These activities suit the diversified interests of the students and provide unique and special opportunities to learn and practise the facts and principles of a school subject. The learning difficulties evolved out of the lack of interest, non-availability of direct and first hand learning experiences, deficiencies in the methodology of teaching, psychological needs and problems of learners and a host of other reasons may be easily overcome through the organisation of useful non-formal activities of social and scientific interest in the schools.

Thus, we have tried to outline and discuss the desired remedial measures for the pupils experiencing difficulties and problems in the learning of some areas or aspects of school curriculum through a few organised formats of remedial teaching. However, the discussed diagnostic and remedial measures for the learning deficiencies, difficulties and weaknesses of the students in a school subject belong to the academic front or cognitive domain of their behaviour. But it is an undeniable fact that a student may feel the diagnosed difficulties, weaknesses and deficiencies in a particular subject due to some non-academic factors or problems arising in his conative and affective domain of behaviour. Such situations may be pointed out as follows:

1. A student's difficulty or weakness in the subject may be the result of poor physical health, ailments, or physical and mental deficiencies.
2. A particular student or group of students may fall victim of the backwardness or learning problems in the subject due to the lack of proper educational opportunities and teaching-learning environment for the study of that subject.
3. A student may feel difficulty in the learning of a subject due to some psychological causes, and social or emotional maladjustment. Sometimes, due to some reasons, an event involving reproof, bitter criticism, scolding and rebuking of a particular student on the part of the subject teacher may bring disaster to the future learning and progress of the student. It may first drift the student too away from the teacher and then he begins to hate not only the teacher but also his teaching and the subject taught by him. Many times such vicious circle involving emotional and psychological factors may play a substantial role in the deficiencies and backwardness of the students in the subject. The root of all such emotional and behavioural problems does not always lie in the improper behaviour by the subject teacher or other negative factors present in the school environment, but also in the unfavourable circumstances and uncongenial environment at home in the form of defective and faulty upbringing and the injustice and improper behaviour experienced by them at the hands of their parents and elders.

In this way, it should now be clearly understood that the difficulties, weaknesses and deficiencies felt by the students in the learning of a particular subject are not only caused by the factors lying in the field of academic or cognitive behaviour of the students, but these may result due to some non-academic or health, physical and behavioural problems in their conative and affective behaviour. It is also true that some times these difficulties

and deficiencies of the students may arise only due to a single factor and at other times these may emerge due to multiplicity of causes. It is, therefore, essential on the part of a teacher to carefully examine the probable cause of these deficiencies and weaknesses of their students in the learning of the subjects and then wisely plan for their remedy on the individual or collective basis, depending on the requirement of the individual cause of diagnosed deficiency and weaknesses.

Enrichment Program Strategy

Enrichment, as a technical term, is used for enriching the already available opportunities of education. Basically it consists the selection and organisation of learning experiences and activities appropriate to the child's adequate development. In this way, the enrichment of the curriculum should be considered a need of all students. But in the case of gifted children, it will definitely imply an urgent need of giving them a great variety of experiences or tasks at a more advanced level. This enrichment programme in a particular subject has to bring additional learning opportunities for the gifted children in the subject. Through such programmes, the gifted children must find something new and challenging to their capacities.

In providing additional learning opportunities under the enrichment programmes for the students, the following two channels are suggested:

1. Provision of different curriculum
2. Enrichment within the existing curriculum

Under the former channel, gifted children may be provided with

different curriculum. This curriculum may contain more advanced topics generally of the college level or include more analytic and heuristic approach to the subject or have additional topics selected with other areas of experience and applied nature.

Under the latter scheme, no separate curriculum is recommended to the gifted children. Here, attempts are made to provide additional educational opportunities to them for the learning within the existing curriculum. This provision, for example, may include the following:

- i. To ask the gifted children for solving more difficult problems.
- ii. To ask them for deep and intensive study of the topics.
- iii. To encourage the gifted children to ask questions for the satisfaction of their curiosity and thirst of knowledge.
- iv. To encourage them for the novelty and originality in their approach.
- v. To encourage them for becoming active independent enquirers and discoverers of the knowledge.
- vi. To encourage them to seek association and correlation within topics, branches and subjects of the school curriculum.
- vii. To encourage them to carry the learning of mathematics to their daily life activities.
- viii. To ask them to work on some useful projects independently or in a group.
- ix. To hand over special assignments.
- x. To ask them for the construction of mathematical models, aid material and improvised apparatus.
- xi. To encourage them to write good essays and articles on the topics of a particular subject.
- xii. To ask them to arrange or contribute to the mathematics or science fairs and exhibitions.
- xiii. To ask them to participate in panel discussion, seminar or contest and to prepare and produce its report.
- xiv. To ask them for the participation or organisation of activities concerning different clubs.

- xv. To encourage them for the experimentation and independent research in the field of allied subjects.

The above list for *enriched learning* experiences to the gifted children should not be taken as complete in itself. The teacher may plan some or the other learning experiences for the benefit of gifted children depending upon the available resources and circumstances. *Enrichment* of the learning experiences or programmes provided within the existing framework of the curriculum, in my opinion, is the most suitable plan for the education of the gifted children. It helps in evolving a school programme that is beneficial to both the average and the gifted. Both of them can develop according to their own interests, abilities and capacities without interfering with the development of others. It not only provides facilities for the full development of special abilities and potentialities of the child but also cares for his total personality. Therefore, a teacher should strive hard for the enrichment of learning experiences according to the needs and requirements of gifted children.

SUMMARY

1. The term *teaching strategies* refers to the plans, means and specific ways specially devised and employed by the teachers for the proper realisation of the desired teaching or instructional objectives in a particular teaching–learning situation. It differs significantly from the terms such as *teaching methods*, *teaching tactics* and *teaching devices* in terms of its composition as well as scope.
2. *Teaching method* refers to a particular mode employed by the teacher for the presentation of some specific contents of a particular subject. *Teaching strategy*, on the other hand, is selected and employed not only for the proper presentation of some specific material but also for the realisation of the predetermined teaching–learning objectives. In this way, the *teaching strategy*, as a term, is more comprehensive in its scope as well as composition in comparison to the term *method of teaching*.
3. *Teaching tactics* refers to those behaviours and activities of a teacher that he employs while making use of a particular teaching strategy for the realisation of the desired objectives in a particular teaching–learning situation. A *tactic* representing a small segment or unit of a teacher behaviour/teaching act, therefore, is a quite small term in its composition and scope in comparison to the term *teaching strategy*.
4. The term *teaching devices* stands for a variety of teaching tricks, techniques and tools employed by the teacher for producing better outcomes of his/her teaching. These are found to provide valuable assistance to a teacher in carrying out his strategy for the realisation of the predetermined teaching–learning objectives and that is why the *teaching devices* as a term is smaller and narrower in comparison to the broader and comprehensive term *teaching strategies*. However, the distinction between *teaching devices* and *teaching strategies* becomes narrower as and when each of

these tends to focus on the realisation of the teaching–learning objectives effectively and that is why many times these terms may be found to be used synonymously. There are a number of teaching strategies that are being employed by the teachers at one time or the other. These are broadly classified as the *autocratic* (content centred and teacher dominated) and *democratic* (student centred and democratically organised) strategies.

5. While making use of the lecture as a *teaching strategy*, a teacher tries to present a segment or unit of the desired content material of a subject to a group of learners through lecturing (verbal communication of ideas). It aims to attain the specific teaching–learning objectives related particularly to the *cognitive and affective domains* of the learner's behaviour. The *lecture strategy*, as an oldest traditional mode of teaching, may prove quite advantageous in many ways for the present-day classroom teaching–learning. The main criticism labelled against the use of it lies in its focusing to organise the teaching–learning act merely on the *memory level* rather than the *understanding and reflective levels*.
6. The group discussion strategy involves some sort of discussion, i.e. exchange of **ideas between students and teacher** or among a group of students resulting in some learning for the realisation of the predetermined teaching–learning objectives. It may prove quite helpful in a number of teaching–learning situations if handled properly in an able leadership.
7. The *demonstration strategy* refers to the visual presentation of the action and activities, practical work, or the experiments related to the facts and principles of a delivered lesson by the teacher in the classroom to facilitate the teaching–learning task.
8. The *narration strategy* calls for the capacity and ability of a teacher to produce before the students a well-ordered and sequenced verbal account of the objects and events related to the teaching–learning of a particular topic or subject in the most interesting way.

9. The *brainstorming strategy* is utilised by a teacher with a group of students to explore a number of ideas related to a situation or solution of a problem without passing any judgment or censure. It is, therefore, especially useful in the development of higher cognitive abilities like *reflective thinking, creative imagination, and problem solving* among the students.
10. In the context of classroom teaching–learning, we may take *role playing* as such a teaching–learning technique or strategy in which a well-planned situation is enacted by the students by playing specific roles under the direction of a teacher for deriving useful educational experiences. For example, if we want to get our students acquainted with the working of our parliament or legislative assembly, we may provide them opportunity for dramatising the scene of the parliament or assembly by playing specific roles of speaker, ministers, ruling and opposition parties, MPs, MLAs, marshals, etc.
11. *Gaming*, instead of being taken as merely an entertainment means or playing activity, may be understood as an effective instructional strategy in which planned and organised play way activities and games are utilised for deriving useful educational purposes. Gaming or play way activities may be organised as individual or group activities in both simulated and non-simulated conditions. Moreover, we may also make use of both verbal (e.g., quiz competition, puzzles and riddles, oral problem solving and exploring creative ideas regarding a thing, idea or a phenomenon, etc.) and non-verbal stimulus material (e.g., building a pattern, construction or completion of a picture or design, creating a thing out of the raw material and constructing as many words as possible with the help of given alphabets, etc.)

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Simulated Teaching

INTRODUCTION

In any teachers training course, the main target lies in equipping the teacher as nicely as possible to face the class in real setting. For this purpose teachers are taught various methods, skills and many other things for communicating well with their students. The theoretical knowledge is supplemented by giving them opportunity for actual teaching in the practising schools in the name of *practice teaching*. However, it is not proper as well as justified to send the teacher directly to the classrooms of the practising schools without actually giving them opportunity for practising their teaching skills and communication performances. *Microteaching* as discussed in the preceding chapters may provide a platform for such pre-preparation but it does not help in the *full dress rehearsal* or experimentation of what is to be done in actual classroom situation. The answer lies in another training technique named *simulated teaching*. Let us try to know about it in detail.

WHAT IS SIMULATION?

Simulation in its dictionary meaning stands for the act or process of pretending or *role playing*. It is a kind of an assumption or imitation of a particular appearance or form. When a male child puts the beard and moustaches on his face and the little girl serves the dishes to him they are said to simulate, i.e. imitate the acts of their parents. Through such simulated playful acts the children get the opportunity of training them for future life. When Chandra Gupta was first located by Chanakya in his simulated act, i.e. playing the role of a king with his playing mates he was not only pretending or imitating the king but also actually trying to solve the problems and disputes faced by his mates. Thereby simulation as a task involves both role playing and problem solving and thus may be defined as a *process of learning or training technique aimed to increase the potential of one's own problem-solving behaviour through role playing*.

Use of simulation

Use of simulation as a learning or training technique is as primitive as the creation of life on the earth. Human beings including birds and animals have been using this technique to train themselves as well as their youngsters to adjust and face the real-life problems. For training soldiers in the strategy of warfare, personnels in the management affairs and artists in the preparation of valuable pieces of art, the simulation technique has been in vogue since the immemorial time. With the passage of time, its use is now gathering momentum day by day and, in general, it is now recommended for every type of training in all walks of life. For illustration, we may have its use in the following situations:

1. Soldiers may be engaged in simulating the war strategies, mock fighting for providing them essential knowledge, experience, skills and attitude for fighting later on in the actual military warfare.
2. Pilots, navigators and drivers may be given all types of necessary experiences for flying and driving through

simulation on the models in the laboratory like conditions.

3. An orator, an actor, a salesman and a lawyer may be trained through the simulated technique by giving them essential experiences by arranging artificial situation and mock trials.
4. Engineering students and technical persons may be trained with simulated technique by using maps, models and arranging the artificial mock working conditions and projects.
5. Doctors and the personnels connected with medical profession may be trained in looking after and treating patients through *simulation*. In order to perform operations in real medical settings, they are made to learn the operation techniques by experimenting on frogs, rats and other animals including dead human body.
6. Teachers of all categories may be trained through *simulation* by making use of a mechanism known as simulated teaching before allowing them to teach their students in real teaching-learning situations.
7. *Simulation* may be used in the teaching or training of the children at all levels. With the help of the role-playing in a particular project, mock play, drama, etc., they may learn many things connected with their formal or informal education.

In a nutshell, thus, we can say that *simulation* as a learning or training technique is applicable and useful for all types of learners and trainees at all levels of training and learning.

WHAT IS SIMULATED TEACHING?

Literally, simulated teaching means the teaching performed through *simulation*. In this sense it conveys the use of simulation technique in the field of education and may be defined as below:

Simulated teaching is a learning or training technique for helping the learner to bring desirable changes in his behaviour through some systematic and organised learning experiences in simulated, i.e. artificial laboratory like conditions.

Advantages and merits of simulated teaching

The belief that teachers are born and one who has good knowledge of his subject can teach well without going through any prescribed course of teachers' training do not hold much ground. Teaching is a serious activity, a highly specialised and technical job that needs proper pre-preparation, training and sufficient practice in the form of acquiring necessary knowledge, skills, interests and attitudes. One has to learn the art of teaching and therefore the efforts for bringing desirable modifications in the behaviour of the teacher trainees are very much essential for helping them to become effective teachers. The teacher teaching courses at all levels cater to this need. Apart from imparting theoretical knowledge there is a provision of practical experiences to the student teachers in the form of demonstration lessons, discussion lessons and practice teaching.

In demonstration lessons, teacher educators are required to demonstrate before the trainees, the art of teaching by selecting some suitable lesson from the prescribed school curriculum. In discussion lessons, this responsibility of teaching falls on the shoulders of teacher trainees who try to teach (play the role of a teacher) on the lines as demonstrated by their teachers. Where demonstration lessons exhibit models of teaching before the trainees to imitate, discussion lessons are held to suggest improvement in the performance of individual teacher trainees who actually engage in *role playing* before their teacher and fellow teacher trainees. These two practices, giving demonstration lessons and arranging discussion lessons in a group, constitute the basic pre-preparation of

the trainees before sending them to various schools for practising their teaching skills.

In general, all these three practices related with our teachers training programme suffer from the following limitations and drawbacks:

Dependence on schools: These practices are dependent on schools in terms of material as well as human resources. While arranging for demonstration lessons and discussion lessons, the schoolchildren are required to be taught by the teacher educators and trainees for playing the role of the school teachers. During teaching practice, not only the schoolchildren but the total resources of the school are called for playing the role of school teachers by the trainees.

Injustice to the schoolchildren: Schoolchildren are made scapegoats in the name of the training of the teacher trainees. Much of their valuable time is wasted with little or no learning gains on account of the lack of necessary skills and desirable attitudes on the part of the teacher trainees. Teacher trainees not only cut a sorry figure in terms of playing the role of teachers but may also drift the school to utter confusion and indiscipline causing great harm to the process of modification of the behaviour of the schoolchildren.

Insufficient provision of training: The question arises whether or not the traditional teacher education programme provides sufficient opportunities to the teacher trainees through its demonstration discussion and practice teaching programmes? The answer lies in negative. Acquisition of teaching skill by all means is a serious task. It needs repetition, revision and practice of all the minute component of the different teaching skills. This means that there is a need of sufficient experimentation at will, which is neither possible nor desirable with the school children. While giving demonstration lesson, a teacher educator may like to discuss or throw more light on some or the other aspects of his teaching connected with contents, methods, techniques, class management. But due to the presence of the schoolchildren, he is forced to adopt the beaten track of confining himself to the teaching of the particular topic. Similarly, during discussion lesson, the freedom needed for bringing modification in

the trainee's behaviour is snatched due to the presence of schoolchildren. As a result, trainees find a very little scope for practising different teaching skills and showing any novelty or originality in terms of the teaching or classroom interaction. In such circumstances, when the trainees are forced to go through practice teaching programme in real school conditions. They find themselves nowhere due to their ill-equipped teaching potentiality. They teach classes half-heartedly with little confidence and lack of enthusiasm for learning or practising the art of teaching.

The remedy for the above pointed dismal picture lies in some appropriate alternate arrangement where we can train the teacher trainees in some artificial laboratory like conditions. Simulated teaching, in this way, may emerge as most suitable technique for the training of teachers. This arrangement may be compared with the provision made for the professional pre-preparation of the compounders, nurses and doctors. No doctor is allowed to operate a living human being before experimenting upon some non-living or animal objects. In the same way student teachers may not be directly allowed to use schoolchildren for practising their teaching skills and modifying their teacher behaviours. They may first acquire the necessary teaching experience through simulated teaching, i.e. playing the role of teachers in the non-stressful conditions of their own institution within their own group of fellow teacher trainees, then and only then they should face the real classroom teaching situations.

Disadvantages and demerits of simulated teaching

Simulated teaching, besides the mentioned merits and advantages, may be found to suffer from some of the following disadvantages and demerits.

1. *Simulation* cannot be a substitute of a real phenomenon. The teaching carried out in simulated conditions may pose difficulty in being transferred to real classroom situations.
2. Simulated teaching requires the different roles to be played by the teacher trainees as student, teacher and supervisor. They may be found non-serious or inefficient in enacting

these roles in an appropriate way and this may drift the process of simulated teaching into a failure.

3. Simulated teaching expects too much on the part of teacher educators. They have to plan, orient, distribute or assign the roles to be played by the teacher trainees, evaluate the process and outcomes of simulated teaching and provide timely feedback. It is not an easy task. They have to be specially oriented, trained and motivated for this purpose. The paucity of such teacher educators and proper sincerity on their part may many times cause a great obstacle in the success of simulated teaching programme.

Mechanism of Simulated Teaching

The mechanism of simulated teaching revolves around the *role playing* and problem-solving behaviour of the three namely, teacher, pupil and observer under the supervision of a trainer (teacher educator in the case of teachers training). Here attempts are made to create artificial teaching learning situations (as much as resembling the real classroom settings) within the environment of the training institute and the teacher trainees are required to play the role of teachers, pupils and supervisors one by one within their limited groups for a limited time, on a specific topic, in order to learn or practise particular teaching behaviours or teaching skills. The specific steps or procedure involved may be summarised as below:

Orientation: In the beginning, the student teachers should be given necessary theoretical background for the adoption of simulated teaching by bringing into light the following important aspects:

- i. Concept of simulation.
- ii. Use of simulation as a training technique.
- iii. Concept of simulated teaching.
- iv. Significance and rationale of using simulated teaching for their training.
- v. The mechanism and procedure followed in its use.
- vi. The role of student teachers in simulated teaching.

- vii. Requirements and setting for adopting simulated teaching technique.

Selection of the theme for teaching: What is to be practised through simulated teaching should be decided well in time. What are the specific teaching skills or teacher behaviours that need to be practised or modified? The topic and the methods or technique used should be planned in advance for becoming specific and objective in the task of simulated teaching.

Demonstration lesson: Example is always better than precept. Keeping this thing in mind, the teacher educator should try to give demonstration of a good teaching for the practice of the skill selected, topic to be dealt with the methodology to be employed by the teachers trainees.

Formation of groups: The teachers trainees are divided into specific groups based on their teaching subjects, teaching skills practised, methods and techniques used, their total numbers and their ability and interest, etc.

Assignment of roles: Simulated teaching requires the *role playing*. As pointed out earlier, there are three different roles—teacher, pupil and observer, that is to be played by every pupil-teacher in his group. Therefore, a prior judgement is needed for deciding the order in which different teacher trainees will play the role of the teachers, pupils or observers. However, it is always remembered that, irrespective of the order, everyone has to play all the three roles at one time or the other in the overall process of simulation.

Planning: The schedule of teaching, in every aspect, is now planned. Each trainee who is assigned the role of a teacher is now helped in the selection of a suitable topic of his interest in view of the skills to be practised. He is further helped in preparing mini or micro-lesson plan. The trainees who will play the role of pupils are also helped in deciding and planning for the role of pupils. The anticipated classroom interaction is also planned with respect to the role of the trainees as observers. The procedure and technique of observation is also decided and planned in advance. The decision regarding the

use of these observations in providing feedback to the teacher actors is also taken in advance.

Execution of the first practice session: The teacher trainees who are to play the roles of teachers are then asked to deliver their lesson one by one to their peers who play the role of pupils. Those playing the role of observers/supervisors engage themselves in noting down all the strong and weak points of teaching concerning classroom interaction, teacher behaviours, content taught, skills practised and methodology used, etc. After delivering the lessons, free and frank discussions are held purely to provide feedback for modification and improvement in teacher behaviour, classroom interaction and overall art of teaching. The role of pupils and supervisors is also discussed in order to bring desirable modification. In view of such discussions, the whole mechanism of simulated teaching is then subjected to necessary alteration in terms of the roles played by the teachers, pupils and supervisors.

Follow-up during subsequent practice sessions: What is decided in terms of modification and alterations in the first session is being practised in the second and subsequent sessions till the goals of practising one or the other teaching skills and acquisition of sufficient art of teaching is not achieved. The roles of the student teachers are also gradually altered as to provide opportunity for playing different roles. In this way, all student teachers in the group are given full opportunity to practise their teaching skills, modify their teacher behaviours and acquire an overall art of teaching with the help of their fellow teacher trainees under the guidance of the teacher educator.

The steps laid down above do not stand for any rigidity in carrying out the task of simulated teaching. One is free to adopt his own system and procedure as found most workable in one's circumstances. The important factor is the initiation, motivation and enthusiasm of the teacher educator and the participating student teachers to engage in active research and experimentation under simulated conditions for finding the ways and means of providing the best training technique to learn the art of teaching. They are free to adopt and synthesise microteaching procedure with the practice of

usual classroom teaching. They can concentrate on the improvement of one or the other skills or may have a *full dress rehearsal* of a class teacher. For example, in one situation, they may practice to learn the art of *introducing the lesson* by picking up a particular lesson. Turn-wise, they may play the roles of a teacher, pupil and observer and thus may get adequate feedback as well as opportunity for practicing and bringing desirable modification in their own technique and skill of introducing a lesson. In other situation, they may learn or practice the art of class management or asking questions etc. and finally they may rehearse for playing the role of a full-fledged classroom teacher and then offer themselves to be placed for practice teaching in the real classroom setting of the practicing schools.

SUMMARY

1. *Simulated teaching* stands for a training technique helpful to the teacher trainees for having a full dress rehearsal or experimentation of what is to be done in actual classroom situation. Its ways of functioning is based on a mechanism named as *simulation*.
2. *Simulation* in its dictionary meaning stands for the act or process of pretending or *role playing*. In its practical application, it may be turned into a process of learning or training technique aimed to increase the potential of one's own problem- solving behaviour through his *role playing* in simulated, i.e. artificial laboratory like conditions. With the adoption of such technique, the navigation trainees may get real like navigation experiences by diving in the artificially conditions created in the training laboratories. The same thing may also be done for training the prospective teachers by adopting a training technique referred to as *simulated teaching*.
3. The adoption of *simulated teaching* for the training of prospective teachers may be equated with the training of professionals like pilots, navigators, compounders, nurses and doctors. As we know, no doctor is allowed to operate a living human being before experimenting upon some non-living or animal objects. In the same way, it is not worthwhile to allow the teacher trainees straightforward to use schoolchildren for practising their teaching skills and modifying their teacher behaviours. They are in the beginning required to acquire the necessary teaching experiences through *simulated teaching*, i.e. playing the role of teachers in the non-stressful conditions of their own institution within their own group of fellow teacher trainees, then and only then they should be considered fit to face the real classroom teaching situations.
4. The mechanism of simulated teaching revolves around the *role playing* and problem-solving behaviour of the three

namely, teacher, pupil and observer under the supervision of a trainer (teacher educator in the case of teachers training). The application of *simulated teaching* technique for the training of the prospective teachers require the adoption of a few systematic and organised steps such as (i) orientation (providing necessary theoretical background for the adoption of simulated teaching), (ii) selection of the theme for teaching (what is to be practised through simulated teaching, (iii) arranging demonstration lesson for presenting model before the trainees, (iv) formation of groups of teacher trainees, (v) assignment of roles to the trainees for turn wise playing their roles as the teacher, pupil and observer, (vi) planning for teaching in a simulated situation, (vii) execution of the first practice session, (viii) the required follow-up during subsequent practice sessions for bringing improvement in one's teaching.

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Team Teaching

INTRODUCTION

Team teaching, as the name suggests, signifies the teaching work and activities organised by a team of individuals comprising teachers, resource persons, clerical staff and other employees. Although quite popular and prevalent in the western world, it is relatively a new concept in our country. We can term it as an *innovation* in the field of teaching and learning. In a simple way, it may be understood as an attempt to seek ways and means for bringing improvement in the process and product of teaching through collective efforts by a group of individuals, mostly teachers teaching in the same school. Let us see what it is and how it can be best utilised for achieving its desired objective.

ORIGIN AND GROWTH

It is difficult to pinpoint the exact origin of the new concept of *team teaching* in terms of the time, country or the personality, responsible for its invention. However, it is true that the concept got its emergence around 1950. As a matter of historical interest, the Harvard University was the first to put forth a plan known as **internship plan** in 1955. In this plan, five teacher trainees were required to work simultaneously under the leadership of an experienced teacher. The second known project in this field along the line projected by the Harvard University was started in Lexington (1957–64). Then came the turn of the Chicago University where Francis Chase emphasised and worked for the development of a system of *team teaching* for the effective utilisation of the best teachers. Another mentionable American personality of the mid-1960s was J. Leyod Trump, Director of the Commission of the Experimental Study of the Utilisation of Staff in Secondary School, who contributed significantly in the growth of this concept. The concept gradually became so popular that it remained not only confined to the training of teachers or imparting effective instructions in the schools but also started to be used in the training of armed forces.

From U.S.A., this concept got transferred to England and up to 1965 it was in proper progress in the schools and colleges of U.K. In the late 1970s, an educationist from this country named Joseph Lancaster came into limelight for developing a monitorial system of instruction in the field of *team teaching*. In this system, a teacher, master in his subject, was supposed to teach a few monitors, the bright students who in turn worked as a team to teach to their fellow students what they had learnt. In this way, the concept of *team teaching* reached its peak in the seventies in most parts of the western world. However, it took enough time to reach our country. Even till date, it has only a theoretical value and is still not known by many of the pupil-teachers trained in our universities and colleges of education.

MEANING AND DEFINITIONS

Several scholars have defined the term *team teaching* in various ways. Let us reproduce some of them as below:

I.J. Singer (1964): *Team teaching may be defined as an arrangement whereby two or more teachers cooperatively plan, teach and evaluate one or more class groups in an appropriate and agreed teaching plan and is given length of time so as to take advantage of specific competencies of the team members.*

Carlo-Olson (1971): *Team teaching may be defined as an instructional situation where two or more teachers possessing complimentary teaching skills cooperatively plan and implement the instruction for a single group of students using flexible scheduling and grouping technique to meet the particular instruction. (S.S. Chauhan, 1979 : 114)*

J.T. Shaplin (1964): *Team teaching has been defined as a type of instructional organisation involving teaching personnel and the students assigned to them, in which two or more teachers are given responsibility or working together, for all or a significant part of the instruction of the same group of students. (Usha Rao, 1977 : 168)*

David Warwick (1971): *Team teaching represents a form of organisation in which individual teachers declared to pool resources, interests and expertise in order to devise and implement a scheme of work suitable to the needs of their students and the facilities of the institution.*

S.G. Callahan (1971): *Team teaching is that teaching-learning process where two or more teachers cooperatively formulate a plan, carry it out, evaluate its effectiveness as it relates to a specific group of students. (Usha Rao, 1977 : 168).*

H.M. La Fauci and P.E. Richer (1970): *Team teaching is an organisational device which makes a number of individuals cooperatively engaged in some relevant instructional activities for achieving the common educational objectives. This concept carries*

the belief that the objectives are best achieved through organised cooperative efforts in comparison to unrelated individual efforts.

M. Haridwar (1986): Team teaching is *that organised form of the teaching structure in which two or more teachers cooperatively teach a particular subject or topic to a group of students.*

The analysis of the above definitions brings into limelight the following characteristics of team teaching:

1. *Team teaching* is not a method of teaching but an organisational device to plan, execute and evaluate the teaching work in a cooperative way.
2. It represents an arrangement of teaching–learning situation where two more teachers join hands for achieving the desired teaching–learning objectives.
3. *The teaching* team consists of not only the teachers, but other personnel also such as laboratory assistant, librarian, clerk, expert from the relevant field, and researchers, who may join hands to help the teachers in their tasks.
4. *Team teaching* works on the principles of joint responsibility shared by the members of the team.
5. It is called cooperative teaching calling for the full willing cooperation of the members. Here their joint efforts are more important than the total individual efforts made by individual members in an unrelated way.
6. While calling for the joint responsibility and combined efforts, it provides full opportunity to the individual member of the team to contribute its maximum according to his interest, ability and need of the situation.
7. Here, every teacher is provided appropriate time and opportunity for utilising his specific talent and competencies for teaching a topic or content to a group of students.
8. It helps the students in getting the best services of the best talent of the team members at the proper time.
9. It provides flexibility in terms of scheduling and grouping techniques to meet the need of a particular instruction. Accordingly, it may allow the formation of student groups in

varying sizes, i.e. large group class, small group discussion and individual study.

10. It calls upon the members to work hard for bringing improvement in the teaching-learning process.
11. It inspires and motivates the individual teacher to improve his knowledge and skills for contributing his share in the teamwork.
12. *Team teaching* provides autonomy and freedom to the members of the team to choose their teaching activities and responsibilities according to their interest and abilities.
13. It helps in utilising the available resources—human and material, in a proper way and at the proper time in the interest of the students and institution.
14. The need and interest of the students are fully cared in the joint responsibilities shared by the teachers.
15. Here the students are owned by all the members of the team and not only by an individual teacher.

Thus, we can think about team teaching as *an innovation in the field of teaching and learning, aiming to improve its process and products by calling upon the joint cooperative efforts of a team of the personnel (teachers and others) by utilising the resources available in a given teaching-learning situation, at the proper time and in a proper way.*

OBJECTIVES

Team teaching is generally directed to achieve the following objectives:

1. To bring improvement in the quality of instruction by making the best use of the available resources.
2. To develop a feeling of joint responsibility of instruction.
3. To make the best the utilisation of the talents, interests, and expertise of the teachers.
4. To provide better organisation of the teaching–learning by increasing grouping and scheduling flexibility.
5. To provide opportunity to a specific large or small group of students to take advantage of the specifically talented, experienced and more expert teachers, otherwise not available to them.
6. To meet the needs and interests of the students and institutions and removing their difficulties relating to the teaching–learning of some specific contents or activities.
7. To minimise the wastage and errors occurred in the instructional process.

THE GUIDING PRINCIPLES

Team teaching for a particular teaching subject is organised under the following basic principles:

Principle of pooling the resources: *Team teaching* is based on pooling and best utilising the available resources and expertise in the field of teaching.

Principle of joint responsibility and cooperation: *Team teaching* is organised to teach a specific group of students by a team of personnel headed by a leader. It requires that all the members of the team share joint responsibilities and work together for achieving the ends.

Principle of attending the needs of the students: *Team teaching* is organised according to the interests, abilities and needs of the learners. Since a team as a whole shares the teaching task in it, it provides better opportunities to take care of the difficulties and needs of the individual students.

Principle of flexibility in terms of grouping and scheduling:

Team teaching requires adequate flexibility in terms of grouping of the students in the form of large classes, small groups or study at the individual level. It also needs flexibility with regard to time factors and scheduling. Here the time needs to be adjusted according to the requirements of the teaching-learning situation.

Principle of appropriate selection of the team members: *Team teaching* requires joint responsibility and such responsibility can only be undertaken properly if the members of the team are selected judiciously according to the needs of the instruction.

Principle of willingness and appropriate distribution of the responsibilities: The team members should distribute duties among themselves properly for the realisation of the set objectives. However, nothing should be thrust upon them by the head of the institution or the team leader. They should willingly come forward or

be persuaded for sharing their responsibilities according to their abilities, experiences and needs of the situation.

Principle of appropriate teaching-learning environment: *Team teaching* for its success needs appropriate teaching–learning environment. Here nothing should be left for chance and the leader along with the members of the team should try hard for achieving appropriate teaching–learning environment, in terms of the readiness of the teachers to learn, members to work, arrangement of the proper material facilities and resources, suitable non-distracting environment, etc.

Principle of appropriate supervision and evaluation: The *team teaching* activities require constant supervision and evaluation. This may be in the form of self-evaluation and check on the ongoing activities by the individual members or the leader can take up the task. Similarly, the learners should also be engaged in the task of supervised study, drill work, homework and other activities for the needed practice, revision and evaluation of the learning.

TYPES OF TEAM TEACHING

Team teaching can be organised in various forms and styles. The common ones are the following:

Single disciplinary team teaching: In this type, the members of the team belong to the same institution and also to the same discipline or subject. For example, the mathematics teacher teaching high school classes may form a team for the teaching of mathematics to a particular high school class. Here, every member of the team is allowed to teach that very branch, topic or content of the subject that can be the best handled by him.

Interdisciplinary team teaching: Here the teachers from different disciplines, but working in the same institution, join hands to take responsibility of teaching the topics belonging to their own discipline. This type of team teaching suits the most for teaching the interdisciplinary subjects. For example, in the teaching of some foundation course that includes the topics from various disciplines such as, economics, geography, civics, and history different teachers of the same institution belonging to these disciplines/subjects may form a team.

Inter-institutional team teaching: In this type of team teaching, the members are not confined to the same institution. Here we can call the services of any talented teacher, expert, etc. from any institution/public life for dealing with some or the other specialised field, topic, work activity, content material, etc. and in this way, we can ask him to contribute in the capacity of the members of the team for a specific period, to teach a particular group of students.

ORGANISATION, PROCEDURE AND STEPS

Team teaching is carried out in a cooperative way by a team of persons. Every team has its leader and one or more cooperating teachers. Besides, the team may have a clerk, a librarian, a laboratory assistant and other full-time or part-time professional for the desired help according to the needs of the teaching–learning situation.

In terms of procedure, *team teaching* usually involves three main stages or steps: (i) planning, (ii) execution, and (iii) evaluation.

Planning stage

At the planning stage, *team teaching* involves the following activities:

1. Decision about the topic to be taught.
2. Formulating the objectives and writing them in behavioural terms.
3. Identifying the initial behaviour of the learner.
4. Identifying the available men and material resources.
5. Selection of the members of team teaching, teachers, team leaders, and other professional and non-professional helping hands.
6. Taking decision about the tentative schedule, large or small group teaching, the level of instruction and teaching strategies, etc.
7. Distributing responsibilities among the members of the team according to their interest and abilities.
8. Taking decision about the means and ways of evaluating the learning outcomes.

Execution stage

What is planned by the leader of the team with the active cooperation of other members at the planning stage is put to work at the execution stage. Here the actual teaching-learning activities are

carried out by the members in the following three subsequent sessions:

Large group session (general assembly): In the beginning, the students are taught in a large group. Two or three sections of a class may be combined to form a large group. This group is taught by the most competent and expert teacher among the members of the team. All other members then provide the essential cooperation in his task. For example, one may provide some additional points or information, the others may show the map, draw summary on the blackboard, demonstrate some experiments, give examples, etc. as needed the most. The maintenance of discipline also may be left to some cooperative teachers. The students are to listen to the lecture or observe what is demonstrated to them by the teacher. They are also free to ask question and discuss the matter taught and points raised by the teacher. Here other teachers play their part to help the main teacher in providing appropriate answers to the questions of the students.

Small group session: After the general assembly, the students are divided into small groups. These groups work under the supervision of the individual teachers. Here the teacher tries to discuss with the learners, the common difficulties faced by them in understanding the material taught in the general assembly session. He may explain, illustrate, demonstrate and provide opportunities to them for doing experiments or other activities in the small groups.

Individual study session: Following the activities in large group or small group sessions, as discussed, the students are able to engage in self-study and do independent work on the individual level. Now, they can go to library for independent reading, to laboratory for independent experimentation or to other work places for doing practical work. They can have drill and practice work or adopt other resources for self-study. Here the teachers and other members of the team have a big responsibility of supervising, guiding and directing the students on the right path. They have to remove their individual difficulties and suggest ways and means for their progress according to their interests and abilities.

Evaluation stage

At the evaluation stage of team teaching, attempts are made for the evaluation of the progress and outcomes of the activities performed. The outcomes are subjected to evaluation in the light of the set objectives, the learner's initial behaviour, the methods and strategies, planning, the responsibilities shared by the team members, etc. The evaluation of the student's performance is done through oral, written and practical tests. Their sessional practice and homework also is evaluated from time to time for providing comprehensive picture of their learning outcomes as a result of team teaching. In the light of all such evaluation works, attempts are made to incorporate necessary modifications and improvements in the organisation of team teaching programmes in the institution.

ADVANTAGES

Team teaching as an organisational device has the following things on its credit side:

Best utilisation of the available talents: Team teaching provides opportunities for the best utilisation of the talents and expertise of the experienced and devoted teachers in their respective fields. Here the teachers discharge their responsibilities according to their own interests and abilities, hence they can play their role quite effectively and efficiently. In this way, the learners are greatly benefited for the different teaching–learning situations.

Best utilisation of the available material resources: In usual teaching, a teacher finds it difficult to take full advantages of the available material resources, but in team teaching he can get help from the members for the proper utilisation of the available resources as some may render help in the utilisation of audio-visual aids, some may help in maintaining discipline and others may note the difficulties of the learners and answer them at the proper time. In such a cooperative situation, it becomes quite easy for the teacher for attaining the set objectives.

Provides opportunities for professional growth: Team teaching provides challenge and opportunities to the teachers for their proper professional growth. Here, the young and less experienced teachers get opportunities to work with the experienced and talented ones. They learn many things about their subjects and teaching skills. In addition, all the team members have to prepare themselves in a proper way for discharging their responsibilities. Thus, attaining perfection in terms of knowledge and teaching competencies.

Provides better learning opportunities: *Team teaching* helps in getting better learning opportunities to the students in comparison to the traditional teaching. Here they are provided proper opportunities for raising questions, getting their difficulties solved and having free discussion on the topics of their interest with the best teachers. They get large exposure in the general assembly and have proper time attention from their teachers in the smaller group discussions and

self-study sessions. All this helps in removing their common and individual difficulties and provides them a stimulating learning environment, suiting to their own needs and pace of learning.

Provides opportunities for interaction with the experts: Both the teachers and the learners get opportunities to interact with the experts in a subject of a specialised field. It not only gives them a useful exposure in terms of learning many new and specialised things but also provides due inspiration and motivation for reaching at the top in the field of learning, instruction and research.

Helps in maintaining proper human relationships and cooperative attitude: Team teaching works on the principle of cooperation and shared responsibility. It makes the members of the team to come near to each other, understand the likings and competencies of one another and develop sweet and cordial relations among themselves. Their cooperative attitude, helping nature and team spirit make the students to imbibe such things quite automatically and, in this way, team teaching helps in achieving a very important goal of education namely, helping the children in their proper social development.

Proves economical in terms of time and labour: *Team teaching* helps in reducing the level of anxiety in the individual teachers by assuring cooperation from the members for achieving the desired objectives. It helps in reducing the labour of the individual teacher. It also proves economical in the sense, that a large group having more than 200 or 300 students can be successfully taught by a single expert teacher at a time with the help of suitable communication aids and cooperative team members.

Provides proper flexibility: *Team teaching* proves quite flexible in terms of scheduling and grouping techniques to meet the need of a particular teaching-learning situation. Accordingly, the learners may be taught in large and small groups or alone as individuals. Here the timetable is never rigid.

Helps in maintaining discipline: *Team teaching* is carried out by members of the team in a cooperative way. There are many teachers

and other professional and non-professional assistants present in the teaching-learning situation who can share different responsibilities. Hence, the responsibility of maintaining the discipline should not be assigned to a single teacher only as a common practice in the traditional classroom teaching. The students get proper help, guidance and direction from the members. There is enough scope for the application of the principle of change and variety in the teaching-learning process. The teaching is done in accordance with the needs and interests of the learners. Care is to be taken for the arrangement and proper utilisation of the material resources in terms of building, seating arrangement, proper ventilation, light and display of audio-visual aids.

Provides opportunities for proper supervision: There are a number of teachers and other personnel involved in team teaching. Therefore, there is no difficulty in having a quite planned scheme for the supervision of the independent and self-study made by the individual students. Their drill and practice work, homework and assignments, laboratory and other practical work can never go unsupervised and unchecked in *team teaching* as may be possible in the traditional teaching due to heavy load of work.

Proves an effective training technique: *Team teaching* may prove a good and effective technique for the training of *would-be teachers*. Here only one or many teacher trainees can work under the leadership of an expert or an experienced teacher for learning the art and technique of the teaching profession. The practice is similar as adopted in medical colleges, where a number of medical students doing internship or engaged in M.D, or M.S. studies acquire valuable practical knowledge of their profession while working with a senior doctor.

DRAWBACKS AND LIMITATIONS

Team teaching suffers from the following serious drawbacks and limitations:

Difficulty in the distribution of the responsibilities: Proper sharing of responsibilities is required on the part of the *team members*. For this purpose, the members should willingly come forward. However, it is seen that members try to avoid or hesitate to share the responsibilities, as a result, the task or distribution of the responsibilities, is left entirely to the team leader who feels a lot of difficulty in choosing the proper persons for the particular tasks and then persuading them to take over the assigned responsibilities.

Difficulty in maintaining harmony and understanding: *Team teaching* requires proper understanding and cooperation among the members. The goal is to achieve the set objectives and, for this purpose, every member should have proper team spirit and a positive attitude towards the assigned work. There is also a need of doing away with their ego, hesitation, inferiority complex, etc. for working for the common cause. The teachers with the required attitude are hardly available and, consequently, it will become difficult to maintain proper coordination and harmony among the members for getting desired success through team teaching.

Too much expectations from the teachers: *Team teaching* for its success demands a lot from the teachers. Every teacher should have a thorough knowledge of the subject along with the necessary skills to handle small group discussions, individualised study and many other experimental and project works. Such competent teachers with complete willingness and positive attitude towards *team teaching* are hardly available.

Undue importance of the teachers at the cost of the learners:

The entire scene of the *team teaching* is dominated by a team of the teachers. The activities concerning planning, execution and

evaluation are entirely teacher's task and thus, the learners are given an insignificant role in the teaching-learning process.

Difficulty regarding lack of material facilities in schools: The organisation of *team teaching* requires proper space and material facilities in terms of a big hall, large rooms, furniture, laboratory, library, workshops, teaching aids and communication equipment. Lack of these material facilities proves a big obstacle in the success of *team teaching*.

Not suitable to the present educational set-up: *Team teaching* for the required effectiveness: necessarily demands some changes in the existing school organisation, selection and appointment of teachers, school's curriculum, system of evaluation, etc. which is not an easy work.

Teachers' resistance for any change: Team teaching is a new thing for our teachers. Most of them live in a world of inertia and do not want to change the mode of traditional teaching. So, *team teaching* for its success requires a change in the attitude and philosophy of the teachers. It also requires from them to learn the art and skill of *team teaching*. In the absence of these requirements, it is difficult to adopt team teaching in our schools.

Expensive in terms of finances: *Team teaching* requires more facilities in the form of space, material and equipment, in comparison to traditional teaching. Our schools, where it is difficult to have even sheds and blackboards for all the classes, we cannot expect to arrange for the finances required for making arrangement for the needed men and material facilities.

Limitation in terms of planning and execution: *Team teaching* requires quite appropriate planning and its execution. The planning itself is not a simple task. It needs full cooperation of the team members and planning skill of the leader. Such type of cooperation is hardly available to the leader. If he himself is lacking the required planning skill, team teaching cannot be organised in a proper way. At the execution stage, the members must feel the responsibility of

sharing the planned activities. However, practically it is seen that the team members, instead of sharing their responsibilities with full sincerity, begin to blame each other and quarrel for very petty things.

Lack of accountability: In the traditional teaching, a teacher teaches a subject to a particular class or classes and he is accountable for the results and progress of the students belonging to that class in his subject. However, in *team teaching* it is not the individual but the whole team who is accountable for this. It can make the individual teachers quite careless and irresponsible towards exercising his teaching duties as he can blame other members of the team for any failure.

In this way, *team teaching* has almost equal points on its credit and debit sides. However, careful scrutiny of its defects and limitations may reveal that the defects do not lie within the innovation itself. It reflects the natural tendencies and work habits already prevalent in our teachers and education system. There is nothing bad in adopting a good practice for improving our school teaching.

Team teaching provides a way and it is our duty to experiment it with full understanding and determination. The beginning can be made with our colleges of education where we can equip the teachers for the effective organisation of *team teaching*. In addition to this, we must have desire for research work to make necessary modifications in the basic philosophy and organisational procedure of *team teaching* so as to suit the requirements of our students and schools.

SUMMARY

1. *Team teaching*, as the name suggests, is a type of teaching in which a number of teachers and other personnel of the school work as a team for providing instruction to a group of students by utilising the resources available in a given teaching–learning situation at the proper time in a proper way.
2. *Team teaching* aims for (i) seeking cooperation of all the members of a subject faculty and other personnel in the instructional work, (ii) developing feelings of joint responsibility towards the students, (iii) proper realisation of the teaching objectives of a particular school subject by making best use of the available men-material resources, (iv) removing some of the difficulties and problems of the teaching of a particular subject faced due to the paucity of resources, and (v) minimising the wastage and errors occurring in the instructional process.
3. *Team teaching* in the teaching of a particular school subject is to be organised by keeping certain basic principles in mind like (i) principle of pooling the resources, (ii) principle of joint responsibility and cooperation, (iii) principle of attending the needs of the students, (iv) principle of flexibility in terms of grouping and scheduling, (v) principle of appropriate selection of the team members, (vi) principle of willingness and appropriate distribution of the responsibilities, (vii) principle of appropriate teaching–learning environment, and (viii) principle of appropriate supervision and evaluation.
4. *Team teaching* with regard to the teaching of a particular school subject can be organised in a number of forms and styles like (i) single disciplinary *team teaching* (consisting of the members of the faculty of the particular teaching subject only), (ii) interdisciplinary team teaching (incorporating also the members and personnel from other faculties of the school, and (iii) inter-institutional *team teaching* (incorporating teachers and other personnel from other

schools along with one's own in the team).

5. The task of *team teaching* in reference to teaching of a particular school subject can be organised by following three steps like (i) planning for the team teaching, (ii) execution of the team teaching task, and (iii) follow-up or evaluation of team teaching activities.
6. *Team teaching* with regard to the teaching of a particular school subject can be found helpful in gaining the advantages like (i) best utilisation of the available talent, (ii) best utilisation of the available material resources, (iii) providing opportunity to the teachers for their professional growth, (iv) providing better learning opportunities to the learners, (v) providing opportunities for interaction with the experts, (vi) helping in maintaining proper human relationships and cooperative attitude, (vii) proving economical in terms of time and labour, (viii) providing proper flexibility, (ix) helping in maintaining proper discipline, and (x) providing opportunities for proper supervision.
7. *Team teaching* with regard to the teaching of a particular school subject may also be found to possess the limitations and drawbacks like (i) difficulty in the distribution of responsibilities, (ii) difficulty in maintaining harmony and understanding, (iii) too much expectations from the teachers, (iv) undue importance to the teachers at the cost of the learners, (v) difficulty regarding lack of material facilities in schools, (vi) not suitable to the present educational set-up, (vii) teachers' resistance for change, (viii) expensive in terms of finances, (ix) limitation in terms of planning and execution, and (x) lack of accountability on the part of the team members.
8. In spite of its suffering from some limitations and difficulties, *team teaching* may play a quite effective role in the teaching and learning of a number of subjects of the school curriculum particularly the subjects of multidisciplinary nature. For example, in the subject social studies, the content material, the valuable learning experiences and topics of study are drawn from the various disciplines of

social sciences such as history, geography, civics, economics, political science, etc. We cannot expect from a single teacher to have proper mastery over the subject material of all these disciplines and here the *team teaching* approach can prove a valuable substitute or supplement to the traditional classroom teaching in the teaching and learning of the subjects of multidisciplinary nature.

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Models of Teaching

MEANING OF THE TERM “MODELS OF TEACHING”

The term *model* carries different meaning in our day-to-day life. We look at the model of *Taj Mahal* and find it an exact replica of the original. This is why models prove a quite effective aid as a substitute for the reality in the classroom situation.

In behaviour modification and in the task of helping the individual to learn good habits, to imbibe desirable attitude, interests and many other personality characteristics, the term *model* or *modelling* is used in presenting some ideal figure or behaviour for the purpose of its copying or imitation by the individual concerned. A teacher, a leader or a screen hero may work as a model for a child and he may pick up the behaviour or traits of the personality of that model.

In another way models are profoundly used by the artists, architects or engineers in their professional activities. Initially the models of dams, projects, installation, or construction of machinery and equipment are prepared by the concerned engineers and then the work is carried out exactly as it has been laid down in the model. The architect also provides us with some models when we happen to consult him for the construction of the building of our house.

The different meanings attributed to the term *model* as described above may prove quite helpful in understanding or defining the term *models of teaching* or *teaching models*. It has been defined by the research workers and writers in a number of ways. Some of these definitions are given below:

Joyce and Weil: *Teaching models are just instructional designs. They describe the process of specifying and producing particular environmental situations which cause the student to interact in such a way that specific change occurs in his behaviour.* (1972, p. 2)

Joyce and Weil: *Teaching models is a pattern or plan, which can be used to shape a curriculum or course, to select instructional materials and to guide a teacher's actions.* (1972, p. 3)

Weil and Joyce: *A model of teaching consists of guidelines for designing educational activities and environments. It specifies ways of teaching and learning that are intended to achieve certain kinds of goals.* (1978, p. 2)

Paul D. Eggen et al.: *Models are prescriptive teaching strategies designed to accomplish particular instructional goals.* (1979, p. 12)

N.K. Jangira and others: *A model of teaching is a set of inter-related components arranged in a sequence which provides guidelines to realise specific goal. It helps in designing instructional activities and environmental facilities, carrying out of these activities and realisation of the stipulated objectives.* (1983, p. 10)

Analysis of the definitions

First definition considers models as instructional designs. These designs help in the process of teaching as below:

- i. These suggest the ways and techniques of creating a favourable environmental situations for carrying out teaching process.
- ii. These help in achieving desirable teacher-pupil interaction during teaching.
- iii. The ultimate goal of bringing desirable changes in the behaviour of pupil may be achieved through these designs.

Second definition considers models as a sort of some patterns or plans prepared in advance for the success of the teaching–learning process as below:

- i. It helps in the construction of a curriculum or contents of a course.

- ii. It helps in the proper selection of instructional materials for teaching the prepared curriculum or course.
- iii. It helps in guiding the teacher to select appropriate teaching techniques, strategies and methods for the effective utilisation of the teaching situation and material for realising the set objectives.

Third definition considers models as sort of specific guidelines helpful in the accomplishment of the following tasks:

- i. Designing appropriate educational activities.
- ii. Arranging proper teaching environment.
- iii. Specifying suitable ways and means of teaching as well as learning.
- iv. Directing all the resources of teaching to achieve specific objectives or goals.

Fourth definition views models in terms of some specific teaching strategies aimed at the realisation of the set objectives. These strategies are prescriptive in nature. What is to be done and how it is to be done in the process of teaching is pre-planned and well thought in view of the teaching goals and the diagnosis carried out with the student and teaching environment. Therefore, in exercising their prescriptive functions models help in defining clearly the teacher's responsibilities in the teaching process at all the three stages, namely, planning, implementing and evaluating.

Fifth definition considers models as a well-planned guide sheet helpful in realising the stipulated objectives of teaching by controlling the teaching environment and specifying the teaching activities.

The above discussion leads us to conclude that teaching models may be described as some sort of guidelines, plans or techniques or strategies designed to achieve specific educational objectives. They differ from general teaching techniques and strategies in the sense that they are designed to meet specific objective or goals. They help a teacher in his task in the same way as a constructed model or

blueprint helps an engineer in his project. Commenting on this analogy; Paul D. Eggen et al. (1979) writes:

An engineer, in considering a project, first identifies the type of structure to be built, e.g. a building, a bridge, or a road. Having done this, he selects an appropriate design or blueprint to follow in building that structure. The specifications of the blueprint determine the actions the builder takes and the kind of building that will result. The particular type of blueprint or model chosen depends on the type of structure to be built. In a similar manner a teacher considering the choice of a teaching model first identifies what is to be taught and then selects a model in accordance with that goal. The model chosen is specifically designed to achieve a particular set of objectives and will determine in large part the actions of the teacher.

The use of this new term *blueprint* persuades us to define the term *teaching model* somewhat in the following way:

Model of teaching is just a blueprint designed in advance for providing necessary structure and direction to the teacher for realising the stipulated objectives.

NEEDS AND CHARACTERISTICS OF TEACHING MODELS

What has been discussed above in terms of the meaning of the term *teaching models* may help us in drawing about the following conclusions about the needs and characteristics of models of teaching:

1. Models of teaching are some sort of patterns or plans prepared in advance for the success of the teaching–learning process.
2. They differ from general teaching techniques and strategies in the sense that they are designed to meet specific objectives or goals.
3. They provide specific guidelines or blueprint in advance for the realisation of the specific objectives by specifying the teaching activities and controlling the teaching–learning environment.
4. Models of teaching provide specific instructional designs for particular type of instruction in a specified teaching–learning situation.
5. Models of teaching help in creating a proper teaching–learning environment leading to effective teaching for the accomplishment of teaching–learning objectives.
6. Models of teaching help in specifying the criteria of acceptable performance expected from the learners in a specific teaching–learning situation.
7. Models of teaching provide systematic procedure and organised effort for the desirable modification of the behaviour of the learners.
8. Models of teaching first specify the teaching or learning outcomes in behavioural terms and then lay down a step-by-step procedure for the attainment of these outcomes.
9. Models of teaching help the teacher in his task in the same way as an engineer is helped in the construction of a

building or bridge by an appropriate model or blueprint prepared in advance for the construction of that building or bridge.

10. Models of teaching save the energy, time and efforts of the teachers and learners besides providing better economy to the best utilisation of the other teaching–learning resources.
11. Models of teaching are known to serve three major functions in a given teaching–learning situation, namely designing and specifying instructional objectives, developing and selecting instructional material and specifying the teaching–learning activities for the attainment of stipulated instructional objectives. These functions of teaching models can be explained with the help of the following diagram (Figure 22.1).

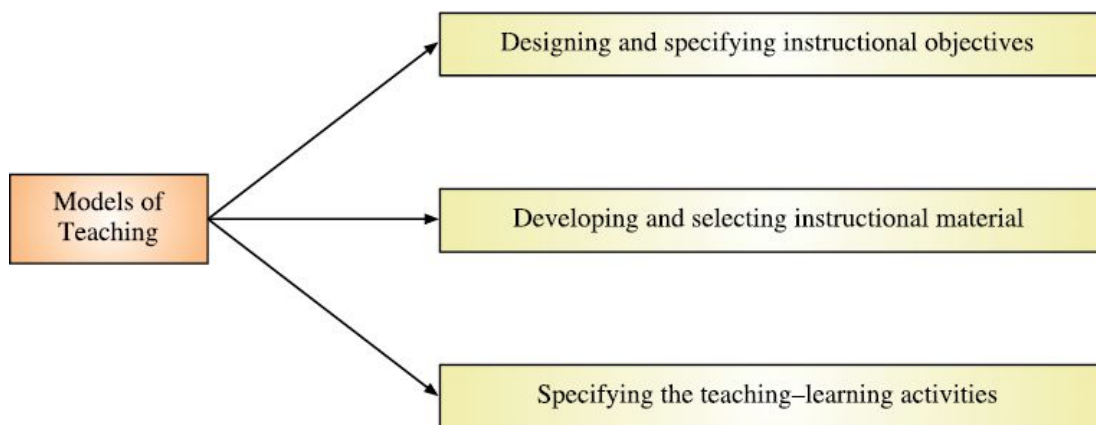


Figure 22.1 Functions of models of teaching.

FUNDAMENTAL ELEMENTS OR STEPS OF A TEACHING MODEL

A *teaching model* provides valuable guidelines and blueprint for carrying out the task of teaching for the realisation of some specific goals. So that a teacher makes use of model, he must be properly acquainted with its theory as well as practice. For this purpose, proper knowledge of the fundamental elements involved in the description of a model is quite essential. Generally, a *teaching model* is described in context with some fundamental elements. In the present text, we would be using the following six elements:

1. Focus
2. Syntax
3. Principles of reactions
4. Social system
5. Support system
6. Application context

Let us discuss these elements below:

Focus: *Focus* is the central aspect of a *teaching model*. The model centres around the theme of the focus. All the teaching models are meant for achieving some specific goals or objectives of teaching in relation to the environment of the learner. Therefore, objectives of teaching and aspects of the environment, generally, constitute the focus of the model.

Syntax: The term *syntax* or phasing of the model refers to description of the model in action. Each model consists of several phases and activities which have to be arranged in a specified sequence quite unique to a particular model. The syntax helps a teacher to use the model. It tells him how he should begin and proceed further.

Principles of reaction: While using the model, how a teacher should regard and respond to the activities of the student is a

concern of this element. These responses should be quite appropriate and selective. Every model through its principles of reaction provides the teacher with a particular and unique rules of thumb by which to tune in the student and select appropriate responses to what the student does. (Weil and Joyce, 1978, p. 6)

Social system: The fourth element refers to the description of the following:

- i. Interactive roles and relationships between teacher and student.
- ii. The kinds of norms that are encouraged and the student behaviour which is rewarded.

Models differ from each other with regard to the description of the above-mentioned aspects. In some models, the teacher is the centre of activity, or activities are somewhat equally distributed between teachers and students, while in others, the students (a few or the whole group) occupy the central place. The leadership role of the teacher comprising the location of authority and the amount of control over that emerges from the process of interaction also varies from model to model. Similarly the way in which student behaviour is rewarded, also differs from model to model.

Support system: This element of model refers to the additional requirements beyond the usual human skills or capacities from the teachers and the facilities or schedules available in an ordinary classroom. Such type of additional support may demand some special skills, knowledge and capacities from the teacher or some special aid material facilities like films, self-instructional system, visit to some place, a flexible schedule and a particular organisational climate suiting to the requirements of a particular model. It is needless to emphasise that the support system of a model contributes towards the success of a model by generating a desirable classroom environment.

Application context: This last element of a model describes its application aspect. Some models are meant for short lessons, some

for the large and some for both. They also differ in terms of the goal achievements—conative, cognitive or affective—and subsequently prove suitable to one or the other type of teaching. Therefore, each model through its element of application context tries to describe the feasibility of its use in varying context achieving specific educational goals and demanding specific work environment.

TYPES OF TEACHING MODELS

As said earlier, there exists a huge variety of *teaching models* arising from a variety of sources representing different frames of reference towards educational goals and means. Many attempts have been made to classify those in some specific categories (Hildgard and Bower, 1975; Patterson, 1977; Dececco and Crawford, 1977; Joyce and Weil, 1980, etc).

The latest attempt of Joyce and Weil needs special mention. By exploring many sources, they have grouped the models on the basis of the specific educational goals and means into the following four families:

- i. Information processing models
- ii. Social interaction models
- iii. Personal development models
- iv. Behaviour modification models

Information processing models

The term *information processing* has been introduced by Joyce and Weil. In their words *Information processing refers to the ways people handle stimuli from the environment, organise data, sense problems, generate concepts and solutions to problems, and employ verbal and non-verbal symbols.* (1972, p. 9)

Accordingly, information processing models are more concerned with the intellectual growth than the emotional or social development of the individual. However, to some extent, all of these models contribute towards the realisation of personal and social goals. The model belonging to this family are being illustrated by the Table 22.1 given below:

Table 22.1 Information Processing Family of Models

S. No.	Model	Major theorist	Mission or goal for which most applicable
1.	Inductive thinking	Hilda Taba	Designed primarily for development of inductive mental process and academic reasoning or theory building. But these capacities are

	model		useful for personal and social goals as well.
2.	Inquiry training model	Richard Suchman	Training in systematic inquiry.
3.	Science inquiry model	Joseph J. Schwab	Designed to teach the research system of a discipline.
4.	Concept attainment model	Jerome Bruner	Designed primarily to develop inductive reasoning, but also for concept development and analysis.
5.	Development model	Jean Piaget, Irving Sigel, Edmund Sullivan	Designed to increase general intellectual development, especially logical reasoning.
6.	Advance organiser model	David Ausubel	Designed to increase the efficiency of information processing, capacities to meaningfully absorb and relate bodies of knowledge.

Adapted from: Marsha Weil and Bruce Joyce (1978).

Social interaction models

The models belonging to this family are concerned with the attainment of the social goals belonging to the *affective domain*. Consequently, the *social interaction models* as Weil and Joyce emphasise, *give priority for improvement of democratic processes and the improvement of the society by the improvement of individual's ability*. (1978, p.3) In this way, the models belonging to this category give more emphasis on the development of the society. The family of these models is being illustrated in Table 22.2.

Table 22.2 Family of Social Interaction Models

S. No.	Model	Major theorist	Mission or goal for which most applicable
1.	Group investigation model	Herbert Thelen and John Dewey	Development of skills for participation in democratic social process through combined emphasis on academic-inquiry skills.
2.	Classroom meeting model	William Glaser	Development of self-understanding and responsibility to oneself and one's social group.
3.	Social inquiry model	Byron Massials and Benjamin Cox	Social problem-solving, primarily through academic inquiry and logical reasoning.
4.	Laboratory	National Training	Development of interpersonal and group skill and through this,

	method model	Laboratory Bethel, Maine	personal awareness and flexibility.
5.	Jurisprudential model	Donald Oliver and James P. Shaver	Designed primarily to teach the jurisprudential frame of reference as a way of thinking about and resolving social issues.
6.	Role playing model	Fannie Shaftel and George Shaftel	Designed to induce students to inquire into personal and social values, with their own behaviour and values becoming the source of their inquiry.
7.	Social simulation model	Sarene Borock	Designed to help students experience various social processes and realities and to examine their own reaction to them.

Adapted from: Marsha Weil and Bruce Joyce (1978).

Personal development models

This family of models is also concerned with the realisation of the instructional goals belonging to *affective domain*. The personal development models emphasise the processes by which individuals can establish productive relationship with their environment and design their unique individuality for realising the personal goals. Frequently, they focus on the emotional life of an individual and ultimately aim at the development of an integrated self-functioning.

Models belonging to this family are illustrated in Table 22.3.

Table 22.3 Family of Personal Development Models

S. No.	Model	Major theorist	Mission or goal for which most applicable
1.	Non directive model	Carl Rogers	Emphasis on the development of self-awareness, understanding, autonomy and self-concept.
2.	Awareness training model	Fritz Perls	Emphasis on the development on interpersonal awareness and understanding, as well as body and sensory awareness.
3.	Syntics model	William Gordon	Personal development of creativity and creative problem-solving.
4.	Conceptual system model	David Hunt	Designed to increase personal complexity and flexibility.

Behaviour modification models

Models belonging to this fourth family are related with the *behaviour modification theories*. They have evolved from the attempts to

develop efficient systems for sequencing learning tasks and shaping behaviour through management of the reinforcement contingencies. More precisely, operant conditioning has given birth to most of the models belonging to this family. *contingency management model*, *training model*, *stress reduction model*, *desensitisation model* belong to the family of such models.

The categorisation of the different teaching models in the above-mentioned specific families does not represent watertight compartmentalisation. These families of models are by no means antithetical or mutually exclusive. The instructional activities and learning environment emerging from some of the models, even though classified in different families, are remarkably similar. Also, within the families themselves, models may share features in respect of the objectives and means to achieve them.

DESCRIPTION OF A FEW TEACHING MODELS

As we have seen above, these are a number of teaching models available for use by the teachers in the varying teaching–learning situations. It is not possible to give description of all these models in the text of the present nature. Therefore, we would like to limit our description for the understanding and application of only two models namely Glaser’s Basic Teaching Model and Bruner’s Concept Attainment Model. Let us begin with the description of Glaser’s Basic Teaching Model.

Glaser’s Basic Teaching Model

The Basic Teaching Model was developed by Robert Glaser (Glaser, 1962) on the basis of psychological principles. It is termed as *basic* because it tries to explain the whole teaching process in an appropriate way dividing it into the following four basic components or parts:

- A. Instructional objectives
- B. Entering behaviour
- C. Instructional procedures
- D. Performance assessment

These parts may be diagrammatically represented in Figure 22.2.

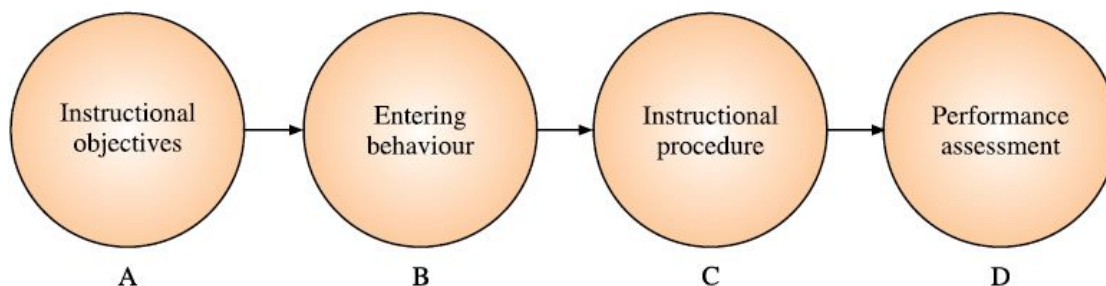


Figure 22.2 Components of teaching process in Glaser’s basic teaching model.

Instructional objectives indicate the stipulated goals that a student is supposed to attain upon completion of a part of instruction.

Entering behaviour means the initial behaviour of the student before the beginning of instruction. It is his basic potential or level of performance in terms of educational abilities comprising of the factors like previous knowledge of the subject or subjects, intellectual ability, learning ability and motivational state, etc. The assessment of

entering behaviour is a very significant aspect of an instructional process. Usually, it is a starting point but here in this model it occupies the second place and is viewed in context of the pre-set instructional objectives. However, in actual teaching–learning situations, both of them interact to influence and help each other for the success of the whole instructional process.

Third component: *Instructional procedures* is the most active or functional part of the teaching process. It represents the teaching methods, strategies and student-teacher interaction patterns involved in the task of teaching. First two components, the stipulated instructional objectives and the entering behaviour, work as a deciding base for the selection and use of instructional procedures.

Last component, performance assessment is related with the task for assessing the performance of the learner. Here in the light of one's entry behaviour and stipulated objectives, his terminal behaviour is assessed through some suitable evaluation techniques (test, observations, etc.). The assessment of the performance may prove as an effective *feedback* device for each of the steps and element of the teaching process. The objectives may be modified and instructional procedures may be improved in the light of the end results shown under the performance step.

In actual practice, all these four basic components of the teaching process interact and influence each other. One sets the way for the other by proving as a base or feedback for the successful operation of the teaching act.

Glaser's basic model—description in terms of elements

Let us now describe this model in terms of the fundamental elements mentioned earlier.

Focus: The model tries to pinpoint the four basic functions, processes and major activities comprising the whole teaching–learning process. The sequence to be followed in the instructional process is also brought into limelight.

Syntax: The flow of activities in this model is quite sequential. First of all, the objectives to be achieved through the instruction carried

out by the teacher are fixed. Then attempts are made to assess the potentiality of the learners in terms of their entry behaviour. Then, in the light of the entry behaviour, the school instructional work is carried out to achieve the stipulated objectives and how far these objectives have been realised is ascertained in the last phase of the model.

Principles of reaction: The main principles of reaction are summarised below:

1. *Principle of active involvement and expertise:* The teacher has to remain quite active in the execution of this model. He has to acquire essential skills in the formulation of objectives, assessment of entry and terminal behaviour and devising suitable means and ways for the realisation of set objectives. At every stage, he has to develop proper understanding of the potential and difficulties of his students for reaching the goals.
2. *Principle of interdependence:* The four stages involving objectives, entry behaviour, instructional process and assessment of its outcomes are quite interconnected and interdependent. The student's responses are to be understood and dealt with in the light of such interaction and dependence.
3. *Principle of correction and follow-up:* If the assessment in terms of terminal behaviour does not match with the aspirations in terms of the set objectives and entry behaviour, there lies something wrong either with the instructional process or with the setting of the objectives. What goes wrong should be detected and followed with necessary correction and subsequent necessary activities for the improvement of the instructional process.

Social system: This model is sufficiently structured and supposed to be dominated by the active role and control of the teacher on the whole process of instruction from beginning till end. Its success depends upon the competency and ability of the teacher in terms of

the acquisition of various skills like formulation of objectives, employment of methods and strategies, techniques of evaluation, etc.

Support system: The model for its success requires additional support in terms of the following:

- i. Requirement of sufficient pre-service and in-service training facilities for teachers to acquire needed skills and competencies for the use of model.
- ii. Need for the desirable teaching–learning situations and environment for the employment of suitable teaching strategies and instructional technology.
- iii. Need for the appropriate evaluation devices for the assessment of entry as well as terminal behaviour of the pupils.

Applicability of the model: The model is applicable to any teaching–learning situation preferably dominated by the teacher and requiring the flow of knowledge and information in a quite systematic and structured way and realising some well-defined instructional objectives within the limited means of the usual classroom situations.

Suchman's Inquiry Training Model

The Inquiry Training Model was developed by J. Richard Suchman for developing scientific inquiry training skills in the pupils. Suchman had a particular system of assumptions and beliefs which form the basic philosophy of the present model. These may be summarised as below:

- i. All knowledge is tentative. A scientist generates a theory or principle. After some time it may be pushed aside by a new one.
- ii. There is not a single answer. We can always be more sophisticated in our explanations and most problems are amenable to several equally plausible explanations.

- iii. In a natural process, all of us often inquire when confronted with a problem or puzzle.
- iv. An individual can be made consciously aware of the process of inquiry and learn to analyse his thinking strategies.
- v. In addition to what is already known to him, he may be taught the new strategies to enquire and explore things.
- vi. A co-operative effort helps in the inquiry process. As a result, the development of knowledge is always facilitated by help and ideas from colleagues.

Focus: The children are very curious by nature. For satisfying their curiosity, they may be seen to be engaged in the inquiry process, exploring and analysing the things or phenomena by themselves. The *Inquiry training model* aims to refine or improve such inquiry skills of the children through a systematic inquiry training. It provides systematic structure within which the students have to ask questions, organise those to formulate and test hypotheses in the similar way as scholars and scientists do in organising knowledge and generate principles for explaining causation.

Syntax: *Inquiry training model* consists of five phases—the initial encounter with problem, the three stages of inquiry (verification, experimentation and explanation) followed by the postmortem process (the analysis of the inquiry). These phases, along with the concerned operations can be summarised as in Table 22.4.

Table 22.4 Syntax of the Inquiry Training Model

Phase one	Encourage with the problem
	(i) Explaining inquiry procedures
	(ii) Presentation of the problem or puzzled event
Phase two	Data gathering process (Verification)
	(i) Verifying the nature of objects and conditions
	(ii) Verifying the occurrence of the problem
Phase three	Data gathering process (Experimentation)
	(i) Isolating relevant variables

	(ii) Hypothesising (and testing) causal relationships
Phase four	Formulating an explanation
	Formulating rules or explanation
Phase five	Analysis of the inquiry process
	Analysing inquiry strategy and developing more effective ones

The first phase: Encounter with the problem. In this phase the teacher is required to explain inquiry procedure and present the problem situation. The problem situation or the puzzling event should be such as it may provide a discrepancy or appear illogical, quite contrary to the common notion of reality. It may puzzle the students because they do not know the answer. The problem selected may or may not add to the knowledge of some or the other subject. However, the emphasis is always on inquiry training as explained by Weil and Joyce in the following words:

The emphasis in this model is clearly on becoming aware of and mastering the inquiry process, not on the content and explanation of any particular problem situation. Although the model should also be enormously appealing and effective as a mode of acquiring and using information, the teacher cannot be too concerned with subject matter coverage or correctness. (1978, p. 130-131).

Regarding explanation of inquiry process, the students may be told to observe the following rules:

1. They have to phrase such questions as are answerable by a *yes* or a *no*.
2. They are not to ask the teacher to explain the phenomenon to them, i.e., to give directly the cause of answer of the puzzling event.
3. Once a student has been called upon, he will be allowed and persuaded to ask as many questions as he wished to test his hypothesis/hypotheses.
4. The students are free to consult or work with one another if they wish to do so.
5. Any student can test any explanation regarding his hypothesis at any time.
6. Students are free to use resource books, experimental kits

and other aid material, if they feel the need of doing so.

Phases two and three: These phases belong to the data gathering operations of verification and experimentation. In these operations, data are gathered by the students in two ways:

1. by asking questions to be responded by the teacher in *yes* or *no* form and
2. to conduct a series of experiments on the environment of the problem situation.

The process of verification is carried out in two steps:

- i. Verifying the nature of objects and events like:
 - a. identity of the objects,
 - b. state of the objects or systems at a particular time (behaviour of objects under certain conditions), and
 - c. nature of an action or happening.
- ii. Verifying the occurrence of event.

This phase requires the teacher to be aware of the type of questions to verify all aspects of the problem and change questioning pattern through intervention.

The experimental phase is directed at exploration and direct testing. Here, the hypotheses involving plausible explanation are formulated and tested by the students. The teacher has to remain very careful in guiding and directing the student for the rejection of the inappropriate hypothesis and broaden the pupils view for the appropriate hypothesis.

Phase four demands from the students:

- i. the extraction of the relevant information from the collected data, and
- ii. the formulation of an explanation of the problem or puzzling event as good as possible.

Phase five requires working of the teacher and the students together for analysing one another's strategies. They can evaluate the modes of questioning and responding, the appropriateness of questions, the productivity of the lines of questioning, the information they needed but did not obtain. Similarly, the suitability of the formulated hypotheses and its verification, etc., may also be properly discussed and evaluated. This analysis attempts to help the teachers to modify and improve the inquiry process and equip the students with appropriate problem-solving skills.

Principles of reaction: The particular and unique rules of thumb for responding and reacting to the actions of the students in the *inquiry training process* may be summarised as follows (Weil and Joyce, 1976, p. 135):

1. Ensuring that phrased questions are such as can be answered by a *yes* or a *no*.
2. Asking students to rephrase invalid questions.
3. Pointing out invalidated statements—for example, *We have not yet established that this is a liquid*.
4. Using the language of the inquiry process—for instance, identifying student questions as theories and inviting testing (experimenting).
5. Neither approving nor rejecting student theories (hypotheses).
6. Pushing students for clearer statements of theories and more support for generalisations.
7. Encouraging interaction among students.

Social system: *Inquiry training model* provides high weightage to the controlling of social system. Teacher and students, however, participate as equals where exchange of ideas is concerned. At every stage teacher has to respond in such a way as students may be encouraged to initiate and persuade the inquiry as much as possible. Wherein the beginning, the social system may be arranged as highly structured, it may be relaxed when the students seem to

learn the principles of inquiry. The open environment with a possibility of proper teacher-pupil interaction and pupil-pupil interaction surely adds to the success of this model.

Support system: While working with the *inquiry training model*, a teacher requires additional support in the form of

- i. a set of confronting materials,
- ii. technical understanding of the intellectual processes and strategies of inquiry, and
- iii. resource materials bearing on the problem.

Application context: Basically, the *inquiry training model* has been developed to provide training on systematic inquiry. It is not a method of teaching or imparting information. However, it can work to impart knowledge concerning with subject areas particularly in the field of natural sciences. Any event or topic from a curriculum area which can be converted into a problem situation or puzzle can be selected for inquiry training.

Illustrating the Use of Inquiry Training Model

Encounter with the problem

The family of Mr. Gupta, headmaster of a school, was away during summer vacation. On return, they were shocked to see that their garden was destroyed. There was twisted fence, flattened flowers and damaged plants. The lock on the door was in place. There was dust settled on all furniture. One of the wall pictures which was about 1/2 meter below the roof was lying on the floor with glasses crashed. Mr. Gupta hurriedly turned to the almirah. It was lying open but all things were intact. The whole family felt surprised. What might have happened in their absence during the vacation? Can you find out the things?

After presenting the problem (verbally and also in written form) the teacher will try to explain the essentials of inquiry procedures.

Details of the classroom interaction

The students may respond immediately by naming several factors like stray animals, pet animals, theft, storm, etc. The teacher's responsibility lies in bringing them to formulate specific hypotheses and test them by gathering relevant data through appropriate questioning.

The interaction may then take the following form:

Pupil 1 : Were there footmarks of stray cattle in the garden?

Teacher : No.

Pupil 1 : Was some pet left locked inside the drawing room?

Teacher : No.

(**Conclusion:** The above interaction helps in rejecting the hypothesis of some animal involved with dilemma.)

Pupil 2 : Had they checked all other things of the house besides the almirah?

Teacher : Yes.

Pupil 2 : Was something found missing?

Teacher : No.

(**Conclusion:** This may help in ruling out the hypothesis concerning theft motive).

Pupil 3 : Was there a storm during this period?

Teacher : I cannot say, you may verify.

Pupil 4 : Were the windows closed?

Teacher : Yes, it has already been told to you.

Pupil 5 : Was there too much dust lying in house?

Teacher : Yes.

Pupil 5 : Was there pieces of leaves and straws lying here and there in drawing room?

Teacher : Yes.

Pupil 5 : Was there a ventilation in front of the crushed wall picture?

Teacher : Yes.

Pupil 5 : Was the ventilator closed?

Teacher : No.

Pupil 5 : Here lies the lesson. The strong wind might have entered the room through ventilator.

Teacher : Good, can you further verify your reason?

Pupil 6 : Had the chowkidar and neighbours informed about any storm during these vacation?

Teacher : Yes.

Pupil 7 : There might be some news about the storm in the local newspaper.

Teacher : Yes, there was, but what you conclude; state clearly.

Pupil 5 : There was a storm during the summer vacation. It had caused the damage in the garden. The windows were closed but one of the ventilators lying in front of the hanging picture was open. It had blown the picture and sprayed dust and leaves in the room.

Another Illustration of the Inquiry Training Model

Encounter with the problem

The incident took place in a village of South India at the turn of the century. The village was an ordinary one. The chief occupation of the villagers was agriculture. They were tradition bound. A school was opened and there was much enthusiasm in the villagers. The enrolment in the school went on increasing. One day all of a sudden, a number of parents withdrew their children from the school. This matter was reported to the inspector of schools of that district. He became too much perplexed by the event and could not find any reason. Could you help him in this matter?

The classroom interaction during inquiry training may be summarised as below:

Pupil 1 : Was there a famine or economic hardships?

Teacher : No.

Pupil 2 : Was co-education introduced?

Teacher : No.

Pupil 3 : Was a student being punished or expelled?

Teacher : No.

Pupil 4 : Was there shortage of labour in the region?

Teacher : No.

Pupil 5 : I think the fees might have been raised?

Teacher : No.

Pupil 6 : Sir, could it be a result of the transfer of a good teacher?

Teacher : No.

Pupil 1 : Was it a Govt. School?

Teacher : Yes.

Pupil 1 : Did all the students, prior to this incident, belong to high castes?

Teacher : Yes.

Pupil 1 : Was a student belonging to a lower caste given admission in the school?

Teacher : Yes.

Pupil 1 : The parents might have threatened to withdraw their children if the boy was not removed from the school.

Teacher : Yes.

Pupil 1 : Here lies the reason. The tradition bound parents could not tolerate the schooling of the lower caste boy along with their children and hence withdrew their wards in protest.

Possible Encountering Situations for Inquiry Training

Situation 1, Subject: Physics, Class VII

Topic: Law of Floating Bodies

Students of Science Club visited a seashore in Mumbai. They saw a number of ships standing in the sea. All of a sudden, a hair clip of a girl student slipped from her hand into the sea water. It got sunk immediately. The students were quite astonished to see how the big ships could remain floating in the sea while a small hair clip got sunk. Could you help them by finding some reason?

Situation 2, Subject: Geography, Class IX

Topic: Local and Standard Time

A gentleman boarded a train from Ferozpur at 12 noon. The train halted on a station. After half an hour, he got down from the train for some refreshment. Instantly he looked at the clock of the railway platform, the time was twelve. Instantly, he looked at his watch, the time was 12.30. He asked some other persons belonging to that station. They also told him that the time was twelve. He could not understand how come it happened that when he started at twelve and already travelled for thirty minutes. Could you help in this situation?

Situation 3, Subject: Physics, Class VIII

Topic: Electric Current

It was a noon of a bright hot summer. A child was standing besides a moving electric table fan. He suddenly cried and fell down. His mother felt nervous and could not understand the reason. When the father of the child came home, she narrated him the incident. He thought that there might be electric current in the fan. He touched that but could not feel any such a current. But when the mother tried to touch that she had a shock. She asserted that there was current in the fan, the father was not agreed with her. Can you settle their disagreement?

Situation 4, Subject: Biology Class X

Topic: Ecology

In a certain year 10 per cent of the wheat crops of a country was damaged due to some pest. For seeking preventive measures, insecticides and other germs killing material was sprinkled over heavily in the fields. But to a great astonishment, it was found that the crop damage percentage was increased from 10 to 15 per cent instead of the expected decrease. Can you find the reason?

Situation 5, Subject: Chemistry, Class IX

Topic: Dilute Sulphuric Acid

The students were asked to dilute the given amount of concentrated sulphuric acid. Some of them added water in a beaker containing concentrated sulphuric acid and the others added sulphuric acid in the beaker containing water. The latter observed that there was much heat generated through their experiment whereas the former could not experience such heat. Could you find the reason for the difference?

Situation 6, General Topic Age 14 +

It was summer vacation for a schoolteacher. His family was out of station and he was all alone at home. A friend of him had to leave for some distant place and he had to reach the station in time. He thought that he was getting late, so he rushed up by locking all the doors. On his return, he unlocked the gate lock and the corridor lock. When he entered the main room, he was astonished to see its door

open but the lock was found intact. Could you find out what had happened?

Situation 7, General Topic Age 14 +

The incident is related with an examination in a school. It was winter and some of the students were draped in blankets in the examination hall. An examiner on the basis of similarity in handwriting sensed cheating in the answer books of Roll No. 903 and 978 who used to sit quite apart in the examination hall. The further enquiry revealed the repetition of the similar cheating in other papers. Can you find out the mode of cheating?

Bruner's Concept Attainment Model

The term *concept attainment model* is historically linked with the work of Jerome Bruner and his associates and that is why it is named as *Bruner's concept attainment model*. For the necessary back ground, let us mention some of the basic ideas from the work of Bruner et al. (1956):

1. Our environment is full of tremendously diverse things and it would have been impossible to adjust in it if we had not been endowed with the capacity to discriminate, to categorise things in groups and to form concepts.
2. A concept has three elements—(i) examples (ii) attributes and (iii) attribute values.
3. Examples are instances of the concept. Some are positive and some are negative. In *concept attainment*, the negative and positive examples are tested and searched for their features. Each example can be described in terms of its basic characteristics called *attributes*, and each attribute has an *attribute value*. For illustration, if the concept is *apple* then each fruit is an example. Here the pears and oranges are negative and the apples are positives examples. The colour may be an attribute and yellow or red may be attribute values.
4. In categorising or concept formation, although the content

of categories may differ from culture to culture, yet all sets of concepts are the product of the same thought processes. Thus, the strategies for forming concepts or categorising are more or less the same.

5. Categorising activity actually has two components: the act of category formation (concept formation) and the act of *concept attainment*. *Concept formation* is the first step towards *concept attainment*.
6. In concept attainment, the concept is determined in advance and the task is to determine the elements of the concept. While concept formation in contrast is the act by which new categories are formed, it is an act of invention.
7. *Concept formation* and *attainment* differ significantly in terms of thinking processes and consequently require different teaching strategies. Hilda Taba's *Inductive Thinking Model* is an example of concept formation. The concept attainment models are concerned with the process of concept attainment.
8. In identifying the strategies used to attain concepts, a distinction should be made between the two learning conditions of *selection* and *reception*. In reception conditions, the teacher presents the examples in a pre-arranged order, labelling them *yes* or *no*. In selection conditions, the examples are not marked *yes* or *no* but form a group of un-marked examples, the students are required to select one and inquire whether it is a *yes* or a *no*.

On the basis of the above ideas and research work done by Bruner and his associates, several models of teaching have been developed. The original work of Weil and Joyce (1978) mentions three variations or models of concept attainment that have been designed by them on the basis study. These three models of concept attainment are named as follows:

1. Reception model of concept attainment
2. Selection model of concept attainment

3. Model for unorganised material

Each of these models has a slightly different sequence of activities (syntax) but all are developed from a common conceptual base. A detailed study of any one model will help us to know about others. Let us begin with the discussion on *reception model* below:

Reception model of concept attainment

Focus: The *concept attainment model* facilitates the type of learning referred to as conceptual learning, in contrast with the rote learning of factual information or of vocabulary. In practice, the model works as an inductive model designed to teach concept through the use of examples. Therefore, in addition to help the students in the attainment of a particular concept, the model also enables them to become aware of the process of conceptualisation.

Syntax: The sequence of the phase and activities covering the *reception model* may be outlined as shown in Table 22.5.

Table 22.5 Syntax of the Reception Model

Phase one	Presentation of data and identification of the concept	
(Activities)	(i)	Presenting examples with <i>yes</i> or <i>no</i> labels in a prearranged order by the teacher.
	(ii)	Comparing attributes in positive and negative examples.
	(iii)	Generating and testing hypotheses.
	(iv)	Naming the concept.
	(v)	Stating the rule or definition of the <i>concept</i> according to its essential attributes.
Phase two	Testing attainment of the concept	
(Activities)	(i)	Correctly identifying additional unlabelled examples of the concept as <i>yes</i> or <i>no</i> .
	(ii)	Generating own example.
Phase three	Analysis of thinking strategies	
(Activities)	(i)	Describing thoughts.
	(ii)	Discussing role of hypothesis and attributes.
	(iii)	Discussing type and number of hypotheses.
	(iv)	Evaluating the strategies.

Principle of reaction: Important principles of reaction to the responses and regard from the students may be put as under:

1. The teacher is to remain supportive to the student's hypotheses, emphasising, however, that they are hypothetical in nature.
2. He has to maintain record by keeping track of the hypotheses (concepts) of the attributes as those are mentioned by the students.
3. He is to remain supportive for turning the student's attention toward analysis of their concepts and strategies.
4. He is to encourage analysis of the merits of various strategies rather than attempting to seek only the best strategy for all people in all situations.

Social system: In the initial uses of *concept attainment model*, it is helpful to be very structured. In most part of the teaching, teacher has to exercise control over the *social system*. He has to present examples in such a way that the attributes are clear and that they are indeed both positive and negative examples of the concept. However, ample freedom is given to the students for carrying out their own thinking. They may formulate their own hypotheses and test these in the light of the available data. In case the students fail to reject wrong hypotheses, the teacher prompts them to re-examine the data. He sometimes also persuades them to form new hypotheses.

The social system of the model demands from the teacher to place the responsibility of identifying and verifying the concept on the student The teacher should try to communicate the students that the solution to the problem of identifying the concept lies not within the teacher, but in the data (examples) (Eggen et al., 1979, p. 164).

Support system: The system, as a whole, provides smooth interaction between teacher and the students for a cooperative support in the following form:

1. It requires material in the form of well-thought examples marked as positive and negative to be presented to the students for concept attainment.
2. As the students have to describe the characteristics (attributes) of the examples (marked as *yes* or *no*); something like a blackboard or tag-board is required for recording these responses. The formulated hypotheses can be evaluated in the light of these characteristics available to the class in a summarised form.
3. A flannel board may be used to present the various parts of the evolved definition and explanation of a concept.

Application context: *Concept attainment model* proves an excellent way (based on inductive reasoning and systematic thinking) to teach concept through the use of examples. It certainly helps the students to acquire concepts which they are unfamiliar with. It can be used to teach the concept related with any discipline or area of the curriculum. However, its use should be confined in such a way that he may persuade his students to determine the concept on the basis of the examples provided. What may be fit or not fit for teaching with the *concept attainment model* may be adjudged from the following reading:

- The requirement to let the students know about the concepts, like triangle, regular polygon, proper noun, mammals, democracy, internal conflict, fits well in this model. But when the content, goals of instruction do not include *concept learning*, the *concept attainment model* cannot be used. It may happen in the cases like below:
 - i. Teaching of generalisation like, *Solid gets expanded when heated, people resist changes* etc.
 - ii. Teaching of the facts like, *hydrogen is lighter than oxygen*, or *Alexander invaded India in 327 B.C.* etc.
 - iii. Teaching of explanations for the questions like, *Why Shimla is cooler than Chandigarh* or *Why snakes get sluggish in cold weather while dogs and cats do not.*

Illustrating the use of reception model: Let us utilise *Reception Model* in teaching the concept of *Proper Noun*. The task may be carried out as summarised below:

1. In the beginning, the teacher will present two examples (one positive and other negative) of the concept written in the following way:
 - i. Delhi: Yes
 - ii. Cycle: No
2. The students will be persuaded to suggest possible categories that would encompass Delhi, the positive example.
3. The possible categories hypothesised by the students will be written on the blackboard. They may be as under:
 - a. Capital of the country
 - b. City having over a million people
 - c. City composed of five letters
 - d. Places
4. An additional example (positive or negative) will be presented by the teacher as mentioned below:
(iii) Rohtak: Yes
5. Students will be asked to test their hypothesis in the light of the new example. It will result in the rejection of the hypothesis (a), (b) and (c).
6. At this stage, students may be asked to suggest any new hypotheses. If they are agreed to test only one remaining hypothesis, i.e., places, they will be presented with the example as listed below:
(iv) Home: No
7. This example may cause the elimination of the hypothesis, *places*. Therefore, additional examples like following may also be presented:
(v) Tilak Nagar: Yes (vi) Fort: No (vii)
Red Fort: Yes
8. The analysis of the above examples will result in the

amendment of the hypothesis, places as *special places* or *particular places*.

9. This will lead to attain an important part of the desired concept in the form given below:

Special or particular places are known as proper nouns.

10. In the similar way, repeating the above process, the students may be helped to attain the concept of proper noun and define it in the following way:

A proper noun denotes a particular or specific place, person or a thing as distinct from every other one.

Selection model of concept attainment

Reception as well as *selection models* have the common target of teaching *concept attainment* and arise from the same conceptual base. However, they differ in some aspects as described below:

1. *Reception model* is highly structured and controlled by the teacher. It presents direct way of teaching *concept attainment* to the students. *Selection model* permits more autonomy to the students by giving more freedom to their own initiation and control.
2. Initially, only two examples are provided in *reception model*. In contrast to this, in the *selection model*, all the examples are displayed to the students from the beginning of the activity.
3. The two models differ in respect of the labelling of the examples. While in *reception model*, all the examples are labelled, the *selection model* requires unlabelled examples (With the exception of the first two demonstrated in the beginning).
4. In *reception model*, the sequence of examples presented is decided by the teacher whereas in *selection model*, students enjoy autonomy in controlling the sequence of the examples. They are free to choose in order to make necessary inquiry.

5. The students may put their own examples in *selection model* and ask the teacher to respond in *yes* or *no* in order to attain the concept.
6. Unlike *reception model*, the tracking and analysis of attributes is quite informal in the *selection model*.
7. The *selection model* puts more responsibilities and demands on the students in comparison to the *reception model*.

Illustrating the use of selection model: The working process in the *selection model* for the teaching of *concept attainment* may be illustrated through the example given below involving the concept of quadrilateral. The task may be carried out as explained below:

1. As a part of the essential support, the teacher may prepare a large number of cardboard geometrical shapes (circle, rectangle, square, parallelogram, rhombus, pentagon, hexagon, octagon, etc.) of varying colours and sizes.
2. He may begin by presenting two labelled examples (as given below) and say *look, I have a category in mind, please try to find to out.*
 - i. A small green square: Yes
 - ii. A large green circle: No
3. The pupils may hypothesise as under:
 - i. The category is green
 - ii. The category is square
 - iii. The category is small
4. The teacher will present all the geometrical shapes with him and ask the students to select figures that could be used to test the hypothesis one by one. It may happen as shown in Table 22.6.

Table 22.6 Testing of Hypothesis in Selection Model

S. No.	Pupil's activity	Teacher's activity	Inference drawn

1.	Big green square	Yes	The hypothesis <i>small</i> is ruled out
2.	Small green rectangle	Yes	Hypothesis <i>square</i> may be ruled out
3.	Yellow pentagon	No	The category may be <i>green</i> (let us try further)
4.	Large black rhombus	Yes	The hypothesis <i>green</i> is ruled out

5. At this stage, the students will be persuaded to think about some other hypothesis as all the stipulated hypotheses have been eliminated.

It may be thought as below:

(d) the category is *four sided figures*

6. The newly suggested hypothesis will then be put to test by asking the students to select examples.

S. No.	Pupil	Teacher	Inference
1.	Triangle	No	It cannot be a three-sided figure
2.	Parallelogram	Yes	It is a four-sided figure

7. The help may also be taken from the previous data like:
 Big green square : Yes
 Small green rectangle : Yes
8. The students may thus infer that the category in the mind of the teacher was nothing but *four-sided figures*.
9. After realising that the class had attained the concept, the teacher at this stage may label the category as *quadrilateral*.

Model of unorganised materials

Unorganised material model represents third variation in the teaching of *concept attainment*. It is similar to *reception* and *selection models* in the following ways:

- i. It has a common target of helping the students to attain concept.
- ii. The conceptual base is the same.
- iii. It also uses examples to teach a concept.
- iv. It also begins with the identification of one positive and one negative example of the concept to be attained.

It can be differentiated with the earlier two variations in the following ways:

- i. Leaving the first two, all other examples are provided by the students.
- ii. It provides more autonomy to the students.
- iii. It assigns more responsibilities to the students in the process of concept attainment.
- iv. The data presented is quite unorganised and unstructured.

In brief, all the three models as Weil and Joyce (1978, p. 45) put *constitute a continuum from direct instruction in concept theory under teacher structured conditions to student control and application in naturalistic (unorganised) data situations.*

Illustrating the use of unorganised materials model: Let us illustrate the use of *Unorganised Materials Model* by teaching the concept *vegetables with edible roots*. The task may be carried out as under:

1. The teacher may begin by presenting the two labelled examples as below:
 - i. Carrot: Yes
 - ii. Wheat: No
2. It may lead the students to suggest the following hypotheses (The same will be written on the blackboard):
 - i. Orange coloured vegetables
 - ii. Vegetables that are eaten raw
 - iii. Vegetables with edible roots

- iv. Vegetables rich in vitamin A
3. The students will be persuaded to provide suitable examples for testing the formulated hypotheses. The process may be summarised in Table 22.7.

Table 22.7 Examples for Hypothesis Testing

Student	Teacher	Inferences
Radish	Yes	Hypotheses (a) and (d) are eliminated
Potato	Yes	Hypothesis (b) is rejected.

4. The students are left with only one hypothesis, i.e. vegetables with edible roots. They will be persuaded to search for more examples for the confirmation of the hypothesis like turnip, onion, etc.
5. The students with the help of all positive examples will be persuaded to list out all the attributes of the concept and distinguish it from other concepts as understood through negative examples. It will help them to attain the concept *vegetables with edible roots*.

Choice of a particular concept attainment model: As said earlier, all the three described *concept attainment models* lie in a continuum in respect of the autonomy and responsibilities on the part of the students. The choice of a particular model for *concept attainment* is likely to depend upon the complexity of the concepts taught, as well as with the experiences and maturity of the students.

While the *selection model* may work well with inexperienced learners and *reception model* with still more inexperienced, the *unstructured material model* will definitely require suitable learning experiences and maturity.

Ausubel's Advance Organiser Model

Advanced organiser model owes its existence to the basic ideas and efforts of the famous educational psychologist David Ausubel. The

ideas and assumption responsible for the emergence of the theory and practice of this model have been quite effectively explained by him through his writings (Ausubel, 1963, 1968, 1977). These are also extensively discussed and analysed by Bruce Joyce and Marsha Weil (2003) in their textbook *Models of Teaching*. Let us have a summarised view of the ideas and assumptions in the model.

1. According to Ausubel, the type of learning material related with the content of a course or curriculum (no matter how difficult and abstract it may be) can be learned by the learner quite effectively and efficiently if due care is taken by the teacher in its presentation to him through bringing improvement in his presentational methods of teaching (lecture or other form of expository teaching like presentation of learning material through blackboard writing, visual graphics, charts and pictures, film, audio tape, and transparencies).
2. The method of teaching involving lecture or other form of expository teaching is known to be resulting in *reception learning* on the part of a learner. It is feared that such *reception learning* may breed passivity in the learner. He may become a passive recipient of the knowledge and information imparted by the teacher through his lecturing, or other form of expository teaching. Ausubel strongly refutes the allegation that learning through listening, watching or reading is necessarily rote, passive or non-meaningful. He argues that breeding of such passivity and non-meaningfulness is the result of the faulty ways and means adopted by the teacher for the presentation of the learning material. If due care is taken in this task by adopting the ways and means suggested by advance organiser model of teaching, the listeners and watchers in the classroom may not only be made quite active but also be helped in the meaningful acquisition and retention of the imparted information and knowledge.
3. Ausubel, thus, is of the firm opinion that a proper

presentation of the subject matter (related with curriculum contents) on the part of a teacher is likely to result in meaningful verbal learning. However, in his opinion, it can happen only when the teacher is able to demonstrate required competency in dealing with the following three issues simultaneously related with curriculum, *learning and teaching* (Joyce and Weil, 2003 : 267):

- i. How knowledge (curriculum content) is organised,
 - ii. How the mind works to process new information (learning),
 - iii. How teachers can apply these ideas about curriculum and learning when they present new material to the students (instruction).
4. While recommending the use of his model for dealing with the above-mentioned issues, he argues that every learner at any specific stage and period of his learning has his own cognitive structure for the learning or acquisition of a piece of knowledge or information. New ideas can be learned or retained only to the extent that they can be related to already available cognitive structure (in the form of knowledge of the facts, concepts or proposition) that provides needed linkage in terms of ideational anchors. This task may happen properly when a teacher tries to sequence the material to be learned and presents it in such a way that ideational anchors are provided (Joyce and Weil, 2003 : 270). Sequencing or proper prior organisation of the learning material and presenting it in a properly organised way may, thus, prove a potent device in helping the learner to enrich and strengthen his cognitive structure by acquiring and retaining the new information or knowledge provided to him directly by the teacher through his presentation. It is the fulfilment of this task that needs the role of the advance organisers as claimed by David Ausubel.
5. Advance organisers, as Ausubel maintains, are the primary means of enriching or strengthening the learner's cognitive structure and enhancing the possibilities of learning or retention of new knowledge or information. He describes

those as introductory material presented ahead of the learning task and at a higher level of abstraction and inclusiveness than the learning task itself. Their purpose is to explain, integrate and interrelate the material in the learning task with the previously learned material (Ausubel, 1968 : 148). They are also known to play an effective role in inducing a proper set or bent of mind in the learner. Besides this, these can help him in the task of processing and storing of information resulting in the proper acquisition and retention of the new information and knowledge.

6. Advance organisers are said to play their role before the teacher's presentation of the learning material. In the opinion of Ausubel, the organiser is an important content in itself and, thus needs to be taught by the teacher well before the presentation of the material. These are generally based on the major concepts, proposition, generalisations, principles and laws of a discipline, and subject or topic going to be taught by the teacher. Their presentation may, thus, be seen as a well-thought preparatory measure taken beforehand on the part of a teacher for the proper presentation of the subject matter.
7. In the opinion of Ausubel, the advance organisers being used by the teacher may be of two types, namely (i) expository and (ii) comparative. The *expository* organiser, as the name suggests, stands for that content which is helpful in providing and classifying the basic concepts at the highest level of abstraction, essential for understanding the unfamiliar learning material. For example, if the lesson is concerned with the salient features of the Indian Constitution, then, while making use of the expository organiser, the teacher is supposed to present and provide explanation for the basic concepts such as sovereignty, socialism, democracy, republic, secularism, equality, fraternity, and liberty before presenting the verbal material related to the lesson. Comparative organisers, on the other hand, are typically used with relatively familiar material. They are designed to discriminate between the old and new

concepts in order to prevent confusion caused by their similarity (Joyce and Weil, 2003 : 272).

For example, comparative statements, examples and illustrations may be given beforehand by the teacher for explaining the difference between autocratic and democratic, regular and non-regular, liberty and non-liberty characteristics and set-up of an institution or country for fully understanding the role of democratic, secular and liberty providing features of our constitution.

8. On the whole, advance organisers (whether expository or comparative) are helpful in meaningful verbal learning on the part of the learners, are said to be characterised with the following features:

- i. Showing set of verbal or visual information.
- ii. Presentation prior to learning a larger body of *to be learnt* information.
- iii. Containing no specific content from the *to be learnt* information.
- iv. Providing a means of generating logical relationship among elements in the *to be learnt* information.
- v. Influencing the learner's encoding process.

In this way, loaded with the above-mentioned features, advance organisers are said to work for the smoothening of the task of meaningful verbal learning by providing specifically relevant anchoring ideas for the more differentiated and detailed material that is subsequently presented to the students by the teacher. Besides this, these may prove quite helpful in influencing the learning set by increasing students motivation and/or encouraging use of active encoding strategies on the part of the students resulting into the desired strengthening of their cognitive structure.

9. Basically, in recommending the use of his advance organiser model of teaching, Ausubel expects from the teachers to organise in advance the presentation of their teaching in the following manner:

- i. To provide advance organisers (expository and/or comparative) in the shape of teaching essentially related with basic contents like concepts, terms, proposition, appropriate illustrations, and analogies in helping the students have proper bent of mind for the reception of the presented material and understand, grasp, and retain the material to be presented at the delivery stage of the lesson by the teacher.
- ii. To have proper advance organisation in the shape of logical as well as psychological sequencing and structuring of the learning material presented to the students at the delivery stage of the lesson by taking proper cognition of their existing cognitive structure and the nature of the advance organiser contents provided to them at the preparatory stage. However, in doing so, care is to be taken that the most general ideas related to the lesson delivered should be presented first followed by a gradual increase in detail and specificity. Also, as far as possible, new ideas should be consciously related to the previously learned contents or environmental experiences resulting into the desired enrichment and strengthening of the learner's existing cognition structure.
- iii. To have proper advance organisation in bringing desired improvement in the presentation methodology of the material to be learnt in such a way that the:
 - a. New ideas may get properly assimilated with the already acquired knowledge or information.
 - b. Students may be persuaded to respond actively in the task of proper processing of the received information to extract meaning from the processed information, and to retain it for the strengthening of their cognitive structure

and making its use in their further learning or living.

10. Ausubel is of the opinion that one can learn properly through the organisation of new information and placing it into coding system. He calls the general concepts and generalised ideas at the top of the coding systems the **subsumer**, because all other concepts and ideas are subsumed under it. He believes that learning should progress deductively, that is from an understanding of the general concepts to an understanding of the specifics. Therefore, he asserts for the presentation of the concepts, principles and generalised ideas in advance (in the name of advance organisers) before the presentation of the material.
11. Ausubel maintains that there is a hierarchy of organisation in every discipline depending upon the level of complexity, leading to the formation of a sort of pyramidal structure of that discipline. Wherever a teacher tries to introduce a new concept of that discipline to the students, they engage in the information-processing exercise for assimilating the new concept/information in their existing cognitive structure. The understanding of the new concept takes up in the minds of the students only when there exists a condition of potentially fit between the existing cognitive structure and the new structure of a discipline. If it happens, it can result in the enrichment and enlargement of the learners' cognitive structure. Therefore, a teacher should try to present the learning material or task so skillfully before the students as the learner feels no difficulty in hooking the new knowledge with his existing cognitive structure.

Description of the model in terms of its basic elements

Focus: The *advance organiser model* mainly focuses on:

1. Helping the teachers in improving their methods of

presentation of the subject matter, lecture and other expository form of teaching.

2. Organising and conveying large amounts of information as meaningfully and efficiently as possible.
3. Helping the learners to strengthen their existing cognitive structures by receiving, processing and retaining the presented information/knowledge for its use in their further learning and living.

Syntax: The activities are carried out in the following three phases (Table 14.6):

Phase one—Presentation of advance organisers: It is the preparatory stage. Here, the stage is set for the actual presentation of the learning-task or material on the part of the teacher. The following types of activities are generally undertaken during the execution of this phase:

1. *Clarifying the aims of the lesson:* Here, the teacher is supposed to introduce the students with the aims and objectives of the lesson. It may help the students in getting motivated for the proper acquisition of the presented material and also orient both the teacher and the students to their respective teaching–learning goals.
2. *Presenting the advance organiser:* After introducing the students with the aims and objectives of the lesson, the teacher tries to present the relevant advance organiser, expository or comparative to the students by keeping the following things in his mind:
 - i. The organiser has to be constructed in the manner so that it may contain ideas, distinct from and more inclusive than the material in the learning task itself, quite helpful to the learner in motivating, understanding and grasping the information delivered by the teacher.
 - ii. While presenting the organiser, care should be taken for its proper teaching in the following manner:

- a. Its contents involving the major concepts and/or prepositions of a discipline or area of study should be clearly pointed out and carefully explained.
- b. Teacher may cite the essential features, explain them and provide examples for its being clearly perceived, understood and continually related to the presented material on the part of the students.
- c. For better results, the presentation of organiser may be repeated several times by having its illustration in multiple contexts or having its citation under new or special terminology.

3. *Prompting awareness of the learner's relevant knowledge:*

At the preparatory stage, before the actual presentation of the subject matter of the delivered lesson, it is also essential to have a prior idea and awareness of the learners' existing cognitive structure in terms of their previous knowledge and experiences relevant to the learning task and organiser. Such awareness is going to help the teachers in a good way for the planning and delivery of their lessons.

Phase two—Presentation of learning task or material: It is the execution stage where the material to be learnt or lesson to be delivered is actually presented before the students. Generally, the following things are needed to be cared by the teacher in such a presentation:

1. There is a formal presentation of the learning material. It may be done by a teacher through a lecture, discussion, or presentation of films, transparencies, charts, pictures, visual writings, experiments, or readings.
2. Care is to be taken that what is presented before the students is well communicated to them by taking proper

cognition of their existing cognitive structure as well as the intellectual food already supplied to them through the advance organiser.

3. During the presentation as Joyce and Weil (2003 : 275) observe, care is to be taken that *The organisation of the learning material needs to be made explicit to the students so that they have an overall sense of direction and can see the logical order of the material and how the organisation relates to the advance organiser.*

Phase three—Strengthening cognitive organisation: It is a follow-up stage that strengthens the impact of the activities performed at the second stage. In the words of Joyce and Weil (2003 : 275): *The purpose of phase three is to anchor the new learning material in the students existing cognitive structure, that is to strengthen the students' cognitive organisation.*

The following activities need to be performed for this purpose:

1. *Promoting integrative reconciliation:* New knowledge can be incorporated and acquired well if due care is taken for its reconciliation with the learner's existing cognitive structure. The following activities may be undertaken by a teacher for the promotion of such reconciliation:
 - i. He can remind the students of the ideas related to the imparted learning material.
 - ii. He can ask the students to provide a summary of the major attributes of the new learning material.
 - iii. He can repeat precise definitions.
 - iv. He can ask for differences between the aspects of the material.
 - v. He can ask students to describe how the learning material supports the concept or proposition that is being used as organiser.
2. *Promoting active reception learning:* The advance organiser model wants to place the learner in an active receptive model instead of a micro-passive recipient of the

presented learning material. For this purpose, it recommends the following types of activities on the part of a teacher. The teacher may ask students:

- i. To describe how the new material relates to the organiser.
- ii. For additional examples of the concept or propositions in the learning material.
- iii. To verbalise the essence of the material using their own terminology and form of reference.
- iv. To examine the material from alternative points of view.

3. *Eliciting critical approach to subject:* Meaningful learning on the part of the learners can take place well if the teacher gets success in equipping them with a critical approach to knowledge or the learning material. In general, the following types of activities may be undertaken by the teacher. He may ask students to:

- i. Reorganise assumptions or inferences that may have been made in the learning material.
- ii. Judge and challenge these assumptions and inferences.
- iii. Reconcile the contradictions perceived among them.

4. *Clarification:* New ideas or learning material can be fully assimilated or reconciled with the already existing ideas and knowledge only when these are fully understood and known. The unfamiliar can be made familiar only by providing its needed introduction, identity and meaningfulness to them. Hence, what is not clear and understood to the learners should be made absolutely clear and familiar by the teacher by making use of all the needed techniques, strategies, and aid materials.

Thus, by mentioning the needed activities in the syntax of his model, Ausubel, (2003:276), has provided us with a method for *improving not only presentation but also students ability to learn from them. The more we teach students to become active to look for organising ideas, reconcile information with them and generate*

organisers of their own (engaging in inductive activity while reading or watching)—the greater their potential for profiting from presentation becomes.

Table 22.8 A Summarised View of the Syntax of the Advance Organiser Model

Phase one—Presentation of advance organiser activities	
1.	Clarifying the aims of the lesson
2.	Presenting the advance organiser
3.	Prompting awareness of the learner's relevant knowledge
Phase two—Presentation of learning task or material activities	
1.	Formal presentation of the learning material
2.	Adoption of proper way of its presentation
3.	Making organisation and logical order of the learning material explicit to the students
Phase three—Strengthening cognitive organisation activities	
1.	Promoting integrative reconciliation
2.	Promoting active reception learning
3.	Eliciting a critical approach to the subject matter
4.	Clarification

Social system: The social system of the advance organiser model is quite structured and teacher dominated. Here the teacher has to lead the students to the learning track as it becomes an utmost necessity on his part to relate the learning material to the organisers and to help the students differentiate new material from the previously learned material. However, as soon as the learning material is presented to the learners in the Phase II the social system of the model, the Phase III begins to be turned into an interactive style. The students now may engage in initiating many questions and comments as well as making use of their critical faculties for the desired understanding and assimilation of the new learning material into their existing cognitive structure.

Principles of reactions: The model calls for appropriate attention caring and responses on the part of the teacher to the students' reactions and requirements concerning with the attributes, namely:

1. Seeking clarification about the meaning, nature and purpose of new learning material.
2. Differentiating it from and reconciling it with the existing knowledge for strengthening one's cognitive organisation.
3. Making the acquisition of new learning quite relevant to the students' future learning and life.
4. Resulting in the promotion of a critical approach and information-processing ability for the acquisition of knowledge.

In this way, the employment of the model requires a quite active role, keen observation and ready responses on the part of the teacher in dealing with the students' silent and verbal reactions for acquiring meaningful learning as a result of the teacher's expository teaching.

Support system: The model requires the following support for resulting into some meaningful outcomes:

1. A well-organised learning material.
2. Conceptualisation and building of the appropriate advance organisers relevant to the learning material.
3. Establishment of the integral and appropriate relationship between the conceptual organiser and the content.
4. The needed competence and presentational skills on the part of the teacher for helping the students gain maximum advantages out of his expository teaching.

Application context: The model can be used for teaching the contents related to almost all the subjects of the school and university curriculum through its skilled presentation. It can help the teacher convey a large amount of information meaningfully within a time frame through expository methods of teaching like lecturing, demonstrating, reading and exhibiting verbal contents. The all-round applicability of this model as suggested by Joyce and Weil (2003 : 276–77) can be summarised as:

1. This model can be successfully used for structuring extended curriculum sequences or courses and to instruct the students systematically in the key ideas for ultimately gaining perspective on the entire curriculum area of a subject.
2. It can prove helpful in increasing the learner's grasp of factual information linked to and explained by the key ideas through the advance organiser and presentation of the learning material on the part of the teacher.
3. It can be quite helpful to the teachers as well as learners for teaching and learning the skills of meaningful reception learning through expository teaching.
4. It can help in explaining and making the students learn the art of critical thinking and cognitive reorganisation through its mechanism of direct instruction in orderly thinking and in the notion of knowledge hierarchies.
5. The material presented through the application of this model in a deductive way can be further subjected to inductive concept attainment for reinforcing the material and also informally evaluating the student's acquisition of the material.
6. The use of the model may enable the students to learn from expository teaching like lectures, reading and other media used for presentation, besides being useful in developing their interest in inquiry and precise habits of thinking.

Mastery Learning Model of Bloom

Mastery learning model represents one of the most useful and practicable models of teaching being applied in schools and training settings for improving the instructional effectiveness. It belongs to the behavioural systems family of models as classified by Joyce and Weil (1980). Historically, the model owes its origin to a model of school learning postulated by John B. Carroll (1963). He wanted to do away with the ill effects of failures in school learning resulting in huge wastage and stagnation of the educational resources and

frustrations and unhappiness on the part of the individual learner. He proposed through his model of school learning that there may be 100 per cent learning by 100 per cent of the students of a class in a particular learning task if genuine attempts are made to help them for gaining mastery over all the aspects of that learning task with due provisions of sufficient time and appropriate instruction.

It is true that one may learn speedily and easily due to his higher aptitude for that learning and, thus, may be able to demonstrate mastery in lesser time with lesser efforts. However, if others also are provided sufficient time, helped in getting out of the hurdles through timely diagnosis of their learning difficulties and remedial education, or instructed in some other ways for the required understanding and practice of that learning task, they can attain the mastery level like those who are considered as brighter or higher achiever. In this way, Carroll was very much against the prevailing practice of declaring a student passed and allowing him to enter in the next grade or class by attaining simply required pass percentage of achievement scores (like 33% or 40%). He argued that by doing so, he became master of only a fraction of the learning material meant for his grade or class. However, for the desired entry behaviour of the next class or grade, he must be the master of all that is included in the curriculum of the earlier classes. There must be 100 per cent learning of the contents taught to them along with the total realisation of the set teaching-learning objectives for that learning. By bringing the concept of mastery learning and suggesting a model for the attainment of mastery, he suggested that it was possible for nearly all students of a class to master any given set of objectives if sufficient time (the opportunity to learn) was provided to them along with appropriate materials and instruction.

Carroll's ideas regarding mastery learning were further taken ahead by B.S. Bloom (1971) for giving birth to a working model for mastery learning wherein he attempted the individualisation of instruction to the context of group-based teaching. The models as used for the attainment of mastery learning at present are mostly based on the latest attempts and views of B.S. Bloom (1971) with the following assumption, basic features and processes:

1. Any teacher can virtually help all students to learn excellently, quickly and self-confidently. A student failure rests with the instructor giving less time and using poor strategies and not with the lack of ability on the part of student.
2. In a mastery learning environment, the challenge before the teacher is to provide enough time and employ instructional strategies to help all students in achieving the mastery level of learning.
3. The time spent on learning is the key to mastery. All students can achieve mastery if they devote the amount of time needed for the learning.
4. Given sufficient time and appropriate type of help, 95 per cent of the students can achieve grade A as an index of mastery of a subject.
5. The students may vary with regard to the time required for mastering the content. However, the speed at which they master is not more important than mastering. In this way, the late masters are not inferior to the early masters anyhow.
6. Mastery of any subject is defined in terms of sets of major objectives that represent the purpose of the course of unit. The mastery level, e.g. 95 per cent, of the objectives realised should be defined at the beginning of the study.
7. The specific instructional objectives relating to the learning task must be formulated.
8. The learning task or unit should be broken into small learning units, each one accompanied by its own objectives.
9. The students must understand the nature of the task or learning material and the procedure to be followed in learning it.
10. The learning material should then be identified and proper methods and strategy suiting to the needs and abilities of the learner should be adopted for its presentation.
11. Each subunit should be accompanied by a brief diagnostic

test for measuring the students' progress (the formative evaluation) and identifying their learning difficulties. Such testing proves valuable in providing feedback to both the teacher and the learner in specifying the aspects or elements of the learning unit still needed to be mastered.

12. The data obtained from the diagnostic test should be used to provide corrective measures and supplementary instructions to the students for overcoming learning difficulties in the path of attaining mastery over the learning units.
13. The students should not be allowed to proceed on the next learning unit unless they have the required mastery over the present unit.
14. If followed properly, asserts that under favourable conditions, namely optimal ordering of learning material, informing the student of learning tasks by stated objectives, and adjusting the amount of learning time in accordance with individual learning rates, 95 per cent of the students should be capable of attaining the level of achievement now reached by the top 20 or so per cent of learners.

Description of mastery learning model

Let us try to understand the structure and working of the *mastery learning model* in terms of the basic elements of a teaching model.

Focus: The *mastery learning model* is based on the assumption that all the students of a class can learn and attain the mastery level if sufficient time, adequate instruction and timely help are provided to them according to their needs, interests and abilities. Therefore, the model focuses to attain mastery level (i.e. grade A as an index of mastery of a subject) by almost all the students, say 95 per cent of a class with due provisions of sufficient time and appropriate types of help (Bloom, 1971).

Syntax: The *mastery learning model* in action can be explained through a number of phases:

Phase one : Planning for mastery

Phase two : Teaching for mastery

Phase three : Formative evaluation for diagnosing mastery

Phase four : Providing differential teaching for mastery

Phase five : Re-evaluation and remedial work for mastery

Phase six : Summative evaluation and grading for mastery

Let us now explain, in brief, the different activities undertaken during the operations of the above phases:

Phase one—Planning for mastery: The model requires a number of pre-preparation and planning measures for its implementation as the following:

1. Analysis of the subject to be taught in proper units and subunits and their sequential organisation.
2. Determining instructional objectives of the subunits level and for the entire learning unit, and their specification in clearly defined behavioural terms.
3. Communication of these instructional objectives to the students.
4. Orientation of students with regard to the concept and process of mastery learning.
5. Taking proper decision about the level of mastery attained in the learning units, e.g. attaining Grade A by all students of the class in the final test or attaining 95 per cent mastery over the given set of objectives by the 95 per cent students of the class.
6. Knowledge about the potential of the students with regard to their individual interests, abilities and prerequisites for the learning of subject and individual units.
7. Pre-arrangement and planning for the use of instructional material, methods and strategies, aids and equipment in the given teaching–learning conditions for the attainment of mastery learning objectives.
8. Preparation of subunit and unit tests for the formative and summative evaluations.
9. Planning for the sufficient time needed by the individual

learner or class as a whole for the attainment of mastery level along with the needed measures, ways and means for helping the students in attaining it.

Phase two—Teaching for mastery: Here, a particular subunit—an initial and beginning sub-division of the whole unit—is taken first for the required teaching and mastery. For its proper teaching the following things should be kept in mind:

1. The instructional or learning material related to the subunit should be selected with proper care in view of the interests and abilities of the students.
2. A better choice is always made with regard to the methods and strategies for the instructional purpose. Help of suitable teaching aids should be taken for the clarity and understanding of the subject matter.
3. As far as possible, individual attention should be given for making the students understand the presented subject material or demonstrated practical work.
4. There should not be undue hurry in presenting the subject matter to the students. It is natural that students may show wide individual differences with regard to the amount of time required to grasp the subject matter. Hence, speed should always be sacrificed for the sake of proper clarity and understanding of the subject matter.
5. The teacher must demonstrate his love and enthusiasm with regard to his teaching. He must try to involve and seek high participation of the students in the teaching–learning process for the better communication and understanding of the subject matter and learning of a skill.

Phase three—Formative evaluation for diagnosing mastery: After imparting instructions in a particular subunit, the degree of the mastery level attained by the pupils is ascertained through formative evaluation/diagnostic test. For this purpose, the following things should be kept in mind:

1. The specific objectives for the subunits and the unit as a whole as well as the learning content should be properly considered while preparing the formative diagnostic test.
2. For each one of the formative test, mastery criterion has to be set, i.e. Grade A or 90–95 per cent marks.
3. It is better to develop two parallel forms of these formative tests. Out of these, one may be used at stage three (diagnosing the deficiency and difficulties for attaining mastery level) and the other at stage five (providing corrective measures and remedial education)
4. Care is to be taken for knowing the extent to which the mastery level has been attained by individual students and class as a whole. The difficulties faced should be carefully diagnosed and the things which need more clarification should be properly noted.
5. The students who have been successful in attaining mastery level (masters) should be identified and the nature of deficiency in terms of attaining mastery for the non-masters should be properly recorded.

Phase four—Providing differential teaching for mastery: Based on the findings of formative evaluation, serious attempts should now be made for covering up the deficiencies—achievement differences between masters and non-masters. For this, the following measures may prove fruitful:

1. In case many students of the class have not been able to master the learning task/sub-unit, the teacher should re-teach the subunit (emphasising on the things not grasped) by adopting different tactics and strategies.
2. The learning difficulties of the individual students and the group as a whole (sorted out by diagnostic or formative testing) should be solved through a number of measures such as:
 - i. Giving extra time and more individual attention.
 - ii. Adopting various strategies like peer tutoring

(assigning responsibility to the masters for attending the non-masters), small group study season, and quizzes.

- iii. Providing corrective instructions through the use of useful instructional materials like workbooks, educational games, audio-visual aids, programmed learning packages, practical assignments, reference books, and other useful literature.
- iv. Taking help of the parents in doing away with the learning difficulties of their children.
- v. Providing opportunities for more practice, drillwork and working on task to enable the students for covering the gaps left between non-mastery and mastery of the task.

Phase five—Re-evaluation and remedial work for mastery: After adopting corrective measures and providing differential teaching for helping the non-masters to attain the required mastery level as discussed in phase four, the second parallel form of the formative test may now be administered to the group of non-master to ascertain the extent to which the gaps between mastery and non-mastery have been marginalised. The results of this re-evaluation by the form second of the previously prepared parallel formative test may now be used to identify again the masters and non-masters. The so identified non-masters are again subjected to corrective instructions and remedial education in view of their learning difficulties, available resources and the time available for doing so. This work may be carried out in the regular period, or giving extra time in the school or giving meaningful well-structured assignments and projects, etc. completed at home or at some other working situations. After adopting such corrective measures, when majority of the students (say 90 to 95 per cent) of the class seem to attain the mastery level, the teacher may proceed with the next subunit of the course. All what has been done in attaining mastery over the first subunit under the above phases is repeated with all the subunits of the course till a desired mastery over the full unit or course is achieved.

Phase six—Summative evaluation and grading for the mastery: Under this final phase, a summative evaluation test is performed for ascertaining the extent to which the desired mastery over the complete unit or entire course material has been achieved by the individual students and class as a whole. This test is based on the specified instructional objectives aiming towards the mastery over the entire unit of the course material. The summative evaluation test is always administered at the end of the courses. With the help of the data (in the form of single score) obtained through such test, we may be able to classify and have grading of the students. In a successful situation, almost all the students (90 to 95 per cent) may demonstrate the attainment of grade A (i.e., attainment of 90 to 95 per cent scores) implying that the desired objectives of attaining mastery over a learning material has been satisfactorily achieved.

Principles of reaction: The main emphasis in the *mastery learning model* is on helping the students attain mastery over the material taught. Here the speed of a particular student's learning is of little significance. Therefore, the teacher is not to reinforce or reward the speed rather he is to monitor the attainment of the mastery level by all the students of the class. Through formative evaluation, he has to know the nature of the difficulties faced by the individual student or a group as a whole and then provide them individual or collective help for the rectification of their shortcomings. He has to work hard and help every student in learning task by diagnosing his difficulties and providing constant encouragement, required corrective measures and guidance by establishing proper rapport. A teacher working with this model has to remain quite cautious in reminding the students that learning completely is more important than completing the task easily and late masters are in no way inferior to the early masters.

The social system: In the classroom teaching situations, the *mastery learning model* provides quite upper hand to the teacher for being more active and dominant for the flow of the teaching–learning activities. He is assigned more responsibilities right from *the planning to the teaching and evaluation stages*. He has to analyse the contents properly, specify the instructional objectives, teach

properly for the acquisition of these objectives, prepare the formative and summative tests, diagnose the learning difficulties and provide suitable corrective measures and remedial instruction for helping the students attain the desired mastery level in close consideration of their basic needs, interests and abilities. However, for the fulfilment of his obligations, the teacher has to seek a close cooperation from the students at each and every stage of the planning and execution of this model. He has to make them acquainted with the concept and methodology of mastery learning, the nature of formative and summative evaluations and the importance of mastery learning for their own improvement. They must feel the necessity of attaining mastery over the learning material, realise the need of devoting the time and demonstrating required patience and strength for overcoming the difficulties in the learning path. The teacher has to organise the class in small groups, take the help of early masters as monitors and help the students individually as a tutor. So the model provides opportunities not only for the teacher–pupil interaction but for the pupil-pupil interaction as well. The social system of the mastery learning model presents a picture of cooperative learning characterised by a warm, cordial, cooperative and enthusiastic teaching–learning environment.

The support system: The implementation of the model requires some additional support other than that is usually available in a normal classroom situation as mentioned here:

1. The services of the teachers who know the art and technique of implementing *mastery learning model*.
2. Extra support in terms of the suitable textbooks, supplementary reading material, question banks and assignment material for preparing the items for formative and summative evaluations.
3. The help of enriched instructional material, suitable techniques and strategies, audio-visual aid material, multimedia, educational games, etc. for the students in overcoming their learning difficulties and providing corrective measures and remedial education.

4. Make provision in the regular timetable or school time schedule for the extra time required in attaining mastery level.
5. Flexibility in scheduling and pacing of the curricular coverage.

Application context: The application of *mastery learning model* brings two types of advantages in terms of cognitive outcomes and affective consequence:

1. According to the studies reported by Block (1971), adoption of the *mastery learning model* may enable about 90 per cent of the students to reach a level of achievement which less than 20 per cent attain under non-mastery conditions.
2. The model, although suitable for the mastery of some basic skills belonging to all the subjects or areas of the school curriculum, may prove more effective in the teaching of subjects and contents which are more structured, organised and sequential in nature. Learning of various concepts and skills in mathematics, sciences, music, arts, statistics, commerce, economics, management studies, history, geography, and languages may well fall in this category.
3. The attainment of mastery over the learning material helps the learners take genuine interest in the further learning of subject. It helps them create a positive attitude towards the learning and application of the subject in real-life situations. Moreover, the so achieved mastery and its public recognition provide the learners with the necessary reinforcement to look upon themselves as adequate resulting into the proper enhancement of their self-confidence and self-respect.

Problem Solving Teaching Model

It is quite natural for us as the human being to come across with one or the other problems in our life. We have our needs and motives

that ought to be satisfied. For this purpose, definite goals or aims are set. In an attempt to realise them, we experience obstacles and difficulties. It poses a problem for us. We can get rid of the faced problem only by making deliberate attempts of engaging in a particular type of behaviour, named as problem-solving behaviour. It helps us in finding a solution to the felt problem (academic, behavioural, personal, professional or social) in an appropriate way. This is a quite simple meaning of the term *problem-solving behaviour* resorted by us in one or the other problematic situation. However, to know more about the meaning and nature of *problem-solving*, let us take the help of a few definitions put forward by scholars and thinkers.

1. **Woodworth and Marquis (1948):** *Problem-solving* behaviour occurs in novel or difficult situations in which a solution is not obtainable by the habitual methods of applying concepts and principles derived from past experience in very similar situations.
2. **Skinner (1968):** *Problem solving* is a process of overcoming difficulties that appear to interfere with the attainment of a goal. It is a procedure of making adjustment in spite of interferences.

An analysis of the above definitions brings out the following observations about the meaning and nature of *problem-solving* behaviour:

1. In the satisfaction of one's needs and realisation of the set goals, problem-solving behaviour arises only when the goal is purposeful and essential for the individual, there is serious interference in the realisation of this goal, and this interference or obstacle cannot be overcome by simple habitual acts or mechanical trial and error methods.
2. One has to utilise one's thinking and reasoning powers and engage in serious mental work by systematically following

some well-organised steps for the removal of the difficulties and obstacles.

3. The *problem-solving* behaviour involves quite deliberate, conscious and serious efforts on the part of problem-solver.
4. *Problem-solving* behaviour helps in the removal of, or adjustment with, interferences and ultimately helps an individual to reach his goal and satisfy his motives.
5. *Problem-solving* behaviour helps an individual in the growth and development of his personality, making his life happier and wiser by appropriate adjustment. It also contributes significantly to the progress and development of society.

In view of the foregoing, *problem-solving behaviour* may be said to be a *deliberate and purposeful act on the part of an individual to realise the set goals or objectives by inventing some novel methods or systematically following some planned step for removal of the interferences and obstacles in the path of the realisation of these goals when usual methods like trial and error, habit-formation and conditioning fail.*

Problem solving teaching model

Our students need to be equipped with the skill and ability of *problem-solving* for enabling them to face one or the other types of problem arising in their way. How can they be taught or trained in the acquisition of the required problem-solving ability or skill is a ticklish question. As a teacher, we need the services of a teaching model for teaching our students the art of *problem-solving* much in the same way as we have in our stock the enquiry training model for training students in the enquiry process, concept attainment model for helping the students in the attainment of different concepts, etc. However, as we know, in the classification of the model's family provided by Joyce and Weil in their publication *Models of Teaching* there appears no such model in the name of *problem solving teaching model*. We have to collect information on this issue from other available sources.

Different scholars have suggested different sets of steps for being followed in a problem- solving behaviour. Let us have a look in their proposals.

Kilpatric's five steps for problem solving: The famous educationist William H. Kilpatric (1936) tried to provide the five phases or steps for the *problem-solving* act carried out by the problem solvers. These steps along with the activities carried out are briefed as below:

Phase 1: The Individual (or group) faces a situation. He has no satisfactory way of responding to it and hence is perplexed as to what aspect of it he should respond and how he should respond.

Phase 2: He continues to face the situation, begins to analyse it so as to locate details that might be helpful in deciding what to do and how to do.

Phase 3: Out of his past experience and his present analysis of the situation he makes plans for resolving his difficulty and chooses on the basis of careful thought, the plan he prefers to try out.

Phase 4: He tries out the plan selected, revising it whenever it seems desirable to do so.

Phase 5: If the plan works, the perplexity is resolved. If the plan does not work, he may go back through the various activities again and again until some solution has been reached or else the individual abandons the situation.

Bransford and Stein's five steps for problem solving: John Bransford and Barry Stein (1984) advocated the use of their five steps in the task of problem-solving. They referred to these steps as *IDEAL* thinking and arranged them in the following order:

I = Identifying the problem.

D = Defining and representing the problem.

E = Exploring possible strategies.

A = Acting on the strategies.

L = Looking back and evaluating the effects of one's activities.

Bourne, Dominowski and Loftus's three steps for problem solving: Bourne, Dominowski and Loftus (1979) have called for the use of three steps or stages in problem-solving: preparation, production and evaluation, by proclaiming we prepare, we produce, and we evaluate in the task of problem solving.

Five steps non-directive teaching model for the solution of personal problems: Joyce and Weil (1986) have described a teaching model helpful in teaching the students the way of solving their personal problems. This model is associated with the personal development models of instruction family and is developed by Carl Rogers to provide guidance and counselling to the students for resolving their personal problems and difficulties. The steps along with the activities carried out are summarised as below:

Step one: Here, the teacher first helps the students to focus on a particular problem. It can be an academic problem, a behavioural problem, a personal problem or a social problem. Then the Teacher explains the ground rules for the expression of student feelings and the overall structure of the counselling process will be agreed upon by the student and teacher. As far as possible here the teacher is required to serve as a facilitator and needs to be very accepting of student feelings. On the other hand, the student needs to identify feelings associated with the problem.

Step two: In this step the teacher helps the students to define the problem and also attempts to help the student clarify feelings related to the problem. In doing so again, the teacher here serves as a facilitator. It is the student's explanation of self that is important.

Step three: In this step, the student continues to explore the problem. Here, he talks about the problem in more detail and develops insights related to the problem. The teacher continues to be accepting and supportive of student feelings.

Step four: Here the student develops a plan designed to solve the problem. The teacher supports the student by helping the student to clarify the actions to be completed and by providing supportive atmosphere for implementation.

Step five: Here, the student implements the plan. After a designated time, the student reports on progress made using the plan. Based on this information, the plan then may be modified or continued as it is, until it achieves its aim—helping the student in resolving his felt problem.

Wood's five steps problem-solving model: Woods, D.R. and others (1975) have come out with a five-step model helpful in solving the problems. The steps advocated in their model are (i) defining the problem, (ii) thinking about the problem (iii) planning a solution, (iv) carrying out the plan and (v) looking back.

In this way, we may see that scholars and thinkers have tried to put up their views about teaching or developing problem-solving ability or skill among the students/individuals by mentioning the steps and activities needed in learning the *problem-solving behaviour*. In case we try to synthesise the viewpoints emphasised above, then we may be helped in chalking out a workable appropriate model helpful for the development of appropriate problem-solving ability among the students. Such an evolved teaching model may be found to be characterised with the type of syntax (phases and activities) briefed as below:

Phase-one—Problem-awareness: The first step or phase in the problem-solving behaviour of an individual is concerned with his awareness of the difficulty or problem which needs to be solved. He must be faced with some obstacle or interference in the path of the realisation of his goals, needs or motives and consequently he must be conscious of the difficulty or problem.

Phase-two—Problem-understanding: The difficulty or problem encountered by the individual should next be properly identified and analysed so that its exact nature becomes clear to him. This should be followed by relating the problem to his specific goals and

objectives. Thus, all the difficulties and obstacles in the path of the goal or solution must be properly named and identified and what is to be achieved through the *problem-solving* effort should be clearly known in very specific terms.

Phase-three—Collection of the relevant information: In this phase or step, the individual is required to collect all the relevant information about the problem by all possible means. He may consult experienced persons, read the available literature, recall his own experiences, think of the numerous possible solutions, and put in all possible efforts to collect comprehensive data and knowledge concerning the problem.

Phase-four—Formulation of hypotheses or hunt for possible solutions: After understanding the nature of the problem and collecting all relevant information, one may start some cognitive activities to think out the various solutions to the problem.

Phase-five—Selection of the correct solution: In this important step or phase, all the possible solutions, thought out in the previous step, are closely analysed and evaluated. Gates and others (1946) have suggested the following activities in the evaluation of the assumed hypotheses or solutions:

1. Identify the conclusion that completely satisfies all the demands of the problem.
2. Find out whether the solution is consistent with other well-established or accepted facts and principles.
3. Make a deliberate search for negative aspects which might cast any doubt on the conclusion.

The above suggestions would help the individual to select the proper solution to his problem out of the numerous solutions that may be available. In the final analysis, however, he has to use his own discretion by utilising his higher cognitive abilities to properly identify the appropriate hypothesis or solution by rejecting all other hypotheses.

Phase-six—Verification of the concluded solution or hypothesis: The solution arrived or conclusion drawn must be further verified by applying it in the solution of various similar problems and only if the derived solution helps in the solution of these problems, then, one should consider the solution to be acceptable. Such a verified solution may then become a useful product of one's *problem-solving* behaviour and be utilised in solving other future problems.

Inductive Thinking Model

Inductive thinking model owes its origin in the work and ideas of an American theorist and educationist Hilda Taba. In her honour, the model is also designated as Hilda Taba's model of inductive thinking. Let us try to describe this model in terms of its theoretical assumptions, viewpoints and practical applications as prescribed by its propagator Hilda Taba. The main points in this regard may be summarised as below:

1. Hilda Taba postulated that children need to process the information well in knowing and understanding their environment. In their information processing task they may be helped well by their thought process, i.e. ability to think especially in an inductive way.
2. For the development of appropriate thought processes, Hilda Taba built her approach of presenting a working teaching model around the following three basic assumptions. (Joyce Bruce and Weil Marsha, 1980 : 49).
 - i. **Thinking can be taught**—means if suitable teaching strategies are employed, children can learn how to think and reason in a proper way for processing the needed information.
 - ii. **Thinking is an active transaction between the individual and data**—means that thinking employed for processing the data/information involves the use of some specific cognitive operations on one's part. These mental operations cannot be taught directly by the teachers but with a tactful support children

may be stimulated for their use in their thought process.

- iii. **Process of thoughts evolve by a sequence that is lawful**—means that one thought generates the other thought in sequence. However, for the development of a new higher order thought, the previous ones lying in the sequence must be mastered first, and this sequence cannot be reversed (i.e., we cannot first master the higher order thinking skills and then go for the learning of the lower order skills).

- 3. Hilda Taba proposed that specific teaching strategies need to be employed for the teaching and learning of specific inductive thinking skills. She insisted on the learning and development of inductive thinking skills among the children by emphasising that children basically and spontaneously employ the inductive reasoning in carrying out their mental operations for the processing of information.
- 4. Taba identified three inductive thinking skills helpful in employing inductive thinking to process the information or data on the part of children in a learning or problem- facing situation. She named these skills as:
 - i. Concept formation
 - ii. Interpretation of data
 - iii. Application of principles
- 5. She also emphasised that the use of these three inductive thinking skills represents the successive sequential stages of one's inductive thinking employed in processing given information/data. Each stage involves certain kinds of activities to be performed by the individual in the form of overt acts and covert mental operations. These activities take place in systematic order under different phases shown as below in Table 22.9.

Table 22.9 Stages and Phases Involved in Inductive Thinking Teaching

Stage I—Concept formation	
Phase 1	Identifying and listing the data that are relevant to the learning situation or problem solving
Phase 2	Grouping the items of the data according to some basis of similarity
Phase 3	Developing categories and labels for the groups
Stage II—Interpretation of data	
Phase 4	Identifying critical relationships (differentiating among the characteristics of particular data)
Phase 5	Exploring relationships (determining cause and effect relationships)
Phase 6	Making Inferences
Stage III—Application of principles	
Phase 7	Predicting consequences and hypothesising
Phase 8	Explaining and/or supporting predictions and hypothesis
Phase 9	Verifying the prediction (testing and generalisation)

6. In order to teach and train the children in using these three inductive thinking skills belonging to Stage I, II and III, they should be trained in carrying out the different activities (overt and covert) mentioned under these three different phases in a proper way. In view of Hilda Taba, thus the different activities carried out at different stages under different phases represent the different strategies employed for teaching and training the children in inductive thinking.
7. For answering the question how children should be engaged in each of the activities (overt as well as covert) being performed in the different phases of the different stages, Hilda Taba invented teaching moves in the form of questions. These questions are so designed as to elicit and stimulate particular types of activities required to be performed under the different phases of *inductive thinking*.

Hilda Taba in her publication *Teacher's Handbook for Elementary Social Studies* (1967) has made it clear that how questioning strategy used by the teacher may prove helpful in eliciting required overt and covert activities for the use of three inductive thinking skills, namely:

(i) Concept formation, (ii) Interpretation of data and (iii) Application of principles on the part of the children. We are here reproducing the viewpoints expressed by her in the teaching of these three inductive thinking skills in Tables 22.10, 22.11 and 22.12.

Table 22.10 Concept Formation

<i>Overt activity</i>	<i>Covert mental operations</i>	<i>Eliciting questions</i>
1. Enumeration and listing	Differentiation (identifying separate items)	What did you see? hear? note?
2. Grouping	Identifying common properties, abstracting	What belongs together? On what criterion?
3. Labelling, categorising	Determining the hierarchical order of items super- and sub-ordination	How would you call these groups? What belongs to what?

Source: Hilda Taba, *Teacher's Handbook for Elementary Social Studies* quoted by Joyce Bruce and Weil Marsha (1980 : 50).

Table 22.11 Interpretation of Data

<i>Overt activity</i>	<i>Covert mental operations</i>	<i>Eliciting questions</i>
1. Identifying points	Differentiating	What did you notice? see? find?
2. Explaining items of identified information	Relating points to each other. Deter-mining cause-and-effect relationships	Why did this happen?
3. Making inferences	Going beyond what is given. Finding implications, extrapolating	What does this mean? What picture does it create in your mind? What would you conclude?

Source: Hilda Taba, *Teacher's Handbook for Elementary Social Studies* quoted by Joyce and Weil (1980: 51).

Table 22.12 Application of Principles

Overt activity	Covert mental operations	Eliciting questions
1. Predicting consequences. Explaining unfamiliar phenomena. Hypothesising	Analysing the nature of the problem or situation. Retrieving relevant knowledge	What would happen if . . . ?
2. Explaining, and/or supporting the predictions and hypothesis	Determining the causal links leading to prediction or hypothesis	Why do you think this would happen?
3. Verifying the prediction	Using logical principles or factual knowledge to determine necessary and sufficient conditions	What would it take for this to be generally true or probably true?

Source: Hilda Taba, *Teacher's Handbook for Elementary Social Studies* quoted by Joyce and Weil (1980: 52).

Description of inductive thinking model in terms of its elements

Focus: Hilda Taba's *inductive thinking model* focuses on the development of inductive thinking skills in the name of concept formation, interpretation of data and application of principles or ideas by employing specific teaching strategies for their proper learning and development.

Syntax: The model employs a number of teaching strategies in the form of different activities carried out at different stages and phases. In action, thus the model expects from the intended learners and trainers for the execution of all these activities in a proper way on their part. Thus, the sequence of activities forms the syntax of the teaching strategies employed by a teacher for the teaching of inductive thinking skills.

In brief the syntax of the model may be presented as shown in Table 22.13.

Table 22.13 Syntax of Inductive Thinking Teaching Model

Strategy one	Concept formation
<i>Phase one</i>	Enumerate and list
<i>Phase two</i>	Group
<i>Phase three</i>	Label, categorise
Strategy two	Interpretation of data

<i>Phase four</i>	Identify dimensions and relationships
<i>Phase five</i>	Explain dimensions and relationships
<i>Phase six</i>	Make inferences
Strategy three	Application of principles
<i>Phase seven</i>	Hypothesise, predict consequences
<i>Phase eight</i>	Explain and/or support the predictions and hypothesis
<i>Phase nine</i>	Verify the prediction

Source: Joyce and Weil (1980 : 59)

Social system: The model for its operation needs a cooperative social environment governed by democratic values. However, in the earlier stage the ongoing teaching–learning process may be well controlled and directed by the teacher as he has to put relevant questions for eliciting responses of the students in terms of overt and covert activities related to concept formation, interpretation of data and application of principles. Later on as the students learn these inductive thinking strategies they may be found to assume greater control and enjoy greater freedom for the further improvement and employment of these skills. As a whole, the environment of the classroom almost remains quite cooperative and democratic as the students as a group are engaged in the useful activities like collection of data, categorisation and labelling of the collected data, drawing inferences and making generalisation about observed or collected facts.

Principles of reaction: According to Joyce and Weil (1980 : 57–58), Hilda Taba provides the teacher clear guidelines for reacting and responding within each phase and stages of the *Inductive Thinking Model* such as:

- i. While matching the eliciting questions or moves to the specific cognitive tasks within each strategy, the teacher must be sure that the cognitive tasks occur in optimum order, and also occur at the right time.
- ii. The eliciting question like how will you group or categorise these items? To which group this item belongs? etc. should

be put only when the students have finished the task of data collection or listing various items.

- iii. The teachers should try to put appropriate eliciting questions in the light of the feedback how students are processing information.
- iv. The teachers should try to sense the students' readiness for new experience and new cognitive activity with which to assimilate and use those experiences.

Support system: The use of this model needs sufficient flexibility and autonomy to the teachers in terms of time and organisation of learning experiences to the students. Here, children need enough support for locating the things in their environment as well as list and categorise them with the help of the eliciting questions wisely put on the part of teachers. Opportunities in terms of time, moral support and appropriate eliciting questions should also be provided to the students for the proper interpretation, generalisation and further use of the derived conclusions. As far as the outside classroom support is concerned there is the need of enough raw data to organise and analyse.

Application: Hilda Taba model of inductive thinking primarily stands for its use and application as the model of teaching and training the children in the use of inductive thinking skills for processing one or the other types of information. In such capacity it has its wide use and application as summarised below:

- i. It can be employed for the teaching and learning in almost all the curricular areas of school education. It has full potential for teaching concepts related to all the subjects of the school curriculum, social sciences, physical and life sciences, mathematics, languages, health and physical education, arts and crafts, etc.
- ii. The use of this model is helpful in the development of appropriate thinking skills among children. As a result, it may be used beneficially by the children in facing and solving their day-to-day life problems and provide them

enough confidence in facing such problematic situations later in their life.

- iii. The development of appropriate inductive thinking skills may help the teachers to organise their teaching–learning process at the reflective level and bringing constructivist paradigm in the areas of teaching–learning for helping the students to construct and discover the required knowledge for them with their own efforts.
- iv. The use of this model may be made in developing and nurturing the creative expression, inventive faculties and problem-solving ability of the students.

SUMMARY

1. The term *model of teaching* is referred to a model, a blueprint or action plan designed in advance for providing necessary structure and direction to a teacher for realising the stipulated objectives in the same way as happens in the case of a contractor or group of labourers who make use of a model, blueprint, design or action plan drawn by an engineer or architect for the construction of a building, bridge or road.
2. Researchers and educationists have developed a number of teaching models for being used to guide the instructional work of the teachers in one or the other teaching–learning situations. The eminent educationists Bruce Joyce and Marsha Weil have classified these models into four groups, namely information processing models, social interaction models, personal development models and behaviour modification models.
3. A model can be properly explained and understood in terms of its fundamental elements. It also facilitates its use and application for the desired instructional purposes. The fundamental elements of a teaching model may be named as: (i) focus (it tells what the model stands for), (ii) syntax (it refers to the description of model in action), (iii) principles of reaction (the rules followed for responding to the action of the students), (iv) social system (the type of interaction and role played by the students and teachers), (v) support system (the type of additional resources needed), and (vi) application context (where and in which form the model can be applicable for teaching–learning).
4. Glaser's basic model proposes to perform the complex process of teaching by passing through the four stages associated with the four basic components of the model, namely instructional objectives, entering behaviour, instructional procedures and performance assessment.
5. Richard Suchman's *inquiry training model* tries to provide

essential training to the students in the method of inquiry for investigating the causes of the occurrence of a phenomenon or happening of an event. For the purpose, a strange and challenging problem is put before the students and they are made to proceed to solve that by resorting to the method of inquiry, collect relevant data, and try to verify their hypotheses on the basis of the analysis of the data.

6. Bruner's *concept attainment model* is quite helpful in the formation and attainment of the concepts for the students. For this purpose, Weil and Joyce have provided three specific formats: (i) reception model, (ii) selection model, (iii) unorganised material model. Where the reception model is said to work well with the attainment of the complex concepts, the attainment of the simpler concepts may be left on the application of the other formats.
7. The advanced organiser model of Ausubel works on the assumption that the presentation and reception of a learning material may go properly if the learner possesses the relevant previous experiences and the needed cognitive structure for the purpose. Keeping this thing in view, the model expects from the teacher to present the relevant information and ideas related to the topic of the study in the form of advanced organisers in such a way as to facilitate the acquisition of the new information and knowledge related to the presented lesson in a proper way.
8. Bloom's *mastery learning model* proposes that all the students of a class may be helped to attain the mastery level in the learning of a piece of instruction if they are provided adequate time to learn besides being taught in a proper way with proper means. The model recommends to proceed by following some systematic steps: (i) pre-preparation or planning, (ii) teaching for mastery, (iii) formative evaluation for diagnosing mastery, (iv) providing differential teaching for mastery, (v) re-evaluation and remedial work for mastery, and (vi) summative evaluation and grading for the mastery.
9. Our students need to be equipped with the skill and ability of *problem solving* for enabling them to face one or the other

type of problem arising in their way. The use of the *problem solving model* fulfils the need of equipping the students with the art and skills of problem solving related to their instructional work as well as day-to-day life events. The steps advocated in the use of this model may usually include the steps such as: (i) defining the problem, (ii) thinking about the problem (iii) planning a solution and exploring possible strategies, (iv) carrying out the plan by acting on the strategies (v) looking back and evaluating the effects of one's activities.

10. Inductive thinking is quite helpful in the learning carried out in the constructivist perspective on the part of children. It adds to one's creative, explorative and inventive output instead of forcing him to follow the beaten track by depending on one's deductive reasoning. The children may be helped in getting them equipped with the ability of inductive thinking with the use of a teaching model named as *inductive thinking model*. It was developed by an American theorist and educationist Hilda Taba. In its application, it is properly aimed to help the users for being imbibed with some of the necessary skills associated with one's inductive thinking. These skills have been named in this model as (i) concept formation skill, (ii) skill associated with the interpretation of data and (iii) skill associated with the application of principles or ideas. For the development of all these inductive thinking skills, model tries to lay down certain specific teaching strategies for the teachers and ways of learning and practicing opportunities to the learners.

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Micro Teaching

INTRODUCTION

Teaching practice or student-teaching programme aiming to make the student-teachers learn the art of classroom teaching is the weakest link in the training programme of our training colleges. It is poorly organised, improperly conducted and hopelessly evaluated in most of our colleges and universities. The traditional pattern of such student-teaching programme has resulted in producing incompetent and ineffective classroom teachers, and it has resulted in a general belief that trained teachers are not better than the untrained ones. The situation like this has caused to think about some alternative measures and techniques to bring improvement in the student-teaching programme. Micro-teaching is one of such innovations and techniques that has emerged on the map of teacher education for improving the student-teaching programme.

MEANING AND DEFINITIONS

Various research workers and writers have defined *micro-teaching* in number of ways. Let us reproduce here a few important definitions such as:

D.W. Allen (1966): *Micro-teaching is a scaled down teaching encounter in class size and time.*

Allen and Eve (1968): *Micro-teaching is defined as a system of controlled practice that makes it possible to concentrate on specific teaching behaviour and to practise teaching under controlled conditions.*

R.N. Bush (1968): *Micro-teaching is a teacher education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessons in a planned series of five to ten minutes encounters with a small group of real students, often with an opportunity to observe the result on video tape.*

McAlleese and Unwin (1970): *The term micro-teaching is most often applied to the use of CCTV (closed circuit television) to give immediate feedback to a trainee-teacher's performance in a simplified environment.*

Clift and others (1976): *Micro-teaching is a teaching-training procedure which reduces the teaching situation to a simpler and more controlled encounter achieved by limiting the practice teaching to a specific skill and reducing teaching time and class size.*

B.K. Passi and M.S. Lalita (1976): *Micro-teaching is a training technique which requires student teachers to teach a single concept using specified teaching skill to a small number of pupils in a short duration of time.*

L.C. Singh (1977): *Micro-teaching is a scaled down teaching encounter in which a teacher teaches a small unit to a group of 5 pupils for a small period of 5 to 20 minutes. Such a situation offers a helpful setting for an experienced or unexperienced teacher to acquire new teaching skills and to refine old ones.*

N.K. Jangira and Azit Singh (1982): *Micro-teaching is a training setting for the student-teacher where complexities of the normal classroom teaching are reduced by:*

- practising one component skill at a time,
- limiting the content to a single concept,
- reducing the size to 5–10 pupils, and
- reducing the duration of the lesson to 5–10 minutes.

The above definitions lead us to the following conclusions about the nature and characteristics of micro-teaching:

1. It is relatively a new experiment or innovation in the field of teacher education more specifically in student teaching.
2. It is a training technique and not a teaching technique. In other words, it is a technique or design that is used for the training of teachers (to make them learn the art of teaching). It is not a method of classroom instruction or teaching like inductive-deductive, demonstration or question-answer method.
3. It is micro or miniaturised teaching in the sense that it scales down the complexities of real teaching with the provisions such as given below:
 - i. Practising one skill at a time.
 - ii. Reducing the class size to 5–10 pupils.
 - iii. Reducing duration of the lesson to 5–10 minutes.
 - iv. Limiting the content to a single concept.
4. There is provision of an adequate feedback in micro-teaching as it provides trainees, due information about their performances immediately after completion of their lesson.
5. Teaching is said to be composed of very specific skills. These skills cannot be mastered through the traditional approach to teacher training. Micro-teaching provides opportunity to select one skill at a time and practice it through its scaled down encounter and then take others in a similar way.

6. Micro-teaching is a highly individualised training device permitting the imposition of a high degree of control in practicing a particular skill.

Looking at the above characteristics and features, the term micro teaching may be defined appropriately as *a technique or device of imparting training to the inexperienced or experienced teachers for learning the art of teaching by practicing specific teaching skills through Scaled down teaching encounter, i.e. reducing the complexities of class teaching in terms of size of the class, time and content.*

MICRO-TEACHING PROCEDURE—AN INDIAN MODEL

Micro-teaching as a training technique involves three phases (Clift et al., 1976) presented in Figure 23.1 given below:

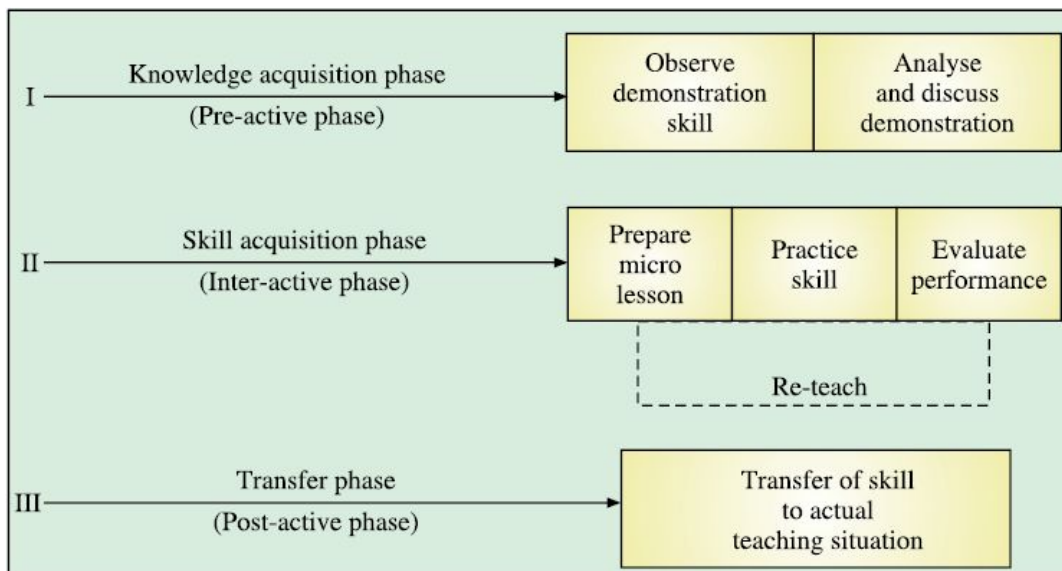


Figure 23.1 Phases of micro-teaching.

In view of these phases a standard procedure of micro-teaching conducted in a teacher training course may involve the following steps. We would like to discuss it in view of the conditions and situations available in our country.

Orientation: In the beginning, the student, teachers should be given necessary theoretical background about micro-teaching by having a free and fair discussion of aspects such as given below:

- i. Concept of micro-teaching.
- ii. Significance or rationale of using micro-teaching.
- iii. Procedure of micro-teaching.
- iv. Requirements and setting for adopting micro-teaching technique.

Discussion of teaching skills: Under this step the knowledge and understanding about the following aspects is to be developed:

- i. Analysis of teaching into component teaching skills.
- ii. The discussion of the rationale and role of these teaching skills in teaching.
- iii. Discussion about the component teaching behaviours comprising various teaching skills.

Selection of a particular teaching skill: The teaching skills are to be practiced by taking them one at a time. Therefore, the student-teachers are persuaded to select a particular skill for practice. They are also provided with necessary orientation and processing material for the practice of that skill. Much of such material may be found in the literature available with NCERT. The student-teachers may be given a necessary background for the observation of a model or demonstration lesson on the selected particular teaching skill.

Presentation of a model demonstration lesson: Here, a demonstration or model lesson for the use of the selected teaching skill is presented before the trainees. This is also termed as *modelling*, i.e. demonstration of the desired behaviours relating to a skill for imitation by the observers. Depending upon the availability of the resources and type of skill involved, demonstration or model lesson can be given in a number of ways such as given below:

- i. By providing written material such as handbooks, guides, illustrations, video tape, etc.
- ii. By exhibiting a film or a video tape.
- iii. By making the trainees listen to an audio tape.
- iv. By arranging a demonstration from a live model, i.e. a teacher educator or an expert demonstrating the use of the skill.

Observation of the model lesson and criticism: What is read, viewed, listened and observed through a modelling source is carefully analysed by the trainees. In a demonstration given by an expert or teacher educator, student-teachers are expected to note down their observations. An observation schedule especially

designed for the observation of the specific skill is distributed among the trainees and they are also trained in its use beforehand. Such observation of the model lesson and its relevant criticism provides desirable feedback to the person giving the model lesson.

Preparation of micro lesson plan: Under this step, student-teachers are required to prepare micro lesson plans by selecting proper concept for the practice of demonstrated skill. For preparing these lessons, help may be taken from the teacher-educators and sample lessons available in the NCERT literature and other books on the subject of micro teaching.

Creation of micro-teaching setting: Under this step, consideration is made for creating proper conditions and providing appropriate facilities for the practice of a teaching skill. In the Indian model of micro-teaching developed by NCERT, the standard setting for a micro class is as below:

- a. Number of pupils: 5–10.
- b. Type of pupils: Real pupils or preferably peers.
- c. Type of supervisor: Teacher-educators and peers.
- d. Time duration of a micro lesson: 6 minutes.
- e. Time duration of a micro-teaching cycle: 36 minutes.

This duration is divided as under:

Teaching session	: 6 minutes
Feedback session	: 6 minutes
Re-plan session	: 12 minutes
Re-teach session	: 6 minutes
Re-feedback session	: 6 minutes
Total	: 36 minutes

Practice of the skill (Teach-session): Under this step, the student-teacher teaches his prepared micro lesson for 6 minutes (prescribed time schedule for teach-session) in a micro class consisting of 5–10 real pupils or peers (student-teachers). It is supervised by the teacher-educator and peers both with the help of appropriate

observation schedule. Where possible, the student-teacher may also have his lesson recorded on a video or audio tape.

Providing feedback: The greatest advantage of micro-teaching lies in providing immediate feed-back to the student-teacher on his teaching performance demonstrated in his micro lesson. The feedback is provided in terms of his use of the component teaching behaviours emphasising the skill under practice so that he may be able to modify those in the desired direction. This feedback, in Indian situation, may be properly provided by the peers and teacher-educators observing the micro lesson. Where possible, the help may also be taken from the electronic gadgets like CD, close circuit television (CCTV), etc.

Re-planning (Re-plan session): In view of the feedback received from the different sources, the student-teacher tries to re-plan his micro lesson. He is provided 12 minutes time for this purpose.

Re-teaching (Re-teach session): In this session of 6 minutes, the student-teacher re-teaches his micro lesson on the basis of his re-prepared plan and rearranged setting.

Providing Re-feedback (Re-feedback session): On the basis of his performance in the re-taught micro lesson, the student-teacher is provided re-feedback in the way outlined earlier.

Repetition of the micro-teaching cycle: A micro-teaching cycle used to practice a teaching skill consists of planning, teaching, feedback, re-planning, re-teaching and re-feedback operations as shown in Figure 23.2.

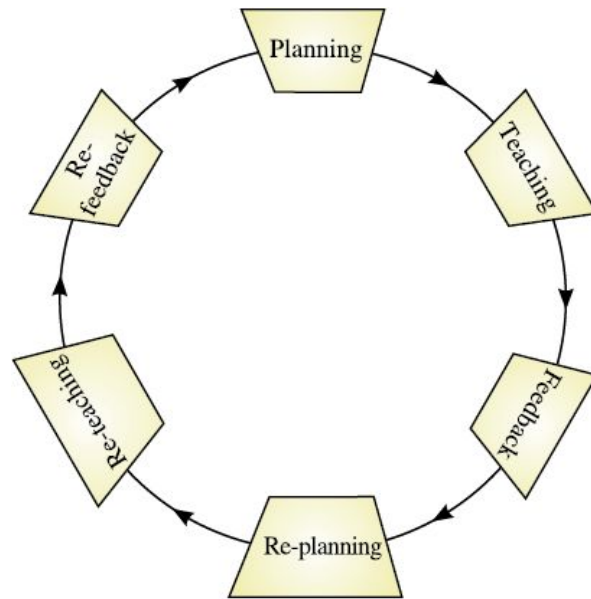


Figure 23.2 A micro-teaching cycle.

The earlier mentioned micro teaching cycle is repeated and the student-teacher is required to re-plan and re-teach his lesson till he attains mastery over the skill under practice.

Integration of teaching skills: This last step is concerned with the task of integrating various teaching skills individually mastered by a student-teacher. This helps in bridging the gap between training in isolated teaching skills and the real teaching situation faced by a student-teacher. We would be discussing it in detail in the last section of this chapter.

MERITS OR ADVANTAGES OF MICRO-TEACHING (In Indian Context)

In Indian context, micro-teaching contains the following advantages over the traditional methods of learning the art of teaching:

1. In our traditional mode of teacher-training a great dependence is observed on the availability of pupils, classrooms and cooperation from the staff of the practising schools. The micro-teaching approach incorporating simulation technique helps a training institution in overcoming the hardships faced in the task of organising student-teaching for learning the art of teaching.
2. The Global concept of teaching is replaced by the analytical concept in micro-teaching approach. Here complex task of teaching is considered as a set of simple skills comprising specific classroom behaviours. This helps in the proper understanding of the meaning and concept of the term *teaching*.
3. Micro-teaching helps in reducing the complexities of the normal classroom teaching. It is a scaled down or miniaturised classroom teaching as it reduces the size of the class and duration of the lesson and provides proper opportunities for practising one component teaching skill at a time by using single concept of the content.
4. In micro-teaching the student-teacher concentrates on practising a specific and well-defined teaching skill consisting of a set of teacher behaviours that are observable, controllable and practicable. Consequently, micro-teaching provides more appropriate technique of learning the art of teaching (although mastering one teaching skill at a time) than the traditional student-teaching programme.
5. Micro-teaching helps in systematic and objective observation by providing specific observation schedule.
6. Micro-teaching works as laboratory exercise to focus

training on the acquisition of teaching skills and instructional techniques. Here a trainee can experiment with several alternatives in limited time and resources. It is just like learning the art of operating human body parts in a medical laboratory by a student-doctor before actually operating a patient.

7. Micro-teaching provides economy in mastering the teaching skills. It saves the time and energy of the student-teacher as well as the pupils. In micro-teaching, it is not only easy for a student-teacher to handle a micro group (5–10 pupils) but also safe because they will have less problem of classroom discipline and subsequent mental tension as faced commonly in the traditional teaching practice programme. It also saves the pupils for being unnecessarily used as guinea pigs for training student-teachers.
8. Another major advantage of micro-teaching lies in the provision of immediate systematic, pin-pointed and objective feedback in behavioural terms. In the traditional teaching practice programme, it is usually given in global terms like *improve handwriting*, *seek pupil's participation*, etc. after the lapse of a lot of time.
9. Micro-teaching caters to the need of individual differences in the training of teachers. Here, an individual trainee may work for the development of teaching skills at his own pace depending on his teaching abilities.
10. Unlike traditional teaching practice programme, it focuses attention on the modification of teacher behaviours and improvement of interaction process involved in the teaching–learning process.

DEMERITS AND LIMITATIONS OF MICRO-TEACHING

Although micro-teaching is described as an effective, well managed and controlled device of learning the art of teaching, yet it also has some limitations and demerits as cited below:

1. Micro-teaching is performed in the artificially controlled conditions. The student teacher trained in such conditions may not feel at home while teaching in the real classroom situations.
2. Micro-teaching presents a fragmented view of teaching as student-teachers are asked to seek mastery over the isolated teaching skills. However, in real classroom situations these skills are required in an integrated form rather than being used turn by turn.
3. It is a time-consuming training technique. It is not easy to have enough practice for having mastery over all the skills required for classroom teaching in the limited time available for the student-teachers in a given session.
4. The success of micro-teaching technique lies in the objective and comprehensive observation and subsequent feedback. It is a quite challenging task. It is quite difficult for having proper supervision and providing feedback to a number of student-teachers practicing teaching skills at a time. In case we leave the task on the fellow student-teachers, then many a time it becomes a mockery or eye bash.
5. Since real students and real classroom situations are hardly available for practicing teaching skills, it becomes a compulsion to have practice in the simulated conditions. The student-teachers are supposed to play the role of pupil, supervisors and teachers. Such role playing on their part suffers from serious drawbacks and limitations and most often proves a failure in getting opportunity for the practice needed in acquiring the necessary teaching skills.

6. Micro-teaching expects too much from the teacher educators. They are supposed to be quite competent in making use of the micro-teaching technique for helping a class of 50 or 60 students (or sometimes more) of their teaching subject to learn well the art of teaching by practising a host of teaching skills. To provide the required guidance, motivation and time as well as care for the proper supervision and feedback to all of them is a quite uphill task. It is never carried in a proper way due to the paucity of the teacher-educators in a teacher-education institute. In such a situation, we cannot expect the desired outcomes from the practice of micro-teaching.
7. Lastly, but not the least, micro-teaching cannot be termed as a full-fledged technique for training the teachers in its all aspects enabling them to fulfill all types of responsibilities and execute all types of work expected from them as a teacher in school set-up. Its field is strictly limited to learn skills required for classroom teaching.

IDENTIFICATION OF TEACHING SKILLS

The analytical concept of teaching considers teaching as a complex skill comprising of various specific teaching skills. These teaching skills can be defined as a set of inter-related component teaching behaviours for the realisation of specific instructional objectives. These component teaching behaviours may be modified through the exercise done in micro-teaching and thus a student-teacher may be able to acquire necessary teaching skills for becoming an effective teacher.

Now the question arises what are these specific teaching skills that are associated with the complex task of teaching? In how many components or constituents can the task of teaching be broken or analysed? What are those skills described as teaching skills that lead towards effective and efficient teaching? Answers to all these questions engage us in identifying teaching skills.

The research workers, working in the area of teacher effectiveness, analysis of teaching, psychology of learning and teaching, observation of teaching and organisation of student teaching, etc., have tried to identify several sets of component teaching skills. A number of these skills are common with a little different terminology and associated teaching behaviours. While Allen and Ryan (1969) have listed fourteen teaching skills, Borg and his associates (1970) have increased the number to eighteen.

In India, Passi (1976) on the basis of work done in CASE, Baroda has given a list of twenty-one skills, whereas Jangira and his associates (1979) have listed them as twenty.

The lists provided by the above quoted writers are not exhaustive and conclusive. We can add or subtract some or the other skill depending upon the desired teaching competency and the prevailing situations for our micro-teaching programme. However, a list of probable teaching skills, required at different stages of lesson is given below in Table 23.1.

Table 23.1 Component Teaching Skills Associated with Different Stages of a Lesson

Stage of a lesson	Component teaching skills

I. Planning stage	1. Writing instructional objectives
	2. Selecting the content
	3. Organising the content
	4. Selection of the audio-visual aid material
II. Introductory stage	5. Creating set for introducing the lesson
	6. Introducing the lesson
III. Presentation stage	(a) Questioning skills
	7. Structuring classroom questions
	8. Fluency in questioning
	9. Probing questions
	10. Questions-delivery and distribution
	11. The use of higher order questions
	12. Divergent questions
	13. Response management
	(b) Presentation skills
	14. Pacing of the lesson
	15. Lecturing
	16. Explaining
	17. Discussing
	18. Demonstrating
	19. Illustration with examples
	(c) Aid-using skills
	20. Using teaching aids
	21. Using blackboard
	22. Stimulus variation
	23. Silence and non-verbal cues
	24. Reinforcement
	(d) Managerial skills
	25. Promoting pupil participation
	26. Recognising attending behaviour
	27. Classroom management
IV. Closing stage	28. Achieving closure
	29. Planned repetition
	30. Giving assignments
	31. Evaluating the pupils' progress
	32. Diagnosing pupil-learning difficulties and taking remedial measures

INTEGRATION OF TEACHING SKILLS

The Need of Integration

Micro-teaching is often criticised due to its analytical view of teaching. There is a feeling that teaching cannot be or should not be broken down into pieces in the form of various teaching skills and component behaviours. Teaching is not just a combination of these isolated bits and therefore only acquisition or mastery over the different teaching skills does not make one an effective teacher.

There is some truth in this allegation. Definitely in the real teaching encounters, one is not going to make use of the isolated teaching skills in the way they are practised in a micro-teaching process. There should be some bridge between training in isolated skills and the real teaching situations. The concept of integration of teaching skills may perform the role of such bridge.

Meaning and Definition

Integration of skills does not mean a compulsory utilisation of all the acquired teaching skills in one form or the other. In real teaching situations, one has to acquire and apply decision-making ability in the selection and use of the different teaching skills in relation to the teaching situation, instructional objectives and one's own competency in different teaching skills. Integration of teaching skills, thus may be defined a *process of selection, organisation and utilisation of different teaching skills to form an effective pattern for realising the specified instructional objectives in a given teaching-learning situation.*

Objectives

The major objectives of the Integration of teaching skills are given below:

1. Helping in the transition from micro-teaching situation to real teaching situation.
2. Providing practice in making decision regarding the

synthesis of teaching skills in view of the teaching situation and instructional objectives.

How to Provide Training in the Integration of Skills?

There are various strategies of providing training for the integration of skills (Jangira and Azit Singh, 1982). With a little different approach, let us discuss the process of integration in the following two forms:

1. Integration in parts
2. Integration as a whole

Integration in parts

Here, the individual teaching skills acquired through micro-teaching practice are integrated in parts and not as a whole.

First of all, decision is made with respect to the number of individually mastered skills required to be integrated. The time duration of the teaching exercise for integration depends upon the number of teaching skills to be integrated. It is increased four times if there are four skills to be integrated and five times in case of five skills and so on. All the steps like teach, feedback, re-plan, re-teach, re-feedback are planned and carried out in the controlled setting (as in the case of micro-teaching) and this process continues till the student-teacher acquires a reasonable level of mastery over the integration of the skills in hand. After acquiring mastery in the integration of these skills, he is required to apply it in a real classroom setting and have sufficient practice in such real teaching.

In the next round, the other three or four acquired individual skills are to be integrated and practised in the micro setting and then transformed in the real teaching situations and in this way the training process continues till the student-teacher learns to integrate all the acquired skills.

Integration as a whole

In this approach, opportunity is provided to integrate all the individual teaching skills by taking those as a whole and not in parts. It is a sort of mini teaching, bridging the gap between micro-teaching and teaching in real situation.

While giving a lesson, a teacher has to make use of all the individual skills acquired through micro-teaching. During micro-teaching, one can learn and master the individual teaching skills just as the technicians learn about the specific parts and functions of the machinery. In the integration exercise, all the acquired individual skills are to be used in the task of preparing and developing the lesson in real teaching situation, just as a technician may make use of the individual skills as a whole in repairing or working with a machinery.

This second approach of the integration requires the considerations given ahead on the part of a student-teacher:

1. The full knowledge of the content or the topic taught.
2. The knowledge of instructional objectives.
3. The existing teaching-learning situations and available facilities.
4. The scope of utilisation of the learned individual teaching skills.
5. Decision about the aspects like selection, organisation, sequence and integration of the individual skills in preparing and presenting the lesson.
6. Repetition of the integration process for acquiring sufficient practice.

PRACTISING TEACHING SKILLS THROUGH MICRO-TEACHING

Micro-teaching primarily aims at the development of component teaching skills involved in the complex task of teaching. How can these skills be developed is quite a technical question. The general procedure involved in the micro-teaching technique used for practising individual (component) teaching skills has been described above in this very chapter. However, each skill involves its own component behaviours and thus needs somewhat special dealing for its practice and development. In the coming pages we would like to illustrate the process of practising and developing teaching skills by dealing with a few important skills.

Skill of Explaining

Meaning of the skill

A teacher has to learn the skill of explaining in order to make the pupils understand many ideas, concepts or principles which need explanation. Explanation is nothing but a few interrelated appropriate statements. Thus, the skill of explaining may be defined as *the art of learning the use of interrelated appropriate statements by the teacher for making the pupils understand the desired concept, phenomenon or principle.*

It is by all means a verbal skill and has two main aspects as given below:

- i. The selection of appropriate statements relevant to the age, maturity, previous knowledge and content of the concept or phenomenon.
- ii. The skill of interrelating and using the selected statements for the proper understanding of the concept or phenomenon.

The statements are generally of three types—the descriptive, the interpretive and the reason giving (usually meant for answering the

questions how, what and why of a concept or phenomenon or principle).

Components of the skill

The skill of explaining a concept or phenomenon consists of two types of behaviour—desirable and undesirable. In the practice of the skill, the occurrence of the desirable behaviour is to be increased whereas that of the undesirable behaviour is to be decreased and extinguished.

These behaviours are to be summarised as given in Table 23.2.

Table 23.2 Components of the Skill of the Explaining

<i>Desirable behaviours</i>	<i>Undesirable behaviours</i>
1. Using appropriate beginning and concluding statements	1. Using irrelevant statements
2. Using explaining links	2. Lacking continuity in statements
3. Covering essential points	3. Lacking fluency
4. Testing pupils' understanding	4. Using inappropriate vocabulary, vague words and phrases

Let us try to understand the meaning of the above component behaviours.

Desirable behaviours

- 1. Using appropriate beginning and concluding statements:** Beginning statement is an opening statement announcing what is going to be explained by the teacher. It prepares the pupils mentally to receive the explanation. On the other hand, concluding statements are made after the end of the explanation in order to summarise or conclude the whole explanation.
- 2. Using explaining links:** Explaining links in the form of words and phrases are meant for establishing links or continuity in the statements used for explaining a concept, phenomenon or principle. Some of these linking words and phrases generally used for explaining are listed below:
Therefore, hence, thus, consequently, since, because, so that, in spite of, as a result of, the function of, the purpose

of, the cause of, due to, that is why, this is how, in order to, in order that, on the other hand, why, while, etc.

3. **Covering essential points:** The explanation given for the understanding of a given concept or principle should be as complete as possible. The completeness is determined by the scope of the concept or principle as specified in the instructional objectives. It should aim for covering all the essential points leading to clear understanding of the desired concept or principle.
4. **Testing pupil's understanding:** This component behaviour involves asking of appropriate questions from the pupils to ascertain whether the purpose of explaining the concept or principle has been achieved or not.

Undesirable behaviours

1. **Using irrelevant statements:** This behaviour covers the statements not related to the concept or principle being explained. These statements, instead of helping the pupils to understand the concept, create confusion and distract the attention of the pupils.
2. **Lacking continuity in statements:** This behaviour involves a missing link or break in the logical sequence of the interrelated statements by the teacher for explaining a concept or phenomenon.
3. **Lacking fluency:** Fluency relates to the flow of uninterrupted statements for explaining a concept or principle. In case where a teacher lacks in fluency, he may be seen to show the following types of behaviours: (i) does not speak clearly (ii) utters incomplete or half sentences (iii) tries to reformulate or correct his statements in the midway of a sentence or a statement and (iv) uses fumbling ideas or inappropriate words or statements.
4. **Using inappropriate vocabulary, vague words and phrases:** This behaviour consists of the following undesirable aspects:

- i. Use of vocabulary not known to pupils or inappropriate to their age, grade and maturity level.
- ii. Use of certain vague words and phrases (like, in fact, somewhat, you see, you know, I mean, actually, probably, perhaps, almost, a little, etc.) obstructing the understanding of an explanation (Table 23.3).

Table 23.3 Observation Schedule-cum-Rating-Scale for the Skill of Explaining

Name of the student teacher:	
Subject:	Concept or topic:
Class:	Session: Teach/Re-teach:
Date:	Supervisor:

Tallies or specific observation	Components	Rating scale						
		<i>Extremely weak</i>	<i>Very weak</i>	<i>Weak</i>	<i>Average</i>	<i>Good</i>	<i>Very good</i>	<i>Excellent</i>
	<i>Desirable behaviours</i>							
Yes / No	1. Using appropriate beginning statements	0	1	2	3	4	5	6
Yes / No	2. Using appropriate concluding statements	0	1	2	3	4	5	6
Tallies	3. Using explaining links	0	1	2	3	4	5	6
Yes / No	4. Covering essential points	0	1	2	3	4	5	6
Yes / No	5. Testing pupils' understanding	0	1	2	3	4	5	6
	<i>Undesirable behaviours</i>							
Tallies	1. Using irrelevant statements	0	1	2	3	4	5	6
Tallies	2. Lacking continuity in statements	0	1	2	3	4	5	6
Yes / No	3. Lacking fluency	0	1	2	3	4	5	6
Tallies	4. Using inappropriate vocabulary	0	1	2	3	4	5	6
Tallies	5. Using vague words	0	1	2	3	4	5	6

	and phrases							

Model Micro Lesson for the Skill of Explanation

Name of the student teacher: Date:

Subject: Geography Topic or Concept: Galaxy in the Universe

Class IX Duration: 6 minutes

Teacher: Students, in the previous lesson, you have studied the concept of universe. Actually, no body knows how big the universe is or whether it has any limits. The solar system, stars and galaxies are the important constituents of the universe. Today, we shall study about galaxies.

A galaxy is a vast collection of stars, dust and hydrogen gas. The solar system—our own sun and its family of planets—belongs to a particular galaxy known as Milky Way. In this way, our sun and its family constitute a small fraction of a galaxy.

For a long-time astronomers called Milky Way *The galaxy*. But it is by no means the only galaxy in the universe. There are millions others. One of the most famous *The Andromeda Galaxy* can be seen with the naked eye. It is two million light years away from our own. You can well imagine the magnitude of this long distance if you have remembered that it takes only 8 minutes and 30 seconds to travel light from the sun to the earth.

In this way, there are millions of galaxies in the universe, each of those containing millions of stars and their families like our sun and its family.

Let me now ask you few questions.

Teacher: What is a galaxy?

Pupils 1: It is a vast collection of stars, dust and hydrogen.

Teacher: Tell me something about Milky Way galaxy.

Pupils 2: Milky Way galaxy is that galaxy which contains our own sun and its family of planets including our earth.

Teacher: Good, can you tell me something about the famous galaxy that can be seen with the naked eye.

Pupils 3: The name of the famous galaxy is Andromeda. It is two millions light year away from our own.

Skill of Questioning

Meaning and definition

Asking questions to the students is being practised since ancient times for instructional purposes. Before the advent of the printing media, the ancient *gurus* used to teach their disciples orally through the question-answer dialogues. In the modern age, despite so much of scientific and technological progress, there is no decrease in the level of the significance and importance of the questioning device in classroom teaching–learning process, rather it has been up surged as an urgent necessity for carrying out the classroom interaction process effectively. In addition, the knowledge about the previous knowledge and entry behaviour of students, the interest and attitudes of the students towards the subject and the topic in hand, and even the success of the methodology and techniques adopted by the teacher including the overall teaching effectiveness, very much depend on the art of questioning adopted by the teacher. In fact, an adequate questioning skill possessed by a teacher may help him much in carrying out an effective interaction with his students in the classroom teaching–learning process including motivating and drawing attention of the students towards teaching. In this way, the whole fabric of the classroom teaching–learning process is being weaved around the activities associated with the employment of questioning skill on the part of a teacher. Bossing (1942) has rightly remarked on this account that *no teaching method can be successfully carried out without taking cognisance to the art of questioning*.

As a result, it is quite essential on the part of a social studies teacher for taking active interest in the acquisition of the skill of questioning through the application of micro-teaching training technique. However, for the initiation of such task, we must have a clear and concise definition of the term *Questioning skill*. *Questioning skill* may be defined as *a teaching skill helpful in asking*

the desired meaningful, clear and concise, grammatically correct, simple and quite straightforward questions to the students in a classroom teaching–learning situation for the purpose of drawing their attention on one or the other teaching points, making them active and alert to the ongoing teaching–learning process, testing their understanding and comprehension at various stages of the lesson, and motivating as well as providing them opportunity for the proper expression of their thoughts, imagination, recall and recognition, and creative and constructive faculties.

Elements or components of questioning skill

The elements or components related to the questioning skill may be properly discussed in the following manner by placing those into their twofold divisions, namely the framing of questions, and the presentation of these questions to the students.

Framing of questions: Questions can serve their purposes well when these are framed with necessary care and preparation on the part of a teacher by taking cognisance of the following things:

1. **Relevance:** Questions framed should be relevant to the topic being taught. There stands no use of irrelevant questions being framed and asked to the students at any stage of the lesson. Moreover, these may become a great hindrance in the process of teaching–learning by getting them away from their learning path or making them unnecessarily puzzled and confused in responding properly to them.
2. **Clarity:** The question should be framed in a simple and clear language. Ambiguity of any kind may kill the very purpose of asking questions to the students. It is obvious if students are not able to understand the meaning, nature and motive of the question asked to them, it cannot be expected from them to properly respond to it.
3. **Precision or conciseness:** Brevity is said to be the soul of expression and a very good vehicle for the communication of thoughts and ideas. As a result, while framing the

questions, due care should be taken for keeping those as precise and brief as possible. For example, it is better to have a question in a precise and concise such as *Name the Mughal emperor who constructed the Red Fort* instead of framing it as *Can you tell the name of the Mughal emperor in whose regime the Red Fort was constructed?* However, it should not also be so brief that it loses its identity of conveying the desired sense, e.g. *Who constructed the Red Fort?*

4. *Specification:* The questions framed should be quite specific and to the point, related to the content material presented to the students and the demand of the specific stage of the lesson, or the purpose to be served by asking it to the class or the individual pupil. For this purpose, due care should be taken to frame such questions that may allow to ask only one specific thing at a time from the students. It is also quite proper to frame such questions which can be responded quite specifically only through a single specific way, i.e. having only one answer.
5. *Grammatically correct:* It should also be duly noticed that the framed question should be grammatically correct. Failure to do so may confuse the students or may not help them in their proper understanding of the nature and meaning of the raised question. For example, we should try to have a question, e.g. *Where was the great emperor Ashoka born* instead of a grammatically incorrect question, such as *Where is the great emperor Ashoka born* or *Where has been the great emperor Ashoka born*.

Presentation of questions in the class: Questioning skill asks for the proper presentation of the questions in the social studies class by a social studies teacher. It calls usually for paying attention to the components as follows:

1. *Voice of the teacher:* A teacher should try to present the questions in the class in a clear and audible voice which

can be properly heard by all the students sitting in the class. He should also be careful about the proper accent, tone, pitch, and rhythm of the voice along with the accompanying gestures and other non-verbal expressions while asking any question to his students.

2. *Speed and pause*: Due care should be taken for the maintenance of proper speed in asking the questions by a teacher. He should try to give enough time to a student of the class for responding to a question asked on a simple logic that the rate or speed of thinking and responding by the students tends to be slower than the speed of asking questions. In addition, he should also try to provide a suitable pause (e.g., looking here and there in the class after asking a question and then asking a particular student of the class to provide the answer).
3. *Distribution of questions*: Questions should be addressed to the whole class instead of its being asked to an individual student. Out of the raised hands of the students willing to answer the question, a teacher may now provide opportunity to any one of them or may choose from the group of the students who have not raised their hands for the purpose. As far as possible, the distribution of the questions must be fair and even throughout the class. As a result, every student of the class must feel that he may be asked to respond to a question asked by the teacher anytime during the course of the lesson and therefore he must remain alert and attentive to the things going on in the classroom.
4. *Teacher behaviour*: A teacher must demonstrate a spontaneous and natural behaviour while asking questions in the class. He must possess a necessary degree of patience, restraint and sweetness in his voice and style of asking questions as well as responding to the responses of the students. He should not try to repeat his questions as it may result in developing a wrong habit among the students for not attending properly to the raised questions. He should also try to refrain himself from the task of

discouraging or ridiculing/snubbing the students for their incorrect answers or for not responding. By all means, he should try to reinforce the responding behaviour of his students through his pleasant behaviour. In asking questions, he should also try to bring variety, novelty, and change in the mode and style of asking questions. As far as possible, he should not try to put such questions which can be responded only by uttering *yes* or *no* (e.g., Is Mughal emperor Aurangzeb responsible for the downfall of the Mughal rule in India?). Such questions cannot provide any opportunity for evaluating the proper understanding and comprehension on the part of the students about the presented lesson.

In this way, the acquisition of the art of framing questions along with their proper presentation may help teachers in the learning and acquiring the skill of questioning for bringing required effectiveness to their classroom teaching. However, the proper acquisition of the questioning skill requires necessary practice by a social studies teacher through the micro-teaching technique. For this very purpose, we are now trying to present a micro-lesson plan for the necessary practice of the skill of questioning.

Micro-lesson Plan for Practicing Skill of Questioning

Name / Roll No. of the Pupil Teacher: Class: IX

Subject: Social Sciences Duration: 6 minutes

Topic: Fundamental Rights Dated:

Session: Teaching

<i>Teacher's activities</i>	<i>Students' activities</i>
1. When did India get freedom?	India got freedom on 15th August 1947.
2. What type of government was established in India after independence? (Walking here and there) Naresh, you tell me.	Naresh: A democratic type of government was established in India after independence.
3. What do you mean by a democratic government? Ramesh will tell.	Ramesh: A government of the people, by the people

	and for the people.
4. When was the Constitution of India introduced? (Pause) Now Geeta, you tell.	Geeta: It was introduced on 26th January 1950.
5. What types of rights have been provided in our constitution?	There remains silence in the class, no body raises hand.
Teacher's statement: A society or nation provides some privileges to its citizens for helping in the progress and all-round development of their personality. These are named as fundamental rights in the constitutional or legal language. (Writes his statement on the blackboard.)	Students listen to it quite attentively.
6. How many fundamental rights were given to the citizens at the time of its introduction?	(Some students raise their hands. Teacher asks Rina to respond) Rina: These were seven, sir.
7. Now name all these seven. (after a while asks Mohan to tell.)	Mohan: Right to equality, right to freedom.
Teacher writes the responses given by Mohan, then interrupts and asks Ram and Rima to continue.	Ram: Right against exploitation, right to religious freedom, right to education and culture. Rima: Right to property and right to seek constitutional remedy.
Teacher's statement: Students, very good, you have told correctly. But now one of those has been withdrawn. Tell me what it is? (Pauses and then asks Naresh to respond). Excellent Naresh, The right to property has been excluded from the list of the fundamental rights vide the 44th Amendment Act, 1978.	Naresh: It is the right to property. Students listen to it attentively and note down in their note books.
8. Children, now how many fundamental rights are there in our constitution?	Children raise their hands and respond collectively by saying six.

A pro forma of the observation schedule-cum-rating scale for this skill is illustrated as follows:

Observation schedule-cum-rating scale

Name/Roll No. of the Pupil Teacher:	Class: IX	
Subject: Social Studies	Duration: 6 minutes	
Topic: Fundamental Rights	Dated:	
Skill: Skill of Questioning	Supervisor's Name:	
Components of the skill	Tallies	Rating scale from extremely poor to excellent
<i>Framing of the questions</i>		
1. Relevancy		0 1 2 3 4 5 6
2. Conciseness		0 1 2 3 4 5 6

3. Clarity		0 1 2 3 4 5 6
4. Specificity		0 1 2 3 4 5 6
5. Grammatical correctness		0 1 2 3 4 5 6
<i>Presentation of the questions</i>		
1. Voice		0 1 2 3 4 5 6
2. Speed and pause		0 1 2 3 4 5 6
3. Distribution of questions to:		
☐ whole class		0 1 2 3 4 5 6
☐ to student volunteers		0 1 2 3 4 5 6
☐ to student non-volunteers		0 1 2 3 4 5 6
Comments if any		Singature of the Supervisor

Skill of Probing Questions or Response Management

The term *probing* refers to going deep in the matter in hand. Consequently, the skill of probing questions may be defined as *the art of response management comprising a set of behaviours or techniques for going deep into pupils' responses with a view to eliciting the desired responses*.

Due to its emphasis on the ways and means of response management, this skill of probing questions has also been named as the skill of Response Management (Jangira and his associates, 1979).

The skill of probing questions consists of the component behaviours or techniques given as below:

- i. Prompting
- ii. Seeking further information
- iii. Re-focusing
- iv. Re-directing and
- v. Increasing critical awareness

Let us discuss these components in detail.

Prompting

In dramatics or role playing, the prompting as a technique is used by someone behind the curtain for helping the characters to speak the correct dialogue and demonstrate the desired behaviour before the audience. In the teaching-learning situation, it refers to the cues or hints provided by the teacher through well-framed questions to a pupil for arriving at the desired response from the undesired situations like no response, incorrect, or partially correct incomplete responses. Note that, here the teacher does not provide the answer to the question asked in the classroom by himself or any pupil but tries to manage the situation by giving prompts.

The selection of specific prompts (hints, cues, restructuring or rephrasing of the question, step-by-step questioning) in a particular situation depends upon the factors like level of maturity and previous experience of the pupils, ability of the pupils to manipulate the relevant facts; concept or principles, logical consistency of the response and the desired responses, etc.

Seeking further information

In the case of partially correct or incomplete responses, the technique of seeking further information is applied. Thus, the technique of seeking further information may be defined as *a technique of getting additional information from the responding pupil to bring his initial, incomplete or partially correct response to the desired response level*. The questions like, What else can you say, how can you make it more clear?, give some examples/evidences/arguments, will you please, elaborate your answer, etc., are often used for seeking further information from pupils.

Refocusing

This technique is used in a correct response situation to strengthen the response given by pupil. While refocusing, the teacher persuades the responding pupil either to relate his response with something already studied by him or to consider implications of his response in a more complex and novel situation. The questions such

as, how does it differ from or similar to, can you give an example to support your answer, how is it applicable to the real-life situations, etc. are often involved in refocusing.

Redirecting

This technique is generally applied in a *no response* or *incomplete response* situation and requires asking or redirecting the same questions to several pupils for eliciting desired response. Such redirection helps the teacher in the task of probing by prompting or seeking further information with the help of several pupils.

Increasing critical awareness

This technique is used in a correct response situation to increase critical awareness in the pupil. A teacher is required to ask *how* and *why* of a completely correct or desired response from the responding pupil. The questions such as, How can you justify it, Why do you assume so, How does it occur, What may be the reason behind it etc. are helpful in asking the responding pupil to justify his response for the purpose of increasing critical awareness in him (Table 23.4).

Table 23.4 Proforma of Observation Schedule-cum-Rating Scale

Name of the student teacher:	
Class:	Concept or topic:
Session: Teach/Re-teach	Duration:
Date:	Supervisor:
Tallies components (Showing occurrence of component behaviour)	Rating Ranged from extremely weak to excellent mastery over the component
1. Prompting	0 1 2 3 4 5 6
2. Seeking further information	0 1 2 3 4 5 6
3. Refocusing	0 1 2 3 4 5 6
4. Redirecting	0 1 2 3 4 5 6
5. Increasing critical awareness	0 1 2 3 4 5 6

Model Micro Lesson for the Skill of Probing Questions or Response Management

Name of the student teacher:	Date:
Class: VII	Duration: 8 minutes
Subject: Physical Sciences	Concept / Topic: The sources of heat
<i>Teacher's activity</i>	<i>Pupils' activity</i>
1. What are the sources of heat?	Sun
2. Is there any other source?	Stove
3. What is there in stove which is responsible for giving heat?	The burner of the stove
4. Is there any connection of kerosene oil with heat?	Yes, the burner cannot give heat if there is no kerosene oil in stove
5. How do we get heat from kerosene oil?	By its burning
6. Name some other substances which give heat by burning	Gases, firewoods, coal and its products
7. Any other source?	No response
8. Well, tell me what you feel when you rub the palms of your hands.	Hotness
9. From where has this heat been generated?	By rubbing
10. Can you give some example where you get heat by rubbing?	Rubbing of matchbox stick against the coated surface
11. How was the ancient man of the stone age able to generate heat?	By rubbing the pieces of the stone
12. There are still some more sources of heat. Can you name some of those?	No response
13. Some of you might have used an electric heater. How does it get heated?	With the flow of electric current
14. What are other electric appliances whose heat is being used by you in your day-to-day work?	Electric press, electric oven, electric washing machine, electric bells, etc.
15. How does electric bulb give light to us for our reading?	Its filament gets so heated that it is able to produce light

A teacher, in this way, may proceed further in the light of the concept—sources of heat by managing the responses of the pupils by asking appropriate probing questions. It is not essential to deal with all the sources of heat. The important thing is to have sufficient practice for the development of all component behaviours comprising the skill.

Skill of Stimulus Variation

Meaning of the skill

Generally, a teacher makes use of an appropriate stimulus for evoking desired response/responses. However, a continued use of such stimulus may induce disinterest and inattention due to many physiological and psychological factors. The stimulus variation, i.e. variation or change in the stimuli available in learner's environment provides an answer. Thus *skill of stimulus variation may be defined as a set of behaviours for bringing desirable change or variation in the stimuli used to secure and sustain pupils' attention towards classroom activities.*

Components of the skill

The skill of introducing change or variation in the attention capturing stimuli in a classroom comprises of the following component behaviours.

(1) Movements, (2) Gestures, (3) Change in voice, (4) Focusing, (5) Change in the interaction styles, (6) Pausing, (7) Aural-visual switching, and (8) Physical involvement of the students.

Let us try to know the meaning of these components.

Movements: Moving objects are capable of capturing more attention than non-moving or static. Therefore, the movement of the teacher in the class carries wide significance in securing and sustaining pupils attention. However, all types of movements do not bring positive results. Therefore, a teacher while practising the skill of stimulus variation should learn to make well-planned meaningful movements for securing and sustaining pupils attention.

Gestures: Gestures are non-verbal cues, provided in the oral message given by the teacher for enhancing the value of this message. They are usually made with the help of the movements of eye, hand, head, body, facial expression, like extending the hands in a typical shape to indicate how big or small an object is.

Change in voice: This attention capturing behaviour of the teacher is concerned with the art of bringing appropriate variation or change in the tone, pitch or speed of his voice.

Focusing: It refers to the behaviours that help in focusing pupils' attention on a particular object, word, idea, rule or generalisation.

Such behaviours may take the following forms:

- a. The use of verbal statements like *look here in this map, it is an important thing to note* etc.
- b. The use of gestures.
- c. The use of both verbal statements and gestures.

Change in interaction styles: The communication process going inside the classroom is termed as *interaction*. There are three main styles of this interaction as given below:

- a. Teacher-pupils or teacher-group interaction (Teacher conveys and gets response from the class or group as a whole).
- b. Teacher-pupil interaction (Here, teacher communicates with an individual pupil).
- c. Pupil-pupil interaction (Here, a teacher employs many pupils in a dialogue without doing direct discussion).

For bringing effectiveness in his teaching a teacher should learn the art of bringing variation in interaction styles.

Pausing: Pausing refers to the behaviour related with introducing silence during talk. A pause of approximately three seconds is regarded as quite effective in securing and sustaining pupils attention.

Aural-visual switching: This behaviour refers to the introduction of the change or variation in the use of medium, e.g. (i) From aural to visual, (ii) From visual to aural or a combination of aural and visual.

Physical involvement of the students: This behaviour involves the introduction of change or variation in the types, forms and styles of the physical involvement of the pupils in the class. Sometimes, they may be engaged in dramatising and other times in writing on the blackboard, participating in the demonstration or handling some instrument or aid material etc. (Table 23.5).

Table 23.5 Observation Schedule-cum-Rating-Scale for the Skill of Stimulus Variation

Name of the student teacher:	Date:
Class:	Concept or topic:
Session: Teach/Re-teach	Supervisor:
Tallies components (Frequency of occurrence of the component behaviour)	Rating (Performance in terms of respective components behaviour)
	Extremely Weak...Excellent
1. Movements	0 1 2 3 4 5 6
2. Gestures	0 1 2 3 4 5 6
Tallies components (Frequency of occurrence of the component behaviour)	Rating (Performance in terms of respective components behaviour)
3. Change in voice	0 1 2 3 4 5 6
4. Focusing	0 1 2 3 4 5 6
5. Change in interaction styles	0 1 2 3 4 5 6
6. Pausing	0 1 2 3 4 5 6
7. Aural-visual switching	0 1 2 3 4 5 6
8. Physical involvement of the pupils	0 1 2 3 4 5 6

Model Micro Lesson for Skill of Stimulus Variation

Name of the student teacher:	Date:
Subject: Mathematics	Topic: Area of the crossroads
Class: VII	Duration: 10 minutes
Teacher's Activity	Pupil's Activity
1. Students, you are familiar with the figures of rectangle and square and know how to find out the area of these figures. (Showing a chart of the crossroads) (Figure 23.3)	Figure 23.3 Tell me, what this figure shows.

<i>Teacher's Activity</i>	<i>Pupil's Activity</i>
2. This is true, but let me explain what such figure means. Have you ever seen a ground or garden having crossroads ? (Pause) Usually there are two roads crossing each other like this (telling with hands). (Moves to the chart). Here in this chart, <i>ab</i> and <i>cd</i> are two such crossroads. Can you find out the area of such crossroads?	It is a rectangle containing two sets of parallel lines crossing each other. No response.
3. Let us see how it can be done. Satish, can you find out the area of the road <i>ab</i>?	Yes Sir, it is a rectangular figure and its area is 80 sq. metres.
4. Now Ramesh, you tell me about the area of the road <i>cd</i>.	It is 150 sq. meters.
5. Now who will tell me the area of these crossroads <i>ab</i> and <i>cd</i>.	It will be a simple addition of 80 and 150 sq. meters.
6. (Change in voice), No, there is some mistake. Can you again think for it, Sudesh ?	No response.
7. Well boys, let us try to find out the mistake. (Presenting a model of the crossroads) Here is a model of the crossroads. The red sand is to be spread over these crossroads for decoration. Now Kamla, you come and spread the sand on the road <i>ab</i>. On how much area has she spread the sand?	On an area of 80 sq. meters.
8. Now Bimala, you come and spread the sand on the road <i>cd</i>.	Bimla tries to spread the sand. Place in the crossing of the roads becomes little higher as the sand is spread two times.
9. Now you see that the level of this portion has raised. (Takes help of the hands for showing raised level) Is it a proper way of spreading the sand?	No Sir, the sand is surplus.
10. Can you find the area on which surplus sand has been spread?	Yes Sir, it is 6 sq. meters.
11. Here is the important thing to come. Students, can you tell what should be done for calculating the area of crossroad so that no surplus area is included?	We may first add the areas of the roads and then subtract from it the area of the crossed portion. Area of the cross roads = (The area of one road) + (The area of the other road)
12. Can you say it in terms of a formula for the calculation of the area of crossroads.	The area of the central crossed portion.

Skill of Introducing the Lesson

Meaning of the skill

The skill of introducing the lesson may be defined as proficiency in the use of verbal and non-verbal behaviour, teaching aids and appropriate devices for making the pupils realise the need of

studying the lesson by establishing cognition and affective rapport with them. This skill involves the following component behaviours:

- i. Student-teacher is able to utilise previous knowledge and experiences of his pupils.
- ii. He is able to maintain continuity of the ideas and information in the introduction of lesson.

In this way, utilisation of previous experiences, use of appropriate devices, maintenance of continuity in the main parts of the introduction and relevancy of the verbal and non-verbal behaviour are the major component behaviours or constituents of the skill of introducing lesson. Let us try to describe these component behaviours in detail.

Utilisation of previous experiences: One cannot teach in vacuum. The new learning is to be based or completed with the previous learning, knowledge or experiences acquired through formal or informal education/direct or indirect experiences. An appropriate introduction of a new lesson has to be based on the previous knowledge and experiences of pupil. Therefore, a teacher has to acquire the art of utilising such knowledge and experiences. For this purpose, he had to take care of the following things.

- i. The knowledge of the subject or subjects acquired by the pupils in the previous classes or days of the present session.
- ii. The general awareness of the pupils with their physical and social environment.
- iii. Devices and techniques of exploring the previous knowledge.
- iv. Techniques of establishing link between the previous and new knowledge.
- v. Ability of creating situations in the class for the utilisation of previous experiences.

Use of appropriate devices/techniques: A teacher should essentially acquire the ability of using appropriate devices or techniques for introducing a lesson. The various devices used for this purposes may be listed as below:

(i) Questioning, (ii) Narration, description or lecturing, (iii) Story telling, (iv) Using audio-visual aids, (v) Demonstration or experimentation, (vi) Dramatisation or role-playing, (vii) Visits or excursions, (viii) Use of examples, analogies, and similarities, etc.

Maintenance of continuity: Proper introduction requires the continuity in the ideas or information presented to the pupils. There should be a logical sequence between the main parts of the introduction. One question/statement or activity on the part of the teacher should lead to the other related ones in a chain of continuity creating the need of studying the lesson. What is done at a particular moment should be properly related to pupil's previous response and it should be properly linked with the preceding activity of the teacher himself.

Relevancy of verbal or non-verbal behaviour: A teacher should try to observe relevancy in his verbal or non-verbal behaviour. What is to be stated, asked, demonstrated, dramatised or illustrated should contribute maximum towards the introduction of lesson in some of the ways given ahead:

- i. Testing of the previous knowledge.
- ii. Utilisation of these past experiences.
- iii. Establishing cognitive and affective rapport with the pupils.
- iv. Making the pupils feel the need of studying the lesson.
- v. Pin pointing the aim of lesson.

For providing feedback on the teaching performance, the micro lesson given by a trainee is supervised by the fellow trainees or teacher educator. For the purpose of obtaining objectivity and reliability in the observation process it is always better to lay down an observation schedule and get the supervisors trained in its use.

The observation schedule-cum-rating-scale for the skill of introducing a lesson may consist of three columns. The first column indicates the tallies against the occurrence of the different component behaviour of the skill. The second column specifies the components of the skill. The third one contains seven point rating scale for each of the component of the skill. It is being illustrated in Table 23.6.

Table 23.6 Pro forma for Observation Schedule-cum-Rating-Scale of the Skill-Introducing the Lesson

Name of the student teacher:	Date:
Class:	Concept or topic:
Session: Teach/Re-teach	Time duration:
Supervisor:	
Tallies components (Desirable behaviour)	Rating from Extremely Poor to Excellent
1. Using previous experience of the pupils	0 1 2 3 4 5 6
2. Proper use of device/technique	0 1 2 3 4 5 6
3. Lack in continuity	0 1 2 3 4 5 6
4. Irrelevant verbal or non-verbal behaviour	0 1 2 3 4 5 6
5. Overall impression about introducing a lesson	0 1 2 3 4 5 6

Model Microlessons for the Skill of Introducing the Lesson

Name of the student teacher:	Date:
Subject: Mathematics	Topic: Area of a cylinder
Class: VIII	Duration: 6 months
Teacher's activity	Pupils' activity
(Showing the cardboard cylinder)  Figure 23.4	
1. How many part will you obtain if both upper and lower bases of this card sheet are removed?	In all, three parts will be obtained.
2. What is the shape of the part x and y.	These are circular.

Teacher's activity	Pupils' activity
3. What type of figure will you obtain after removing the parts x and y and spreading the middle parts joining x and y.	A rectangular figure will be obtained.
4. In Geometry, such type of figure is called a cylinder. Can you cite some examples of articles which are cylindrical in shape?	Pipes closed on both the ends, Tarcoal drums, Talcum powder container, Dalda Tin etc.
5. (After showing a figure of a circle) Well Remesh, what type of figure is shown in the chart?	It is a circle.
6. (Showing a Dalda Tin) Which parts of this tin are circular.	The upper and lower base of this tin are circular.
7. (Showing figures of a circle and Dalda tin.) What is the difference between these two figures?	The figure of a circle is two dimensional while that of the tin is three dimensional.
8. Can we find the area of such figure like Dalda tin?	Yes, by finding the area of its upper and lower bases.
9. Good, but what about the area of the curved surface joining its upper and lower bases?	It will provide a problematic situation and pupils will be curious to learn as indicated by their gestures and movements.

Announcement of the topic: Well boys today we will learn to find out the area of such cylindrical figures.

Another Model Micro-lesson for the Skill of Introducing Lesson

Subject: History	Topic: Aurangzeb as the initiator of the downfall of Mughal Empire
Class: IX	
Teacher's activity	Pupil's activity
1. Who was the founder of Mughal Empire?	Babar was the founder of Mughal Empire.
2. Who succeeded Babar?	Humayun succeeded Babar.
3. Who was Akbar?	Akbar was the son of Humayun. He was the most successful and great ruler among the Mughal emperors.
4. Who was Jahangir?	He was the son and successor of Akbar.
5. For what is he remembered upto now?	He is best known for his love to justice.
6. Name the ruler who built Taj Mahal.	He was Shahjahan, the successor of Jahangir. He was very fond of magnificent buildings.
7. Yes boys, Shahjahan was true to his name <i>the ruler of the world</i> . He ruled magnificently like his great father and grand father and brought glory to Mughal dynasty. Now tell who succeeded Shahjahan.	He was succeeded by Aurangzeb.
8. Aurangzeb is blamed for the downfall of Mughal empire. What do you say about it?	(No response) The teacher will judge that the students are curious to know why Aurangzeb is

Announcement of the topic: Well boys, we will learn today about the rule and policies of Aurangzeb responsible for the downfall of Mughal empire.

Skill of Using Blackboard

Blackboard is said to be the right hand of a teacher. It is the simplest, suitable, convenient and widely used teaching aid that is employed in the teaching and learning of almost all the subjects and topics. Therefore, a teacher has to learn the art and skill of using blackboard as effectively as possible (Table 23.7).

Table 23.7 Pro forma for Observation Schedule-cum-Rating-Scale of the Blackboard Writing Skill

Name of the student teacher:	Date:
Class:	Topic:
Session: Teach/Re-teach	Time duration:
Supervisor:	
Tallies components (Desirable behaviour)	Rating from Extremely Poor to Excellent
1. Legibility of the handwriting	0 1 2 3 4 5 6
2. Neatness of the handwriting	0 1 2 3 4 5 6
3. Relevancy of the blackboard work	0 1 2 3 4 5 6
Tallies components (Undesirable behaviour)	Rating from Very Often to Not at All
1. Lack in legibility of handwriting	0 1 2 3 4 5 6
2. Lack in neatness of handwriting	0 1 2 3 4 5 6
3. Irrelevancy of the blackboard work	0 1 2 3 4 5 6

Definition

The skill of using blackboard may be defined as a skill or technique that helps a teacher to use blackboard in the teaching–learning process as effectively as possible for the proper realisation of the stipulated teaching–learning objectives.

Components of the skill: The skill of using blackboard involves the following main component behaviours:

1. Legibility of the handwriting
2. Neatness of the blackboard work
3. Relevancy of the blackboard work

Legibility of the handwriting: This component of blackboard skill is concerned with the clarity and visibility of the letters and writing for conveying the intended meaning to the students. The size of the letters should be in well proportion and the words and sentences should be written in a straight line.

Neatness of the blackboard work: This component of the blackboard skill is concerned with the aesthetic beauty and cleanliness of the written material present on the blackboard. There should not be any unnecessary cutting, rubbing, over writing and over crowdedness in the material presented on the blackboard for providing a good look as well as avoiding unnecessary confusion and ambiguity on the part of the students.

Relevancy of the blackboard work: Blackboard work done by the teacher during the presentation of his lesson before the class must have its proper relevance with the progress of the lesson and the nature as well as the facts of the contents covered. It is an aid to the proper exposition, explanation description illustration, response management revision, recapitulation fixation, etc. required on the part of the teacher during different stages of the teaching-learning process. The contents presented during the delivery of a lesson at a particular time should, as far as possible, be a point of focus in the shape of blackboard material presented at that very time. It should remain on the blackboard till the time it is required for its display. Unnecessary matter written on the blackboard after its use becomes a great hindrance and distracting factor in the proper progress of the lesson.

Now for the practice of the blackboard skill we can have a subject matter related to any topic or sub topic of a subject and prepare a micro-lesson plan on the lines as presented earlier in the discussion of the other microteaching skills.

<i>Teacher's activity</i>	<i>Pupils' activity</i>

1. Who was the founder of the Mughal empire?	Babar was the founder of the Mughal empire.
2. Who succeeded Babar?	Humayun succeeded Babar.
3. Who was Akbar?	Akbar was the son of Humayun. He was the most successful and great ruler among the Mughal emperors.
4. Who was Jahangir?	He was the son and successor of Akbar.
5. For what is he remembered?	He is best known for his love to justice.
6. Name the ruler who built the Taj Mahal.	He was Shahjahan, the successor of Jahangir. He was very fond of magnificent buildings.
7. Yes, boys, Shahjahan was true to his name <i>the ruler of the world</i> . He ruled magnificently like his great father and grandfather and brought glory to the Mughal dynasty.	He was succeeded by Aurangzeb.
Now tell, who succeeded Shahjahan.	No response.
8. Aurangzeb is blamed for the downfall of the Mughal empire. What do you say about it?	The teacher will judge that the students are curious to know why Aurangzeb is blamed for this downfall.

Announcement of the topic: Well boys, we will today learn about the rule and policies of Aurangzeb responsible for the downfall of the Mughal empire.

Skill of Reinforcement

Meaning of the skill

Reinforcement as a technique belongs to the area of psychology of learning and helps in influencing the response or behaviours of the learners. There are two types of reinforcement: (i) positive and (ii) negative. While the use of the former (providing pleasant experiences) contributes towards strengthening the desirable responses or behaviours, the latter (providing unpleasant experiences) is used for weakening or eliminating the undesirable responses or behaviours. For better results, the use of positive reinforcement is to be increased while that of negative reinforcement is to be decreased or eliminated.

In view of the above discussion, the skill of reinforcement may be defined as the art of learning the judicious and effective use of reinforcement by a teacher for influencing the pupils' behaviour in

the desired direction towards maximum pupils' participation for realising the better results in the teaching-learning process.

Components

The skill of reinforcement has the following components:

1. Desirable behaviours
 - i. Use of positive verbal reinforcers.
 - ii. Use of positive non-verbal reinforcers.
 - iii. Use of extra-verbal reinforcers.
2. Undesirable behaviours
 - i. Use of negative verbal reinforcers.
 - ii. Use of negative non-verbal reinforcers.
 - iii. Inappropriate or wrong use of reinforcement.

Let us understand the meaning of these components.

Desirable behaviours

1. **Use of positive verbal reinforcers:** Positive verbal reinforcers refer to those verbal behaviours of the teacher that bring positive reinforcement, i.e. increase the chances for the pupils to respond correctly. They may be divided into the following categories:
 - i. The use of praising words such as good, very good, fine, yes, well done, excellent, right, etc.
 - ii. The use of statements accepting pupils feelings like *yes, you have judged correctly, now explain it in detail.*
 - iii. Repeating and rephrasing or summarising the pupil's responses.
2. **Use of positive non-verbal reinforcers:** Positive non-verbal reinforcers refer to all those non-verbal (without words) behaviours of the teacher which bring positive reinforcement. They may be divided into:
 - i. Writing the responses on the blackboard.
 - ii. Use of gestures and other non-verbal actions

conveying a pleasant feeling or approval of pupil responses like nodding of head, smiling, clapping, keeping eyes, turning ears or moving towards the responding pupil.

3. **Use of extra-verbal reinforcers:** This type of reinforcers fall midway between positive verbal and non-verbal reinforcers and consist of such remarks as *hm-hm*, *Uh-Uh* or *Aaaah*, etc.

Undesirable behaviours

1. **Use of negative verbal reinforcers:** Negative verbal reinforcers refer to those verbal behaviours of the teacher that bring negative reinforcement, i.e. decreasing the chances for the pupils to participate in the classroom or respond correctly. Such reinforcers may be categorised as:
 - i. The use of discouraging words such as *no*, *wrong*, *incorrect*, *stop it*, and *nonsense*.
 - ii. The use of discouraging cues and voice tones as *humph* in a sarcastic voice.
 - iii. The use of discouraging statements, e.g., *I do not like what you are doing*, *do something else*, *that is not good*, and so on.
2. **Use of negative non-verbal reinforcers:** Negative non-verbal reinforcers are those non-verbal behaviours of the teacher that bring about negative reinforcement. The examples are frowning, raising the eyebrows, disapproving stare, tapping foot impatiently and walking around, etc.
3. **Inappropriate or wrong use of reinforcement:** Only proper and right use of possible reinforcers brings encouraging results. The following reinforcers belonging to the category of undesirable behaviours should be avoided by the teacher:
 - i. Using reinforcer when not needed.
 - ii. Not using reinforcers when needed.
 - iii. Using reinforcers in a less or excess amount than

- desired.
- iv. Encouraging or reinforcing only a few responding pupils.

In the light of these behaviours, a teacher is required to practice the occurrence of all the desired behaviours and avoidance of the undesired ones (Table 23.8).

Table 23.8 Observation Schedule-cum-Rating-Scale for the Skill of Reinforcement

Name of the student teacher:	Date:
Subject:	Topic/Content:
Session: Teaching/Re-teach	Supervisor:
Tallies components (Occurrence of the component behaviour)	Ratings (Performance with regard to the component behaviour)
<i>Desirable behaviour</i>	<i>Extremely Weak: Excellent</i>
1. Use of praise words	0 1 2 3 4 5 6
2. Use of statements accepting pupil's feeling	0 1 2 3 4 5 6
<i>Desirable behaviour</i>	<i>Extremely Weak: Excellent</i>
3. Repeating, rephrasing or summarising pupil's response	0 1 2 3 4 5 6
4. Writing response on the blackboard	0 1 2 3 4 5 6
5. Use of gestures and other non-verbal actions	0 1 2 3 4 5 6
6. Use of extra non-verbal reinforcers	0 1 2 3 4 5 6
<i>Undesirable behaviour</i>	Rating (Not at all–Very much)
1. Use of discouraging words	0 1 2 3 4 5 6
2. Use of discouraging cues and voice tones	0 1 2 3 4 5 6
3. Use of discouraging statements	0 1 2 3 4 5 6
4. Use of negative non-verbal reinforcers	0 1 2 3 4 5 6
5. Inappropriate and wrong use of reinforcement	0 1 2 3 4 5 6

Model micro-lesson for the skill of reinforcement

Name of the teacher:	Class: IX
Subject: Geography	Topic/Content: Sea Breeze
Date:	Duration: 8 minutes

Teacher: Yesterday, we were discussing about the land breeze. Can you tell me its definition?

Pupil 1: A land breeze is that wind which blows from the land towards the sea.

Teacher: (Teacher nods while the pupil is responding and afterwards writes his response on the blackboard).

Can you suggest a definition of the sea breeze in the light of the definition written here?

Pupil 2: A sea breeze is that wind which blows from the sea towards the land.

Teacher: (Moves nearer to the responding pupil, writes his response and says *very good* after the response and also pats him on his back.)

Now just see these two definitions on the blackboard. What do you conclude about the nature of these two winds? Geeta, you tell.

Geeta: Sir, they are opposite to each other in their functioning and nature.

Teacher: (Smiles and nods when Geeta is responding. After the response, he says.) "You are right, now let us find out how the sea breeze is caused."

You have studied that wind blows from the place of high air pressure to the low air pressure in order to equalise the pressure. Now tell me, how this principle may be applied in case of the blowing of sea breeze.

Pupil: The air pressure on the land must become less than the air pressure on the sea.

Teacher: Yes, go on ... (moves nearer to the pupil), try further and tell how it should happen. (No response.)

Teacher: No matter, sit down; I will ask you another question. Meanwhile, Ram, you tell me at what time do we get the sea breeze on the seashore?

Ram: During day time, Sir.

Teacher: (Keeps his eyes on Ram, while responding.) Fine, what should happen to the air above the land and sea at day time, Radha, you tell me?

Radha: The air above the land gets heated faster than that on the sea.

Teacher: (Keeps eyes on Radha while seeking answer.) Good, carry on and explain the creation of the difference in pressure on the land and the sea.

Radha: The hot air on the land being lighter rises up and this creates low pressure on the land in comparison to that on the sea.

Teacher: (Teacher puts remarks *uh-uh*, carry on, in between the answer. After response he says, excellent and thus pushes out Radha for the answer further.)

Radha: The cooler air from the sea blows towards the land to equalize the pressure.

Teacher: (Listens carefully to Radha, nods and says) Yes, you are right, the sea breeze blows towards the land, the place of high pressure to low pressure at daytime.

Skill of Illustrating with Examples

Meaning of the skill

Many times, a teacher feels difficulty in making the pupils understand an abstract idea, concept or principle despite the best explanation, lecturing or description on his part. He may then resort to the following process:

1. He begins with an example and tries to illustrate the abstract idea, concept or principle with the help of it.
2. He repeats the process of illustration by giving various other examples.
3. He helps the students generalise or infer a rule or principle.
4. He asks the students to give examples related to the

generalised concept, rule or principle, thus tries to verify whether the students have understood the concept or principle.

This process is concerned with the use of the skill of illustrating with examples. The examples are nothing but the situations or objects illustrating the occurrence or application of an idea, concept or principle.

The medium and ways of illustrating with examples may cover: giving analogy; telling story or incidents; showing objects, models, pictures, diagrams, maps, charts, etc.; and demonstrating experiments based on the pupils' experiences etc.

The proper use of examples, in anyway, necessitates to learn it as a skill, thus the skill of illustrating with examples may then be defined as the art of judicious selection and proper presentation of suitable examples in order to generate a concept, idea or principle with a view to understanding it and proper application.

Components of the skill

The main components of the skill of illustrating with examples can be:

1. Working out relevant examples
2. Formulating simple examples
3. Formulating interesting examples
4. Using appropriate media for examples
5. Making use of the inductive-deductive approach

Let us now understand the meaning and nature of these components, in brief.

1. **Formulating relevant examples:** An example is said to be relevant when it is related to the concept or principle being explained and helps effectively in its proper understanding.
2. **Formulating simple examples:** These are those examples based on the pupil's past experiences and that

suit their level of maturity. Whether a teacher is putting simple example or not can be judged through (i) the level of participation of the pupils, and (ii) the correctness or relevance of their responses to the questions put by him in presenting or making use of them.

3. **Formulating interesting examples:** An example is said to be interesting when it is capable of capturing and maintaining the attention, interest and curiosity of the pupils for the proper understanding of an idea, concept or principle. In what type of examples the pupils should be interested depends upon their age, maturity and past experience. Whether a teacher is putting interesting examples or not can be judged through the overt behaviour of the pupils and overall classroom environment and management.
4. **Using appropriate media for examples:** The examples are conveyed to the pupils through some particular media, verbal or non-verbal, such as storytelling, analogy, concrete objects, maps, pictures, models and experimental demonstration. Whatever form or kind of the media is selected by the teacher for developing examples, should be quite appropriate from the viewpoints of (i) the units or lesson taught, (ii) the age, grade and maturity levels of the pupil, and (iii) the past experiences of the pupil.
5. **Making use of the inductive-deductive approach:** The skill of illustrating with examples involves two aspects (i) understanding a concept or establishing a rule/principle, and (ii) using or applying the established or understood rule, principle or concept. While the former can be properly realised through inductive approach, the deductive approach helps in latter. The task of illustrating with examples requires the use of both approaches. Hence, a teacher should try to learn using combination of inductive and deductive approaches for the development of the skill.

The observation schedule-cum-rating-scale may consist of five components as illustrated in Table 23.9.

Table 23.9 Observation Schedule-Cum-Rating-Scale for the Skill of Illustrating with Examples

Tallies components (Frequency occurrence of component behaviour)	Ratings (Performance with regard to the use of component)
	<i>Poor to Excellent</i>
Relevance of examples	0 1 2 3 4 5 6
Simplicity of examples	0 1 2 3 4 5 6
Interesting aspect of examples	0 1 2 3 4 5 6
Appropriateness of media	0 1 2 3 4 5 6
Appropriateness of approaches	0 1 2 3 4 5 6

Model Micro Lesson for the skill of illustrating with examples		
Name of the student teacher:		Date:
Class:		Duration: 8 Minutes
Subject: Physical sciences		Concept/Topic: Matter and its properties
Teacher's activities		Pupils' activities
1.	Pupils, you have learned about matter or substance. Can you give some examples?	Ink, water, air, stone, iron, gold, salt, sugar, etc. are examples of matter.
2.	(Teacher writes the names of substances on the blackboard) Good, you also know the division of matter into three types: solid, liquid and gas. Can you give an example of each category?	Yes, iron is solid, water is liquid and air is gas.
3.	(Showing a common balance) Boys, as you know, it is a common balance that is used for weighing. Let us try to weigh the iron nail on the balance. What is its weight?	Here, it is 10 gm, Sir.
4.	Let us now try to weigh the water of this tumbler. How can it be done?	No response.
5.	For this, we will have to first weigh an empty container, put water in it and again weigh it along with water. You see that the empty container here weighs 250 gm and, along with water, it weighs 400 gm. Can you now tell the weight of the water?	Yes, it is 150 gm, Sir.
6.	Can you give some examples of weighing liquid in this manner?	The shopkeepers weigh oil, Dalda, etc.
7.	Good, now let us try to weigh air. Can you think how it can be done?	No response.
8.	(Teacher demonstrates the weighing of an empty bladder and a bladder filled with air. He also writes both the weights). Can you now tell the weight of the air?	Yes, it is 2 gm.

<i>Teacher's activities</i>		<i>Pupils' activities</i>
9.	In all these cases—iron nail, water and air—what have you seen in common while weighing them?	They all have weight.
10.	So, what do you conclude about some common characteristics of different types of substances or matter?	All have weight.
11.	Yes, you are right, all substances have the common property that they possess weight. Can you make a list of the substances (as seen by you) possessing weight?	The pupils try to make a list of such substances.

SUMMARY

1. Micro-teaching represents an appropriate innovative technique for helping the pupil teacher being trained in the colleges of education in their acquisition of the desired teaching skills. As a matter of definition, we can define micro-teaching as a sort of specialised training technique that provides appropriate opportunities to the pupil teachers for the practice and development of some specific teaching skills by organising teaching in its micro-form (miniature in terms of class size, time duration and content to be covered).
2. The micro-teaching procedure adopted for practising teaching skills in our teacher education institutions involves quite systematic steps named as: (i) orientation, (ii) discussion of the teaching skills, (iii) selection of a particular teaching skill, (iv) presentation of a model demonstration lesson, (v) observation of the model lesson and criticism, (vi) preparation of a micro-lesson plan, (vii) creation of a micro-teaching setting, (viii) practice of the skill (teach-session), (ix) providing feedback, (x) re-planning (re-plan session), (xi) re-teaching (re-teach session), (xii) providing re-feedback (re-feedback session), (xiii) repetition of the microteaching cycle and finally, (xiv) integration of teaching skills.
3. The use of micro-teaching technique in reference to the teacher education programmes adopted in our country may prove advantageous due to the specific features and characteristics inherent in this technique such as (i) non-dependence over the practising schools and their students for the practice of skills, (ii) providing opportunity for the practice of one teaching skill at a time, (iii) reducing the complexities of the normal classroom teaching, (iv) providing appropriate opportunities for systematic observation of the teaching and immediate feedback to bring improvement in one's teaching skill, and (v) providing opportunity to the teacher trainees for the development of their teaching skills

in the laboratory like controlled conditions.

4. A teacher makes use of a number of instructional techniques and devices for making his teaching as effective as possible in the course of his teaching. In brief, these are designated as teaching skills. In reference to the teaching of a number of subjects of the school curriculum, the school teachers have to make use of many important teaching skills during the instructional activities going on inside the classroom. The significant ones are; skill of introducing the lesson, skill of explaining, skill of illustrating with examples, skill of stimulus variation, skill of reinforcement, skill of questioning.
5. The skill of explaining needs the use of interrelated appropriate statements on the part of the teacher for making the pupils understand the desired concept, phenomenon or principle. Its development needs to take care of two types of component behaviours: desirable and undesirable. For this purpose, the pupil teacher has to increase the frequency of the desirable behaviours (such as using appropriate beginning and concluding statements, using explaining links, covering essential points and testing the pupils' understanding) and decrease the frequency of the undesirable behaviours (use of irrelevant statements, lack of continuity in statements, lack of fluency and use of inappropriate vocabulary, vague words and phrases).
6. The skill of questioning makes a teacher expert in the art of asking questions to the students in the classroom teaching. The skill mainly involves two types of component behaviours, namely the framing of questions and asking these questions to the students. The activities related to the component behaviours may be identified as relevance, clarity, conciseness, specificity and grammatical correctness of the questions framed as well as the appropriateness of the voice, speed, pause, and distribution of the questions asked in the class. While practising this skill, a pupil teacher, therefore is supposed to gain competency in the proper use of these component behaviours.
7. The skill of proving questions differs from the skill of

questioning in the sense that, here the mode of questioning is so channelised as to serve the purpose of probing-going deep in the matter in hand. Consequently, the skill of probing questions may be defined as *the art of response management comprising a set of behaviours or techniques for going deep into pupils' responses with a view to eliciting the desired responses*. Due to its emphasis on the ways and means of response management, this skill of probing questions has also been named as the skill of Response Management. The skill of probing questions is comprised with the components or techniques named as (i) prompting, (ii) seeking further information, (iii) refocusing, (iv) redirecting and (v) increasing critical awareness. The student teachers have to work for making use of these five techniques in the framing and asking questions to the students as well taking care of their responses well in tune with the learning of the topic in hand.

8. The skill of stimulus variation involves a set of behaviours for bringing desired change in the stimuli used in securing and sustaining pupils' attention towards classroom activities. The component behaviours involved in its use may be identified as movements, gestures, change in voice, focusing change in interaction styles, pausing, aural-visual switching, and physical involvement of the students. For the development of this skill, using micro-teaching techniques, therefore the pupil teachers need to be provided enough practice for making use of these component behaviours in their teaching.
9. The skill of introducing the lesson proves helpful in making the teaching–learning environment of the classroom quite congenial by realising the pupils', need of studying the lesson, thus making them quite curious and motivated for the study of the topic. Its development involves the modification of the pupil teacher's behaviour related to the components such as (i) using previous experience of the pupils, (ii) proper use of device and techniques, (iii) maintenance of continuity in the ideas or information presented, and (iv) relevance of verbal or non-verbal behaviour used in

introducing the lesson.

10. The skill of using black-board may be defined as a skill or technique that helps a teacher to use black-board in the task of teaching as effectively as possible for the proper realisation of the teaching or instructional objectives. In its use and application, it may be found to be comprised of the components such as (i) legibility of the hand writing, (ii) neatness of the blackboard work, and (iii) relevance of the blackboard work. Where the former two, here are aimed to do away with any inconvenience on the part of students to visualise and understand the contents of blackboard writing, the latter is aimed to emphasise that what is to be written on the blackboard should be in proper tune with the realisation of the instructional objectives of the lesson being taught.
11. The skill of reinforcement requires a judicious and effective use of reinforcement on the part of a teacher. A pupil teacher for practising the use of this skill has to increase the frequency of the related component behaviours such as using positive verbal, non-verbal and extra verbal reinforcers and decreasing the frequency of the undesired component behaviours such as use of negative verbal and non-verbal reinforcers and inappropriate or wrong use of reinforcement.
12. The skill of illustrating with examples involves judicious selection and proper presentation of suitable examples on the part of a teacher in order to generate a concept, idea or principle in view of its understanding and proper application. The behavioural activities related to the different components of this skill may be identified as: (i) providing relevant examples, (ii) giving simple examples, (iii) providing interesting examples, (iv) using appropriate media for examples, and (v) making use of the inductive-deductive approach. The pupil teachers are given enough opportunity for the use of the activities related to these component behaviours.

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Modification of Teacher Behaviour and Interaction Analysis

TEACHING OR TEACHER BEHAVIOUR

In simple words, the behaviour maintained and demonstrated by a teacher at the time of teaching is known as his *teaching behaviour*. Actually in the practical classroom situations, what does a teacher do with his students in terms of verbal and non-verbal behaviours is quite important for making the students achieve the desired learning experiences. Sometimes the teacher asks the students questions, explains, demonstrates, illustrates, and guides, other times he encourages them to participate and respond, diagnoses the feelings, and so on. All these activities and functions involve both the verbal and the non-verbal behaviours of the teacher. True that the verbal behaviour almost dominates the scene, but the role of non-verbal behaviour in terms of movements, gestures, pause, demonstration, using black-board writing or other aid material cannot be underestimated in realising the classroom instructional objectives. It is in this sense that the term teaching or *teacher behaviour* has been defined by Ryans (1969) in the following way:

The term teaching or teacher behaviour may be defined as the behaviour or activities of persons as they go about doing whatever is required for the teachers, particularly those activities which are concerned with the guidance or direction of the learning by others.

Do all teachers behave in the same way in a given situation? Does the teaching behaviour of a teacher remain uniform or change in relation to environment, or his own personal considerations or teaching tasks? These are the questions that may naturally emerge while searching the concept of teacher or *teaching behaviour*.

McNergency and Carner (1981) have tried to think over these aspects. According to them, teaching or *teacher behaviour may be regarded as a function of the characteristics of the teacher, his environment and the task in which the teacher engages*.

In this way, how a teacher behaves during teaching is almost guided by his own personality (characteristics of individual teachers) and the situation or environment in which he is behaving (engaged in the teaching activities).

Further, there is no doubt that desired or undesired behaviour on the part of the teacher significantly contributes towards his effectiveness or ineffectiveness. For a desired control, guidance and direction of *teaching behaviour*, there must be some methods of finding out how a teacher behaves in a particular teaching–learning situation. Also, there must be some proper ways and means for bringing desired modification in the *teaching behaviour* for the ultimate success of the process of teaching–learning.

MODIFICATION OF TEACHING OR TEACHER BEHAVIOUR

The term *modification of teaching* or *teacher behaviour* stands for the attempts made or processes undergone for bringing desired improvement or modification in the teaching or *teacher behaviour* with an objective of making one as a quite effective and competent teacher for performing one's professional duties as effectively as possible. Modification or improvement in one's performance and behaviour is a continuous process. It starts for a teacher quite early before his entry into the teaching profession and continues till he is associated with the task of teaching and guiding the students. As a pupil teacher, you require desired modification in your teaching or *teacher behaviour* so that you may acquire essential skills, abilities, characteristics and competencies for behaving and performing your duties as a teacher as effectively as possible whenever you get opportunities for doing so in the near future. The task is not so simple. It needs a complete and thorough analysis of what you possesses at present in terms of your entry behaviour, i.e. the teaching competencies, and *teacher behaviour* for performing your duties as a teacher and what you are expected to demonstrate as a teacher in the field, i.e. the terminal behaviour. The gap between the expected terminal behaviour and the existing entry or potential behaviour can only be filled up with the measures attempted for bringing modification and improvement in your teaching or teacher behaviour. That is what is to be achieved in any teacher preparation programme. Therefore, the term *modification of teaching* or *teacher behaviour* essentially stands for the attempts of modification in the existing entry behaviour of a teacher for helping him to attain the level of the desired terminal behaviour in order to exercise his professional duties as effectively as possible.

TECHNIQUES FOR THE MODIFICATION

In fact, all that stands in a teacher preparation programme or in-service education in the shape of theory and practice is always aimed at bringing the needed modification and improvement in the existing teaching or teacher behaviour of the concerned pre-service or in-service teacher. However, researches in the field of pedagogy and teacher education programme have brought a number of innovations and techniques specially suitable for bringing planned modification and improvement in it. These are especially concerned with the process of modifying the ways of interaction with the students and improving one's behaviour as a teacher. In this text, we will try to have necessary discussion on the following topics through which modification of teaching or *teaching behaviour* is possible:

1. Interaction analysis and transaction analysis
2. Action research
3. Micro-teaching
4. Role-playing (simulation) and gaming
5. Teacher evaluation
6. Enforcement of professional ethics and accountability

Here, in this chapter, we will discuss only the techniques of interaction and transaction analysis.

Interaction Analysis Technique

Meaning and definition

The competency of a teacher may be adjudged through the degree of effectiveness of his teaching which is objectively assessed through his classroom behaviour or interaction. It may provide a reliable assessment of what goes on inside the classroom in terms of teaching and learning. Such type of analysis is known as interaction analysis.

Thus, *interaction analysis refers to a technique consisting of objective and systematic observation of the classroom events for the*

study of the teacher's behaviour and the process of interaction going inside the classroom. It helps the teacher bring desired modification in his behaviour and improve his interaction with his pupils.

A system of interaction analysis essentially consists of the process of encoding and decoding. While encoding helps in recording the classroom events in a meaningful way, decoding is used in arranging the data into a useful display and then analysing the results in order to study patterns of teacher behaviour and classroom interaction. Interaction analysis, in this way, works as a standardised observation tool and analysis technique for identifying the patterns of teacher behaviour and analysing classroom interaction between the teacher and the students.

Systems of interaction analysis

As a result of various researches, more than hundred systems are available at present for the analysis of teacher behaviour and classroom interaction. Richard L. Ober et al. (1971) tried to classify these systems into two groups: (i) sign and (ii) category.

The sign system comprises a list of behaviours. In this, the observer simply checks or marks, in some way, each behaviour that occurs during a given period of time. Regardless of the frequency of its occurrence, the behaviour is marked only once during the observation period.

In the category system, the teacher behaviour is first divided into various behaviour units. Each unit is then classified into categories. In this system, at regular intervals of the observation period (e.g., within each three seconds of duration), the task of an observer consists of determining in what category the observed behaviour falls. He also takes note of the category number. Here, a behaviour may be encoded as many times as it occurs contrary to the sign system where it is recorded only once. The sequence of occurrence of various behaviours is also recorded in this system.

The Flanders' System of Interaction Analysis represents a good example of this system. This system was developed by Ned A. Flanders (1966) in the year 1959, at the University of Minnesota, in the form of a teachers training technique. It involves categorisation of

all the sets of possible verbal behaviours of a teacher in the classroom while interacting with his students.

Flanders' interaction analysis categories

In total, there are ten categories of verbal behaviour in this system, which are grouped into three major sections: (i) teacher talk, (ii) student talk, and (iii) silence or confusion.

Teacher talk consists of seven categories. The first four categories belong to indirect influence and the latter three to direct influence. The category of indirect influence covers those verbal behaviours of the teacher which give the students greater opportunity to respond or maximise their freedom of action. In contrary, the category of direct influence exhibits those verbal behaviours of the teacher which tend to restrict or minimise the students' freedom of action.

Pupil talk is divided into two categories. The third section, **silence/confusion**, includes all those behaviours that are not covered in the first and second sections. These sections and their ten categories with underlying component behaviours are summarised in Table 24.1.

TABLE 24.1 Flanders' Interaction Analysis Categories

(a)	Teacher talk		
	<i>Indirect influence</i>	1.	Accepts feelings
		2.	Praises or encourages
		3.	Accepts or uses pupil ideas
		4.	Asks questions
	<i>Direct influence</i>	5.	Lecturing
		6.	Giving directions
		7.	Criticising or justifying authority
(b)	Pupil talk		
	<i>Response</i>	8.	Pupil talk response
	<i>Initiation</i>	9.	Pupil talk initiation
(c)	Silence/Confusion	10.	Silence or confusion

How to use Flanders' interaction analysis

This system involves three major steps:

1. Observation or recording of classroom events
2. Construction of interaction matrix
3. Interpretation of interaction matrix

Let us discuss these aspects in details:

Observation or recording of classroom events: The observer is required to select appropriate position in the classroom to listen to and watch the events as smoothly as possible without disturbing or interfering with the spontaneous activities. He is also required to train himself for the proper recording (referred to as encoding in the language of interaction analysis). For this purpose, he must memorise the code numbers (the category number) in relation to the component behaviours represented by different categories. The next thing he is to do is to note down within every three seconds, the code or category number which best represents the interaction event just observed. For instance, when the teacher is praising, he should put 2; when he is lecturing he should write 5; when he is asking questions, he should write 4; and again if he praises, he should write 2 on his datasheet. The procedure of recording or encoding of the classroom events may go on at the rate of 20 to 25 observations per minute. Here, the observer, in a sense, acts as an automatic device, highly discriminating and objective in observing each and every aspect of the classroom events and recording it in terms of the code or category number. These numbers are recorded in a sequence in a column. Therefore, at the end of his observation, he may get a long series of numbers written from top to bottom so that the original sequence of events is preserved. Besides, he may write down marginal notes for explaining the unusual class events.

Certain ground rules: The task of observation, recording, or encoding is quite complex and needs sufficient training, practice and care on the part of observer. For maintaining objectivity and reliability of the process there are certain ground rules which have to be kept in mind as cited below:

Rule 1: When not certain to which two or more categories a statement belongs, choose the category that is numerically farthest from category 5; e.g. for choosing between 3 and 4, choose 3, and for 8 and 9, choose 9.

Rule 2: If the primary tone of teacher's behaviour has been consistently direct or indirect, do not shift to the opposite classification unless a clear indication of the shift is given.

Rule 3: The observer must not be concerned with his own biases or teacher's intent.

Rule 4: If more than one categories occur during the three seconds interval, all categories used in that interval are recorded; therefore, record each change in category. If no change occurs within three seconds, repeat that category number.

Rule 5: For silence longer than three seconds, record 10 for every three seconds.

Rule 6: A teacher's joke which is made at the expense of children is recorded as 7.

Rule 7: It is recorded as 8 if a student gives a specific predictable answer to a narrow question, or a number of students respond collectively.

Construction of interaction matrix: After recording or encoding the classroom events into ten categories, the next task is concerned with the construction of an interaction or observation matrix table. The matrix table consists of 10 rows and 10 columns. The category numbers of the record sheet are tabulated. Each number is entered in the form of sequence pairs, being used twice, firstly as the first number and secondly as second number. Its rows of the matrix represent the first number in the pair and the columns represent the second. Each pair of numbers overlaps with the previous pair and such overlapping pairs of observation are entered in appropriate cells of the matrix.

In the matrix construction, one is to make sure that the entire series begins and ends with the same number. It is customary to add a 10 to the beginning and end of the series if it is not already

present. Let us illustrate the process of matrix construction with an example.

Suppose that an observer has recorded or encoded the category numbers as 5, 4, 3, 10, 6, 2, 6, 1, 8, and 2. Let us add 10 in the beginning and 10 at the end of this series and try to form pairs. The result may be presented as:

<i>Original series</i>	<i>Series for pairing</i>	<i>Pairing</i>	
5	10	10	I Pair
4	5	5	II Pair
3	4	4	III Pair
10	3	3	IV Pair
6	10	10	V Pair
2	6	6	VI Pair
6	2	2	VII Pair
1	6	6	VIII Pair
8	1	1	IX Pair
2	8	8	X Pair
	2	2	XI Pair
	10	10	

The pairs may be now entered in the matrix as given in Table 24.2.

Table 24.2 Interaction Matrix Table

<i>Category</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>Total</i>
1								/			1
2						/				/	2
3										/	1
4			/								1
5				/							1
6	/	/									2
7											0
8		/									1
9											0
10					/	/					2
Total	1	2	1	1	1	2	0	1	0	2	11

Explanation about entries in the matrix table: The first sequence pair (10, 5) has been tallied in the cell located at the intersection of 10th row and 5th column. The next pair (5, 4) is being tallied in the cell located at the intersection of the 5th row and the 4th column. Similarly, all the remaining pairs have been tallied in their respective cells as shown in Table 24.2.

For exercising a check in the construction of the matrix, the total number of observations N will always be tabulated by $N - 1$ tallies in the matrix. In the present example, there are 12 category numbers (including the extra 10), which have produced a total of 11 tallies in the matrix.

Interpretation: The process of interpretation of interaction or observation data is often called as decoding. It may help in knowing what was going on inside the classroom in terms of teacher behaviour and classroom interaction for communication. It has two broad aspects: (i) quantitative, and (ii) qualitative.

Quantitative analysis of teacher behaviour: It may be based on the following aspects:

1. Interaction categories
2. Areas of interaction
3. Behaviour ratios
4. Interaction variables

Let us discuss them one by one.

Interaction categories: It represents the simplest way of interpreting the interaction data. Here, the total of the column representing the use of various categories, are taken for the interpretation. These are converted in percentages, which help in ascertaining the relative importance given to the use of various categories by a teacher. For example, if we take the matrix Table 24.2 for interpretation, then by applying this method, we would be getting the percentage of categories given in Table 24.3.

Table 24.3 Percentage of Categories for Interpretation

Columns	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Total
Percentage	9.09	18.18	9.09	9.09	9.09	18.18	0	9.09	0	18.18	99.99

Areas of interaction: A useful interpretation of the interaction matrix may be made in terms of these areas. Usually, for this purpose, the tabulated matrix is divided into 10 areas (Flanders, 1963), namely A, B, C, D, E, F, G, H, I and J described below:

Area A: It represents the indirect influence of teacher talk. It is calculated by combining the percentage of teacher statements falling into categories 1, 2, 3 and 4.

Area B: It stands for direct influence of teacher talk. It is calculated by combining the percentage of the categories 5, 6 and 7.

Area C: This area represents pupil talk. It is computed by adding the percentage of categories 8 and 9.

Area D: It involves the silence or confusion category. Operationally, it is the percentage of category 10 in relation to total tallies.

Area E: It represents a block of nine cells involving 1, 2, and 3 categories and gives an index of teacher's dealing with students on affective plane. Operationally, it may be defined as the percentages of tallies in nine cells (1, 1), (1, 2), (1, 3), (2, 1), (2, 2), (2, 3), (3, 1), (3, 2), and (3, 3) with respect to the total tallies.

Area F: It represents a block of four cells involving categories 6 and 7. This area is sensitive to difficulties that teacher may face with regard to direction and criticism in dealing with students. Operationally, it is defined as the percentages of tallies in four cells (6, 6), (6, 7), (7, 6) and (7, 7) with respect to total tallies.

Area G: It represents a block of six cells (8, 1), (8, 2), (8, 3), (9, 1), (9, 2) and (9, 3). It indicates the teacher's responding to the termination of pupil talk with indirect influence. Operationally it is the percentage of the total of these six cells.

Area H: It represents a block of (8, 6), (8, 7), (9, 6) and (9, 7) cells and indicates the teacher's responding to the termination of pupil talk with direct influence. Operationally, it is the percentage of the total of these four cells.

Area I: It represents a block of four cells (4, 8), (4, 9), (5, 8) and (5, 9) and indicates the type of statements that trigger student participation. The students often respond to questions posed by the teacher and hence there is usually high tally loading in cells (4, 8) and (4, 9). A high loading on (5, 8) and (5, 9) indicates classroom drill directed by the teacher.

Area J: It involves four cells (8, 8), (8, 9), (9, 8) and (9, 9) and represents the sustained pupil initiation or response of one followed by the other.

In addition to these areas, the following information may prove helpful in the task of interpretation:

1. If the proportion G/H and A/B are quite different, it may be interpreted as flexible teacher influence.
2. The study of area G with areas E, H and F may help in studying how long indirect or direct influence following the pupil talk was sustained.
3. An above average frequency in area C but not in area J indicates short answers usually in response to teacher stimulation.

Behaviour ratios: This method calls for converting all column totals to percentage of the matrix total and then calculate certain interaction or behaviour ratios. The calculation of behaviour ratios may be done directly from the formulae constructed for this purpose. Behaviour ratios are fifteen in number:

1. **Teacher talk ratio (TT):** It represents the performance of a teacher in terms of actions reflecting the tendency of teacher talk. It is calculated by the formula:

$$TT = (1 + 2 + 3 + 4 + 5 + 6 + 7)/N \times 100$$

For this purpose, the frequencies belonging 1 to 7 categories are added, multiplied by 100, and divided by N, i.e. the total tallies or frequencies of the matrix.

2. **Indirect teacher talk ratio (ITT):** It involves the performance of a teacher in terms of the actions encouraging and supporting pupil participation. The formula runs as:

$$ITT = (1 + 2 + 3 + 4)/N \times 100$$

3. **Direct teacher talk ratio (DTT):** This ratio represents the performance of a teacher in terms of the actions restricting students' participation. It is calculated by the formula,

$$DTT = (5 + 6 + 7)/N \times 100$$

4. **Pupil talk ratio (PT):** It refers to the ratio of verbal activities of the pupils in response to the teacher. It can be calculated by the formula:

$$PT = (8 + 9)/N \times 100$$

where (8 + 9) stands for the addition of the frequencies of the 8 and 9 categories.

5. **Silence or confusion ratio (SC):** This ratio represents the silence or confusion, i.e. any event not included in other categories. The formula runs as:

$$SC = (10)/N \times 100$$

where 10 stands for the frequencies of category 10.

6. **Indirect to direct ratio (I/D):** It involves the proportion of indirect influence of the teacher the formula is,

$$I/D = (1 + 2 + 3 + 4)/(5 + 6 + 7) \times 100$$

7. **Pupil initiation ratio (PIR):** It refers to the pupil talk judged by the observer to be an act of initiation. It is calculated by the formula:

$$PIR = (9)/(8 + 9) \times 100$$

8. **Teacher response ratio (TRR):** It represents an index of teacher's tendency to the ideas and feelings of students. It is computed by the formula:

$$TRR = (1 + 2 + 3)/(1 + 2 + 3 + 6 + 7) \times 100$$

9. **Teacher question ratio (TQR):** It shows the teacher

behaviour involving the use of guiding more content-oriented part of the class discussion. The formula is:

$$TQR = (4)/(4 + 5) \times 100$$

10. **Context cross ratio (CCR):** It is an indication of the extent to which the focus of discussion has been on the subject matter. It represents the proportion of the classroom activity related to the teacher's questions and lecturing with respect to his total classroom interaction. The formula for its calculation is:

$$CCR = (4) + 5/N \times 100$$

11. **Steady state ratio (SSR):** It indicates the tendency of teacher and pupil talk to remain in the same state for a period longer than three seconds. Operationally, it is the percentage of the frequencies in steady state cells [(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6), (7, 7), (8, 8), (9, 9), and (10, 10)]. The formula runs as:

$$SSR = \text{Total Frequencies Steady State Cells}/N \times 100$$

12. **Pupil steady ratio (PSSR):** It indicates the tendency of pupil talk to remain in the same state for a period longer than three seconds. It is the percentage of the (8, 8) and (9, 9) out of categories 8 and 9. The formula is:

$$PSSR = (8, 8) + (9, 9)/(8, 9) \times 100$$

13. **Instantaneous teacher response ratio (TRR-89):** It is an index of the teacher's tendency to praise or integrate pupil ideas and feelings into the class discussion when pupil stops talking. The formula runs as:

$$\begin{aligned} TRR-89 &= (8, 1) + (8, 2) + (8, 3) + (9, 1) + (9, 2) + (9, 3) \\ &= (8, 1) + (8, 2) + (8, 3) + (8, 6) + (8, 7) + (9, 1) + (9, 2) + (9, 3) + \\ &\quad (9, 6) + (9, 7) \times 100 \end{aligned}$$

where (8, 1), (8, 2), etc. stand for the tallies or frequencies of these cells.

14. **Instantaneous teacher question ratio (TQR-89):** It indicates the tendency of the teacher to respond to pupil talk with questions based on his own ideas compared to his tendency to lecture. It can be computed by the formula:

$$TQR-89 = (8, 4) + (9, 4)/(8, 4 + 8, 5) + (9, 4 + 9, 5) \times 100$$

15. Vicious circle ratio (VC): It indicates the teacher's restrictive behaviour involving directions and self-justification, which is sensitive to difficulties faced by the teacher when the students are not complying satisfactorily. The formula is:

$$VC = (6, 6) + 6, 7) + (7, 6) + (7, 7)/N \times 100$$

Interpretation: The index of behaviour ratio is meaningless unless it is interpreted against the norms, i.e. the standard normative expectations. Flanders tried to develop such norms for various grades in U.S.A. These have also been developed to suit the Indian conditions. For illustration purpose, we are reproducing these norms in Table 24.4 for class VIII.

Table 24.4 Behaviour Ratio Norms

S. no.	Behaviour ratio	Symbol	Developed by Flanders	Developed in Indian conditions
1.	Teacher talk	TT	70	67
2.	Pupil talk	PT	19	21
3.	Silence/Confusion	SC	11	12
4.	Teacher response ratio	TRR	35	26
5.	Teacher question ratio	TQR	20	19
6.	Pupil initiation ratio	PIR	15	12
7.	Steady state ratio	SSR	52	46
8.	Pupil steady state ratio	PSSR	26	37
9.	Content cross ratio	CCR	68	72
10.	Instantaneous teacher response ratio	TRR-89	67	48
11.	Instantaneous teacher question ratio	TQR-89	39	42

Note: The teachers exhibiting greater values of behaviour ratios mentioned on serial numbers, 2, 4, 5, 6, 8, and 11 than the norms provided above may be termed as *effective teachers* while those exhibiting greater values of behaviour ratio, as mentioned on serial numbers 1, 3, 7, 9, and 10 may be termed as *ineffective teachers*.

Interaction variables: These may also be used for the analysis of teacher behaviour and classroom interaction. In comparison to behaviour ratio, these provide deeper probe into the nature of classroom communication. Ten such interaction variables are summarised in Table 24.5.

Table 24.5 Interaction Variables with Their Formula

S. no.	Name of the variable	Meaning	Formula for computation
1.	Indirectness	Index of the teacher's indirect behaviour	$i/(i + d) = (1 + 2 + 3)/(1 + 2 + 3 + 6 + 7) \times 100$
2.	Sustained acceptance	Index of accepting and using pupil's ideas in a sustained manner	$(3, 3) \text{ cell} = (3, 3) \times 100/3$
3.	Indirect influence talk behaviour	Index of indirect teacher $N \times 100$	Columns 1, 2, 3, 4 = $(1 + 2 + 3 + 4)$
4.	Questions	Index of the teacher's tendency to use question	Column 4 = $4 \times 100/N$
5.	Teacher-talk	Index of the tendency to use teacher-talk	Columns 1 to 7 = $(1 + 2 + 3 + 4 + 5 + 6 + 7)/N \times 100$
6.	Restrictiveness	Index of the teacher's tendency of being authoritarian in the classroom communication	Columns 6, 7 = $(6 + 8)/N \times 100$
7.	Restrictive feedback	Index of the teacher's tendency of using directions and criticism when pupil stops talking	$[(8, 6), (8, 7), (9, 6), (9, 7)] \text{ cells} = [(8, 6) + (8, 7) + (9, 6) + (9, 7)]/(6 + 7) \times 100$
8.	Negative authority	Index of the teacher behaviour indicative of the classroom discipline problems dealt with negative attitude	$(6, 7) + (7, 6) \text{ cells} = [(6, 7) + (7, 6)]/(6 + 7) \times 100$
9.	Praise	Index of the teacher's tendency to use praise/encouragement.	Column 2 = $(2 \times 100)/N$
10.	Flexibility	Index of flexibility in teacher behaviour	High i/d – Low i/d = High $(1 + 2 + 3)/(5 + 6 + 7)$ – Low $(1 + 2 + 3)/(5 + 6 + 7)$

Qualitative analysis of teacher behaviour: This method employs the following methods for the analysis of teacher behaviour:

1. Clockwise flow diagrams
2. Box-flow diagrams
3. Interaction models of critical teaching behaviours

Let us have a brief idea of these methods.

Method of clockwise flow diagrams: A clockwise flow diagram provides a visual display of the chain of classroom interaction which may prove more acceptable for understanding the nature and structure of classroom verbal behaviour. The following procedures summarise drawing a flow diagram from an observation matrix:

1. Draw a blank matrix form consisting of 10 rows and 10 columns each properly labelled.
2. Locate and encircle the highest cell frequency of a matrix. Now, take the cell of the highest frequency as the starting point of the flow diagram since it is the sequence pair which occurs most often.
3. After locating the starting point, try to identify the event which is most likely to follow. For this, move in the clockwise direction in the row belonging to the starting point cell and encircle the highest frequency other than the starting point cell.
4. Connect these two marked cells with a little looping arrow.
5. For locating the third point, search the column of the second point for the highest frequency cell. The highest frequency should be noted only upward side from the second point so that the clockwise flow may be maintained. Note and encircle it and connect it by an arrow with the second point.
6. After locating the third point, inspect the row towards the right side of the column, locate the highest cell frequency, and encircle it. It is the fourth point. Connect it by drawing a looping arrow from the third point.
7. Follow the procedure for locating other points and connecting them with the preceeding ones. It will help in preparing a clockwise flow diagram for the interpretation of observational matrix.

Flow diagrams help in clarifying the sequence of events and making the matrix to be more understandable. What events precede

and what follow can also be inferred. It also helps in locating the transition of events and the state of steadiness. Besides, this diagnosis proves helpful in making comparisons between two matrices with normative expectations.

Method of box flow diagrams: In place of clockwise flow diagrams, Flanders suggested to draw box-like diagrams, which look little less complicated and help more in understanding the nature and structure of verbal behaviour of the teacher. It attempts to use space in ways that are proportional to the communication pattern. Let us mention a few things regarding the construction of such diagrams:

1. Steady state pairs related to teacher-talk and pupil-talk should be drawn separately.
2. The size of the steady state pairs box should be in proportion to their cell frequencies.
3. The boxes should be connected by looping arrow by inspecting the frequency of the matrix that precedes and follows.
4. The thickness of connecting arrow should be proportional to the frequencies of the cell.
5. The boxes are connected by the interchange events of any cell. There may be interchange within the same domain.

Method of interaction models of critical teaching behaviours: A critical teaching behaviour has been defined by Flanders as a pattern of acts or interaction models that:

1. are logically related to certain educational outcomes.
2. follow a certain sequence with measurable probability.
3. seem crucial in terms of a theory of teacher influence verified by past research.

He has developed seven interaction models of critical teaching behaviour. The first three models involve teacher initiation and, thus provide more scope for active teacher role. The last four involve

pupil initiation and cell for more students' participation. These models may be listed as:

1. High content emphasis under close-teacher direction.
2. Teacher-directed quick drill.
3. Drill combined with lecture demonstration.
4. Teacher gives directions with some clarification.
5. Stimulating independent student thought.
6. Attending to student feelings.
7. Teacher transitions from affective to an intellectual emphasis.

A wise inspection of clockwise flow diagrams may prove helpful in locating these interaction models and useful interpretation may be made for analysing the teacher behaviour and classroom interaction.

Advantages and limitations of Flanders' interaction analysis system

Advantages:

1. It is a reliable and objective technique of observing and analysing the verbal behaviour of a teacher and classroom interaction.
2. It may help in determining the pattern and flow of teaching behaviour.
3. It helps in understanding analytically what in fact goes on in the classroom.
4. Through the use of this system, student-teachers may practise and learn many new desired teaching behaviours quite unknown to traditional teaching.
5. Being a potential tool of the feedback, it helps in acquiring the desired patterns of teaching and modifying one's teaching behaviour.
6. It adds and supplements to the training techniques such as micro-teaching and team teaching.
7. It can be used for carrying out research in the areas of

teaching, teacher-behaviour, and pre-service and in service education of teachers.

Limitations: The Flanders' System of Interaction Analysis suffers from the following drawbacks and limitations:

1. The system concentrates on verbal behaviour and does not describe the classroom interaction or teacher behaviour in its totality. Some behaviours are always overlooked, which might be important too.
2. The system, being content free, does not incorporate various essential steps of teaching a particular subject and, therefore concerned behaviours have to be arbitrarily categorised by the observer.
3. It focuses a great deal of attention on direct/indirect teacher influence and teacher talk. These are provided by three and four categories, respectively.
4. Classroom interaction in the form of pupil-pupil interaction does not find place in this system.
5. The processes of tallying, constructing matrix, and interpreting matrix prove uneconomical in terms of time, labour and money.
6. Its use requires highly trained, reliable and competent observer/interpreter who are always in acute shortage.
7. It does not provide value judgments about good and bad teaching behaviours.
8. Certain activities such as demonstrating an experiment in Science, model reading in language, map and chart reading in Social Studies, do not find appropriate classification in this system.
9. Only one category has been provided to silence and confusion. Equating of silence with confusion is not appropriate. Moreover, in this system no attempt has been made to classify silence as purposive and non-purposive which is a serious drawback.
10. In this system, fourth category related with asking

questions does not classify this type of questions asked. Therefore, it becomes very difficult to interpret or analyse the teacher behaviour in its true form on the basis of the observations of this category.

In this way, the Flanders' System of Interaction Analysis suffers from some serious drawbacks and limitations. For doing away with these difficulties, many attempts have been made to suggest suitable modification in this system. We would like to throw light on some of these attempts in the following pages.

Reciprocal category system (RCS)

Symbolically known as RCS, this system represents one of the several modifications suggested in the Flanders' ten category system. It was developed by Richard Ober et al. (1971) of the University of Florida. The *Reciprocal Category System* is based on the principle of reciprocity which assumes that for any phenomenon or event, there exists a reciprocal. Therefore, for every teacher behaviour or teacher talk, there should exist a corresponding student behaviour. Consequently, the system provides nine categories of verbal behaviour, which can be applied to students talk or teacher talk in a reciprocal way. In addition to these nine categories, it provides a general category concerned with silence or confusion.

Let us now try to have a summarised view of this system with the help of Table 24.6.

TABLE 24.6 Reciprocal Category System (RCS)

<i>Category number assigned to teacher talk</i>	<i>Description of verbal behaviour</i>	<i>Category number assigned to student talk</i>
1	Warms (informalises) the climate:	11
	(i) Tends to open up and/or eliminates the tension of the situation.	
	(ii) Praises or encourages the action, behaviour components, ideas and/or contributions of another.	
	(iii) Jokes that release tension not at the cost of others.	
	(iv) Accepts and clarifies the feeling tone of others in a friendly manner.	

2	<i>Accepts</i> : Accepts the action, behaviour, comments and/or contribution of another for possible reinforcement.	12
3	<i>Amplifies the contribution of another</i> : Asks for clarification or builds on and/or develops the action, behaviour, comments over ideas and/or contribution of another.	13
4	<i>Elicits</i> : Asks a question or requests information about the content, subject, or procedure being considered with the intent that another should answer (respond).	14
5	<i>Responds</i> : Gives direct answer or requests for information that are initiated by another, includes answers to one's own questions.	15
6	<i>Initiates</i> : (i) Presents facts, information, and/or opinion concerning the content, subject or procedures being concerned that are self-initiated.	16
	(ii) Expresses one's own ideas.	
	(iii) Lectures (including rhetorical questions not intended to be answered).	
7	<i>Directs</i> : Gives directions, instructions, orders, and/or assignments to which another is expected to comply.	17
8	<i>Corrects</i> : Tells another that his answer/behaviour is appropriate or incorrect.	18
9	<i>Cools (formalises) the climate</i> : (i) Makes statements intended to modify the behaviour of another from an inappropriate to an appropriate pattern.	19
	(ii) May tend to create a certain amount of tension (i.e. exercise authority, rejecting or criticising the opinion or judgement of another.)	
10	<i>Silence or confusion</i> : Pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.	20

Advantages:

1. RCS devotes equal attention to student and teacher talks by providing reciprocal categories.
2. The system makes it possible to observe classroom verbal interaction with a particular stress on the socio-emotional climate of the classroom.
3. It assists the teacher in planning strategies by providing a set of organised patterns of instructions.
4. It may encourage the development of teacher-made observation systems.
5. It makes provision for noting the warming and cooling behaviours of students and teacher in addition to the

positive and negative reinforcement factors.

6. It may be effectively employed in providing pre-service and in-service training to the teachers.
7. With the help of systematic and objective feedback, this system may add in the improvement of the teaching effectiveness and meaningful classroom interaction.
8. It may help as a research tool in the field of teacher education, teacher behaviour, classroom environment and management, teaching methods and strategies, student teaching, etc.
9. The major advantage lies in the fact that it may help in maintaining the secrecy of a teacher with regard to his teaching performance. He may record the classroom event on a tape or video and evaluate his behaviour and, thus may be freed from the anxiety and pressures of being observed by others.

Limitations:

1. RCS does not describe the classroom interaction or teacher behaviour in its totality. Some important behaviours like quality of verbal information and reacting behaviour are overlooked.
2. It concentrates heavily on the socio-emotional aspect of learning at the cost of the cognitive aspect and the intellectual activities of the classroom.
3. There is no provision of managerial skills in this system.
4. To make sensible value judgements about good or bad teaching behaviour is not possible in this system.

Equivalent talk category system (ETC)

The system represents an extension of RCS for bringing suitable modification in the Flanders' system. Here, the classroom interaction is divided into equivalent categories in contrast to reciprocal categories of RCS. Its main feature lies in classifying classroom

verbal interaction and placing particular emphasis on the quality of verbal actions and reacting behaviours.

This system was developed by Earnest L. Bentley and Edith Miller at Atlanta in 1970. A summarised view of this system can be obtained from Table 24.7.

Table 24.7 Equivalent Talk Category System

Teacher code	Description of verbal behaviours	Student code
1	<i>Presenting information:</i> Unsolicited information—Lecture; explanation related to lesson; demonstration; description; important comments; rhetorical questions.	11
2	<i>Questioning—Restricted thinking:</i> Call for responses that result from restricted thinking; factual knowledge previously learned or easy to produce; lower level of cognition.	12
3	<i>Questioning—Expanded thinking:</i> Call for responses that result from expanded thinking, open-ended responses; generation of principles, concepts, and generalisation; higher level of cognition.	13
4	<i>Responding—Restricted thinking:</i> Result from restricted thinking—Factual knowledge; an accepted or pre-determined correct answer; facts previously learned or easy to produce; lower level of participation.	14
5	<i>Responding—Expanded thinking:</i> Result from expanded thinking—Open-ended responses; generation of principles, concepts, and generalisation; solutions generated by application or rules or procedures; answer to how, why, what do you think; higher level of cognition.	15
6	<i>Reacting—Maintain level of participation:</i> Verbal behaviour that maintains current level of thinking, invitation to continue thinking, amplify, clarify, or summarise ideas at the same or a lower level of cognition.	16
7	<i>Reacting—Extended level of participation:</i> Verbal behaviour that extends current levels of thinking—request for further information; generation of data or principles or reconsideration of ideas requiring increased complexity of thinking; obvious utilisation of information supplied by another where the level of cognitive participation is raised.	17
8	<i>Reacting—Terminate level of participation:</i> Verbal behaviour that brings current topic or thought to a close termination of responses through comment or intervention; indication that thought sequence is ended; change or introduction of new topic; summation or relationship-building activity when new learning is related to old.	18
9	<i>Structuring—Learning activities:</i> Comments that organise learning activities, commands, directions, assignments.	19
10	<i>Structuring—Pause-silence:</i> Absence of verbalisations utilised to promote the sequence planned.	20

Advantages:

1. ETC serves as an organised frame of reference, observing

and describing actual classroom interaction.

2. It helps in providing valuable data for the evaluation and modification of teacher behaviour.
3. It considers teaching of thinking as an important educational activity. Consequently, it may help in developing thinking skills and improving the levels of thinking of both students and teachers.
4. It provides objective feedback for improving instructional skill particularly related to teaching strategies, participation, and quality of content.
5. There is a provision of self-observation in this system for appropriate evaluation. This provision helps teachers bring the desired modification in their teaching behaviour as they may get rid of unnecessary fears and anxieties of being evaluated by others.
6. It is generally applicable to most school subjects.
7. Its use is relatively simple. It can be learned by most classroom teachers in a relatively short training period.

Limitations:

1. ETC neither provides any standard nor passes any final judgement about teacher behaviour.
2. It makes it possible to analyse cognitive verbal behaviour only. In this way, it not only neglects non-verbal behaviours but also pays no consideration for the socio-emotional interactions of the classroom.
3. It does not provide for the improvement of managerial skills.

Regional college of education Ajmer system (RCEAS)

This system represents another approach to modify Flanders' ten category system with a view to making it more reliable, broad-based and applicable to the Indian conditions. Its main features may be summarised as:

1. RCEAS contains ten categories, out of which three have been subdivided into two sections each for providing a more comprehensive analysis and description of classroom interaction.
2. It gives special emphasis on relevance of a particular type of classroom behaviour to be adjudged by an expert observer with reference to the standard of particular class and desirability of certain classroom behaviours.
3. By splitting the category of questioning into two parts, it provides for convergent and divergent questions separately.
4. The category of silence/confusion has been split into two parts separately as purposive and non-purposive silence/confusion.
5. It provides valuable opportunity to assess and develop managerial skills among teachers.
6. The importance of demonstrating activities has been recognised by way of incorporating a full fledged category to this effect.
7. It attempts to provide more motivational value.
8. Its feedback value and usability in Indian conditions have been adjudged greater than the Flanders' system.

A summarised view of the RCEAS system may be obtained through Table 24.8.

Table 24.8 Regional College of Education Ajmer System of Interaction Analysis

Category name	Category no.	Description of verbal behaviour
Teacher talk— Indirect influence	1	<i>Approves pupil action</i> (Agrees to pupil's action or behaviour): Shows satisfaction; amicable acceptance of student's feeling; uses extra verbal cues and positive non-verbal reinforces, e.g. saying hum-hum, O.K., yes, good, right, correct, go ahead, nodding head, etc.
Response	2	<i>Utilises pupil ideas</i> : Accepts, clarifies, rectifies and develops pupil ideas leading to congruous solutions, extensions of pupils ideas/responses.
Teacher talk— Indirect influence	3(a)	<i>Asks close-ended questions</i> : Asks drill questions whose response is quite predictable; it includes memory and comprehension level questions focused on relevant content.
Initiation	3(b)	<i>Ask close-ended questions</i> : Asks thought-provoking questions or questions which

		call for unpredictable responses; it includes application and higher mental order questions.
Teacher talk— Direct influence	4	<i>Demonstrating activities:</i> Shows demonstration; performs experimentation, uses audio-visual aids; model reading and reactions; dictation for improving language skills.
Initiation	5	<i>Lecturing:</i> Gives facts or opinions about content or procedure; expresses his own ideas; gives explanation, narration, description, exposition, verbal illustration, dictation of notes, black-board writing and sketch work, rhetorical questions.
	6	<i>Managerial activities:</i> Directions, commands, orders, requests with the intention of promoting desirable behaviour in the classroom and to create an atmosphere conducive to learning.
	7	<i>Extra relevant and irrelevant activities:</i> Any activity which is not in consonance with objectives of the lessons. It may be curricular or non curricular.
	7(a)	<i>Curricular:</i> Gives irrelevant or wrong information beyond the scope of the class or out of context questioning.
	7(b)	<i>Non-curricular:</i> Criticises or justifies authority, includes teacher's reproof, extreme self-reference and corporal punishment.
Pupil talk — Response	8	<i>Student response:</i> Talk by pupils in response to teacher, includes seeking clarification by students, helping teacher in setting experiments; initiative reading and taking down notes and doing class-work.
Pupil talk — Initiation	9	<i>Student initiation:</i> Students creative expression (may be questions or statements); includes higher order activity or students involving original thinking and novel ideas (prediction, inference, evaluation etc.)
Silence	10(a)	<i>Purposive silence:</i> Absence of verbalisation utilised to promote planned sequential pauses of short periods or silence; includes described classroom activities, e.g. silence; silent reading, and setting up experiments or supervision of the class.
	10(b)	<i>Non-purposive silence/confusion:</i> Prolonged unwanted silence when the teacher is either lazy or busy with register work or homework correction, etc.; includes periods of confusion in which the communication cannot be understood by the observer and considerable noise and interruptions disrupting planned activities may take place.

Note: There is no scale implied by these category numbers. Each number is classificatory; designates particular kind of communication event. To write these numbers down during observation is to enumerate, not to adjudge a position on the scale.

Limitations: The RCEA system suffers from a few limitations. Vashistha (1982) has summarised these as given below:

1. There may be behaviours which might not be covered under the categories of this tool since it is difficult to develop a category system inclusive of all kinds of classroom communication.

2. The non-verbal behaviour is not encoded through this system.
3. To interpret data is a cumbersome job and requires trained personnel.
4. Observations through this system require a content-oriented person.
5. As the focus of this tool has been the modification of teacher behaviour, more attention has been given to indirect/direct behaviour of the teacher and little attention has been given to pupil talk.
6. Although, the system has inferential power, its potential as a research tool for wide application to various problems is yet to be explored.

Conclusion

We have seen the attempts made to define *teacher behaviour* and classroom interaction analysis. The procedure and methods of analysing verbal behaviour of the teacher and classroom interaction suiting to general and special local conditions have also been discussed. However, this analysis has remained confined to verbal level only. The non-verbal teacher behaviour/interaction of classroom communication is equally important. There has been very limited attempt for the analysis of the non-verbal aspect. In an ideal analysis, both verbal and non-verbal aspects should find a proper place and it will surely aid to bring desired improvement in the behaviour of teachers and classroom interaction patterns leading to more effective classroom teaching. In the coming pages of this chapter, we would be focusing on an analysis involving both verbal and non-verbal aspects of teacher behaviour.

Transaction Analysis

What is transactional analysis?

In simple words, *transaction analysis* in a classroom situation stands for a mechanism of analysing transaction of behaviour between teacher and students. As a terminology, transaction may be defined

as an exchange or communication of thoughts, feelings and actions between two or more people. The effectiveness or non-effectiveness of such transaction is adjudged through the mechanism or process of transaction analysis.

In the language of behavioural psychology, transaction behaviour consists of a transactional stimulus (TS) and a transactional response (TR). TS, in fact, stands for a particular type of behaviour (verbal or non-verbal) elucidated by a person in the acknowledgement of the presence of others, when two or more people interact with each other. TR is the response given to TS by another person in such an interaction. What is transacting between the interacting people in terms of qualities and effectiveness of TS and TR is, thus adjudged through the process of *transaction analysis*.

Theoretical framework

Transaction analysis as a method of analysing behavioural transaction is the outcome of the ideas and the philosophy propagated by the famous psycho-analyst Dr. Eric Berne (1968). According to him, the main ideas or concepts lying behind the mechanism of *transaction analysis* are:

1. All individuals, regardless of their age, have three main behavioural characteristics, namely Parent (P), Adult (A) and Child (C). These are called **ego states**.
2. Each of the ego states represents a set of behaviours (verbal and non-verbal).
3. The parent ego state (P) is a state of the behaviour demonstrated by the individual just the same as demonstrated or taught by his parents or elders to him in his childhood. It may be further divided into two parts based on the type of behaviour shown by parental figures:
 - i. **Nurturing** (called Nurturing P—the mother's role): The related behaviour characterised by this state may be cited as advise, feed, coach, train, protect, etc.

- ii. **Criticising or controlling** (called Critical or Control P—the role of father): The related behaviour characterised by this state may be cited as punish, criticise, scold, blame, lay down rules, etc.
- 4. The adult ego state (A) represents the behavioural state of the individuals in which they behave, feel and think in terms of the reality that exists here and now, using all the resources in their hands as an adult human being with many years of experience of life to guide them. Thus, in actual practice, the behaviour of the individual representing this state is characterised by the verbal and non-verbal behavioural acts such as use of discrimination, reasoning, evaluation, data analysis, use of logic, and ability to observe objectively and correctly.
- 5. The child ego state (C) represents the behavioural state of the individuals in which they revert to behaving, feeling and thinking close to how they did in childhood. It may be further subdivided into the following parts:
 - i. The free child state (FC) demonstrating his innate spontaneous and uninhabited nature like having fun, being inquisitive, crying, demanding, being impulsive, curious, shy, and fantasising.
 - ii. The adaptive child state (AC) demonstrating the adaptable nature of the child to the environmental forces, characterised by the behaviour showing sign of obedience, sulking, manipulation, aggression, rebelliousness, feelings of guilt, shame and anxiety, etc. in his behaviour.

These five ego states may be clearly represented through Figure 24.1.

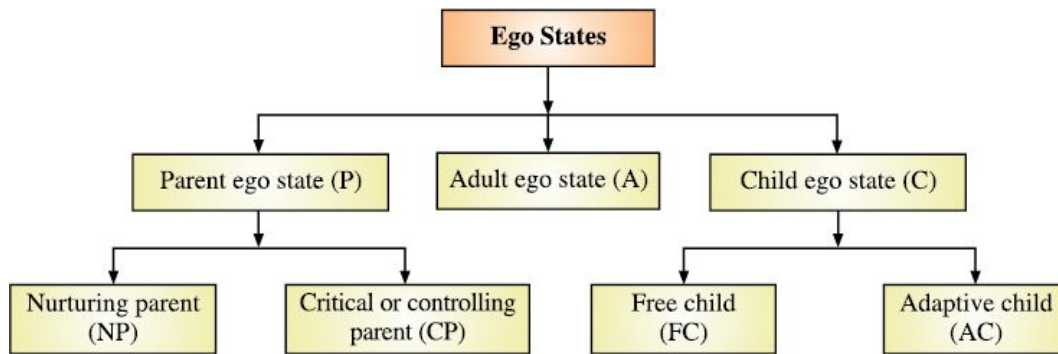


Figure 24.1 Ego states of an individual during transaction.

In this way, depending on the circumstances and needs, people change from one state to another or one state dominates the other in the course of their transactions. It gives birth to a particular type of behaviour, which may be easily noticed through the ego state indicators now described.

Ego state indicators

In the transactions of thoughts, feelings, attitudes etc. in the class, the ego states demonstrated by a teacher may be well indicated through his verbal and non-verbal behaviours (voice, facial expressions, gestures, postures, etc.). Through the help of these indicators we may be able to judge the type of ego state a teacher is passing through at one or the other moment of the transaction. The analysis of these ego states and resulted behaviour may then help us to suggest or devise ways and means for the proper modification of a teacher's behaviour. It is a happy co-incidence that all these five ego states lying in an individual's behaviour may be properly revealed through his verbal and non-verbal behaviours. What one says and the manner in which it is uttered, definitely conveys too much about the ego states and the desirability and undesirability of his behaviour. Let us analyse the transaction of the words *Have you solved the assigned problem?* For example, the tone, pitch, volume, facial expressions, gestures, and postures adopted by a teacher in the transaction of these words may at once reveal the ego state through which he is passing at the time of such transaction. The nature of the ego state will definitely convey the real meaning of the words used for transaction/communication between the teacher and student. The above question, belongs to the adult ego estate (A)

wanting information for assigning next problem to the child, or the nurturing parent ego state (NP) wanting to know whether any help is required or the controlling parent ego state (CP) wanting to know why he has not solved the problem yet.

In this way, a mere observation and analysis of the verbal and non-verbal behaviours of the teacher may clearly reveal the underlying ego state at the time of transaction, the analysis of which may further convey the desirability and undesirability of such behaviour and consequently, the ways and means of its desired modification may be chalked out.

Dr. Eric Berne has provided a list of words and voices, gestures and attitudes indicating the ego states. These are reproduced in the Table 24.9.

Table 24.9 Ego State Indicators

Ego state	Words	Voice	Gestures	Attitude
Nurturing Parent (NP)	Good, nice, splendid, let me help, do not worry, I love you.	Soft, loving, encouraging, concerned.	Open arms, accepting, gentle, caressing.	Understanding caring.
Controlling or Critical Parent (CP)	Never, should, must, stupid, ridiculous, ought.	Strong, critical, condescending, authoritative.	Closed, pointed fingers, angry, frightening.	Judgemental, moralistic.
Adult (A)	When, how, what, why, where, alternative.	Even, calm, confident, unemotional.	Erect, level eye, straight, formal.	Open, evaluative.
Free Child (FC)	Wow, fun, want, lovely, super, hi,	Free, excited, energetic, giggling.	Uninhibited, wide eyed, flirtatious, playful.	Curious, changeable.
Adaptive Child (AC)	No, wish, I am sick, hope, sorry, after you.	Whining, defiant, apologetic, placating.	Pouting, sullen, immobile, distant.	Conforming, ashamed.

Procedures of transaction analysis (as used for behaviour modification)

Transaction analysis may be carried out by the following steps:

1. Observe the verbal and non-verbal behaviours of the teacher (in terms of the uttered words, voice characterised by his tone, pitch, volume, facial expressions, gestures, postures, etc.) at the time of transaction.

2. Analyse the behaviour for taking decision regarding the ego state through which the teacher is passing at the time of transaction.
3. Each ego state carries its own merits and demerits resulting into positive and negative impacts on the effectiveness or ineffectiveness of the teacher's classroom behaviour. Such advantages and disadvantages of the different ego states of a teacher are summarised in Table 24.10.

Table 24.10 Implication of the Ego States During Transaction

<i>Ego state</i>	<i>Advantages</i>	<i>Disadvantages</i>
Nurturing Parent (NP)	Provides encouragement and desired training, helps in proper development, gives relief and consolation at the time of stress and anxiety.	Makes the teacher too liberal, lenient and indulgent. The students may take liberty, take the teacher for granted (loved but not respected), resulting into cases of indiscipline and neglect of work on the part of students.
Critical or Controlling Parent (CP)	Helps in enforcing rules and regulations, maintaining discipline, correcting the improper behaviour and mistakes in the work of the students, class control, giving clear direction and taking firm stand and decisions in the interest of the students.	Makes the students fearful and frightened, suppresses their natural drives and instincts, makes them indecisive and paralyses their thinking by making them quite mechanical, passive listeners, followers etc.
Adult (A)	Proves a rich source of development of rational thoughts among the children, including	The intensity and excess of the adult ego state may make

	power of analysis, evaluation and understanding of the factors relevant to learning and problem solving situation; helpful in providing necessary guidance to pupils for planning problem solving and in the application of acquired knowledge.	the teachers totally insensitive to the feelings and concerns of his students. He may work like a machine, quite unfriendly with his students.
Free Child (FC)	Helps in making the classroom alive through humour and wit; encourages creativity and self-learning on the part of the students; accepts change and challenges and copes comfortably with stress and anxiety-producing situations.	It may lead the teacher to be blunt and tactless, to imagine unrealistically, and to become socially unacceptable.
Adaptive Child (AC)	Makes the teacher tactful, disciplinarian and reliable, quite trustworthy for following the instructions and guidelines of the authority.	May turn the teacher into a slavish, rebellious, obstructive and damaging personality due to the inherent feelings of resentment against authorities. He may cause stress to self and others due to this hostility.

In the light of these advantages and disadvantages arising in the behaviour of the teachers during classroom transaction, we may plan for the appropriate guidance to the teacher for the required modification in his behaviour as per the requirement of the teaching-learning situation resulting into the best realisation of the teaching-learning objectives.

SUMMARY

1. The term teaching or *teacher behaviour* refers to the behaviour (verbal and non-verbal) maintained and demonstrated by a teacher at the time of carrying out his teaching activities in the classroom along with his students. The way a teacher behaves during teaching is almost guided by his own personality and the situation or environment in which he is behaving.
2. The term *modification of teaching or teacher behaviour* refers to the attempts or measures adopted for bringing desired improvement or modification in the existing entry behaviour of a teacher for helping him to attain the desired terminal behaviour in order to exercise his professional duties as effectively as possible. It can be properly modified through the adoption of a variety of techniques including the most commonly used techniques such as *interaction analysis* and *transaction analysis*.
3. The term *interaction analysis* refers to a technique consisting of objective and systematic observation of the classroom events for the study of the teacher's classroom behaviour and the process of interaction going inside the classroom. It helps a teacher bring desired modification in his behaviour and improve his interaction with his pupils for making his teaching more effective and purposeful.
4. There exist more than hundred systems of interaction analysis. Flanders' system of interaction is known as the most popular technique used for the analysis of the teacher behaviour (although verbal only) and interaction going on in the classroom in a particular teaching-learning situation. It tries to categorise all the sets of possible behaviours while interacting with his students in ten categories divided into three major sections, namely: (i) teacher talk, (ii) student talk, and (iii) silence or confusion. The application and utilisation of Flanders' interaction analysis mainly involves three major steps: (i) observation and recording of the

classroom events, (ii) construction of the interaction matrix, and (iii) interpretation of the interaction matrix. However, for one reason or the other, this system suffers from some serious drawbacks and limitations. For doing away with these difficulties, a few alternative systems of interaction analysis have been evolved. These include *Reciprocal Category System*, *Equivalent Talk Category System*, and *Regional College of Education Ajmer System*.

5. The *Reciprocal Category System* developed by Richard Ober is based on the principle of reciprocity conveying that for any phenomenon or event there exists a reciprocal. Therefore, for every teacher behaviour there should exist a corresponding student behaviour. Consequently, the system provides nine categories of verbal behaviour that can be applied to student talk or teacher talk in a reciprocal way. In addition to these, it provides a general category concerning with silence or confusion.
6. The *Equivalent Talk Category System* developed by Earnest L. Bentley and Edith Miller, tries to divide the classroom interaction into equivalent categories in contrast to the reciprocal categories. Its main features lie in classifying classroom verbal interaction into some specific verbal behaviour categories (like presenting information, questioning, responding, reacting, and structuring) and placing particular emphasis on the quality of verbal actions and reacting behaviours.
7. The *Regional College of Education Ajmer System* represents an approach to modify Flanders' ten category system with a view to making it more reliable, broad-based and applicable to Indian conditions. It contains 10 categories out of which three have been subdivided into two sections, each for providing a more comprehensive analysis and description of classroom interaction.
8. The *transaction analysis* developed by Dr Eric Berne carries a considerable advantage over most other systems of interaction analysis on an important ground that it lays emphasis on both verbal and non-verbal aspects of teacher

behaviour. As a term, *transaction analysis* stands for a mechanism or technique of analysing transaction or interaction of behaviour (verbal and non-verbal) between the teacher and the students in a particular classroom setting. In behavioural psychology language, transaction behaviour consists of a transactional stimulus (a particular type of behaviour elucidated by a person while interacting with others) and a transactional response (the response given to transactional stimulus by another person in such an interaction). What is transacting between the interacting people in terms of the qualities and effectiveness of transaction stimulus and response is, thus adjudged through this process. According to Dr Berne, the teacher and the students pass through five specific ego states in the transaction of thoughts, feelings, attitude etc. in a particular classroom interaction indicated through their verbal and non-verbal behaviour. In this way, a mere observation and analysis of the verbal and non-verbal behaviour of the teacher may clearly reveal the underlying ego state at the time of transaction, the analysis of which may further convey the desirability and undesirability of such behaviour, and consequently, the ways and means of its desired modification may be chalked out.

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Pedagogy and Andragogy

CONCEPT OF PEDAGOGY

Pedagogy is best defined as the science of teaching. For keeping into the nature of pedagogy and knowing it well, it would be worthwhile to know about the meaning and nature of the term *Teaching and Functions of Science*. Teaching in general is known as a profession or activity performed by a group of persons known as teachers, for helping their students in learning or acquisition of certain types of learning experience. As a professional activity, thus teaching aims to bring desirable changes in the behaviour of persons known as learners and also to help these learners in seeking the all round development of their personality.

Now as far as the nature of science and its contribution towards our life is concerned, we can say that science with its miraculous nature and wonderful capacity has made our life quite easy and comfortable. With its valuable inventions and technical progress, it has helped us to seek maximum and better output with our least efforts and input. Take the case of cloth production. If we compare the task performed by the modern textile industry with the traditional cottage industry and work performed on looms, we can see how science has changed the way of life as well as the production of the stuff. We can have maximum and fine output of the cloth material with the least input in terms of time, money and labour. With the blessings of the science, now we have fine wings to fly, wonderful hands for working and speedy legs for walking and moving from one place to another. In this way, it is in the very nature of science to help us wonderfully in our all tasks related to our day-to-day life. A simple workable definition of the applied or working science, thus may be given as a tool, device or a working way that may help us to seek maximum and better output with the least investment or input on our part. Hence anything that can help us in a particular task performed by us in the way as science does in our life, we may safely attribute it as a science of doing that very task. It is equally true with the task or

activities performed by us as a teacher. Anything that helps the teachers in the task of teaching much in the same way as science does in performing the day-to-day tasks is, thus fully entitled to be named as science of teaching, i.e. pedagogy. Elaborating further, the methods, devices, strategies, aids and equipments, maxims and principles used by a teacher in his teaching, all may fall in the domain of pedagogy or science of teaching if these can help him in the task of teaching in the way as science does in doing other tasks related to his day to day life.

CONCEPT OF ANDRAGOGY

Before the advent of the term *andragogy* thus we have seen the term *pedagogy* has been in use as *the science of teaching* for the teaching–learning of all types of learners with no discrimination such as age or stage of education. A well known authority in the field of adult education and great American educator believing in the concept and ideas of humanism, Malcolm Shepherd Knowles (1913–1997) proposed that adults' learning is not the same as children's learning, hence the theory and practice applicable to children's learning cannot be applied to adult learning. Therefore, there must be some other type of *science of teaching* for the teaching–learning of adults and he coined the term *andragogy* for being used as the *science of teaching* in the field of adult education. As synonymous to adult education, thus he defined the term *andragogy* as the art and science of adult learning (Kearsley, 2010).

In its etymological derivation and meaning, andralogy in Greek stands for the man-leading in comparison to pedagogy which in Greek means child-leading. Taking clue from such distinction between the terms *andragogy* and *pedagogy* in Greek, Knowles proposed to use the term *andragogy* for the science of teaching in the field of adult education while reserving the term *pedagogy* for being used as *the science of teaching* in the field of child education.

Historically, thus andragogy stands for the theory and practice of education of adults evolved from the practice of pedagogy to address the specific needs in the education of adults as opposed to the education of children.

DISTINCTION BETWEEN PEDAGOGY AND ANDRAGOGY

Pedagogy as said earlier, is the art and science of teaching that is applicable to children's education in comparison to *andragogy* known as the art and science of teaching adults or the mature ones. The distinction between these two terms can be made clear through the comparison brought out in Table 25.1.

Table 25.1 Distinction between Pedagogy and Andragogy

Aspects of teaching-learning	Pedagogy	Andragogy
Objective	To provide necessary theory and practice for the teaching-learning of children.	To provide necessary theory and practice for the teaching-learning of adults or mature learners.
The status of the learner	Almost dependent and directed by the teacher for his learning.	Independent or moving towards independence. Self-directing in terms of his learning needing guidance but not dictation.
Role of the teacher	Responsible for the learning of the learner and thus fully dominates the teaching-learning scenario.	Facilitator and guide. Guides and helps the learner when needed or asked to do so.
Role of the learner's experience	Plays a non-significant part as what to learn and how it is learned is decided by the teacher or prescribed curriculum.	Plays a quite significant part and proves a rich source for taking decision what to learn and how.
Methods used	Most often the direct method of instruction like lecture, demonstration etc. are used. Decision for using a particular method rests with the teacher and not the learners.	Learner centered and group study methods are mostly employed. Group discussion, problem solving, role playing, simulations, project method, etc. are the common method and strategies employed in andragogy.
Nature of motivation	Motivation is by external pressure, and there is a lot of competition for grades.	It is intrinsic in nature often driven by the mode of self-actualisation, need fulfilment and self-efficacy.
Nature of curriculum and learning experiences	Standardised and fixed often based on the social needs.	Flexible and more often issues and application based quite close to the necessities of real life.
Nature of evaluation	Evaluation is controlled and managed by the teacher.	The method of self-evaluation is mostly employed followed by observation and rating in cases where needed.

PRINCIPLES OF ANDRAGOGY

In search of the principles of *andragogy* (the theory and practice of education of adults), Knowles first tried to focus on certain assumptions about adult learners outlined as below (Knowles, 1984 : 12).

1. **Self-concept:** As a person matures, his self-concept moves from one of being a dependent personality toward one of being a self-directed human being.
2. **Adult learner experience:** As a person matures, he accumulates a growing reservoir of experience that becomes an increasing resource for learning.
3. **Readiness to learn:** As a person matures, his readiness to learn becomes increasingly oriented to the developmental tasks of his social roles.
4. **Orientation to learning:** As a person matures, his time perspective changes from the postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from subject-centeredness to one of problem-centeredness.
5. **Motivation to learn:** As a person matures, the motivation to learn becomes internal.

Based on the above assumptions, Knowles tried to suggest the following four principles of andragogy (the art and science of adult learning).

1. **Principle of involvement of the learner:** Adults need to be involved in the planning and evaluation of their instruction.
2. **Principle of experiential learning:** Experience (including mistakes) provides the basis for the learning activities.
3. **Principle of relevancy and purposefulness:** Adults are most interested in learning the subjects that have immediate relevance and impact on their job or personal

life.

4. **Principle of problem-centeredness:** Adult learning is problem-centered rather than content-oriented. (Kearsley, 2010).

These principles can be properly utilised for devising devices and techniques for the teaching and training of the adults/mature learners in one or the other teaching–learning situation. Let us have a look at these techniques of andragogy.

TECHNIQUES OF ANDRAGOGY

Adults need to be taught by keeping in consideration their needs, interests, purposes, nature of motivation, and psychology as well as the methods and techniques available for their teaching–learning. In general the techniques for the teaching–learning of the adult and matured persons may be summarised as below:

1. **Establishment of proper rapport:** Genuine efforts should be made for establishing proper rapport with the adults and mature learners for making them to listen and attend the teacher/trainer. They should have trust and faith in the teacher/trainer and for winning their trust, the teachers should try to establish at least some rapport with them for opening the dialogue. The author is remindful of the event how the girls belonging to NSS unit of his college tried to win the trust of the young daughter-in laws of a Haryana village by teaching them the recipe of punjabi dishes liked by their husbands serving in the army.
2. **Seeking proper motivation of the learner:** Once a reasonable rapport is established, the next technique to be employed in the case of adult learners is to motivate them to one or the other type of learning. The adult's learning is usually problem centered and they seek purpose behind any venture of learning. It is, therefore essential that both these issues, i.e., problem centeredness and purposefulness, should be well utilised for motivating them towards learning. How the task of learning in hand will help them to come out from their felt problem or what benefits they may draw from the proposed learning should be clearly brought into their notice for capturing as well maintaining their interest in learning. However, whatever may be in the line of a teacher's teaching, he should invariably explain to the adult learners, the reasons of teaching those things or he should plan and decide only what is helpful to them in solving their immediate problem or serving their immediate purpose.

3. Proper pre-preparation on the part of teachers:

Teachers should take care that they are going to teach/train the mature and experienced ones instead of the young, inexperienced and immature beings. Therefore, they should try to seek perfection and have thorough pre-preparation before facing the adults as learners. They should have full command over the subject matter to be delivered, skills to be mastered and applications to be demonstrated to the learners. In no case, they should betray the confidence of their learners and always try to make them believe that they know quite more and better than them in one or the other learning areas.

4. Utilisation of appropriate methods and approaches:

Andragogy properly argues and suggests that the teacher should try to adopt the suitable approach and methods for the teaching–learning of the adult and mature learners in the manner outlined below:

- Adopt learner centered, problem centered and task-oriented approach in place of teacher-centered subject centered and examination/evaluation/result oriented approach.
- Arrange the teaching–learning activities at the understanding and *reflective level* instead of *memory level*.
- Try to give due weightage to the experience and previous background of the learners for planning, organising and sharing needed learning experiences with the adult learners.
- Try to seek full involvement and participation of the learners in the teaching–learning activities well in tune with their previous knowledge, abilities, skills, interests and attitudes.
- Make use of appropriate methods, means and devices for the instruction while focusing more on the process and less on the content being taught. The adoption of methods and strategies like discussion, problem solving, case studies role

playing, simulations and self-evaluation, etc. may prove quite useful and fruitful in the teaching-learning of adults.

- Do not try to impose your instructions on the adult learners. Since adults are self-directed, instructions should allow learners to discover things and knowledge for themselves without depending on others. As teacher or instructor provides your learners, guidance and help when it is needed by them or they commit mistakes in their learning path.

SUMMARY

1. Pedagogy is best defined as the science of teaching. As a result, anything that helps the teachers in the task of teaching much in the same way as science does in performing the day-to-day tasks may be fully entitled to be named as *pedagogy* (science of teaching). Elaborating further, the methods, devices, strategies, aids and equipments, maxims and principles used by a teacher in his teaching, all may fall in the domain of *pedagogy* or science of teaching if these can help him in the task of teaching in the way as science does in doing other tasks related to his day to day life.
2. While the term *pedagogy* as *the science of teaching* may be used for the teaching–learning of all types of learners with no discrimination such as age or stage of education, the term *andragogy* is confined to be used as the *science of teaching* in the field of adult education. Historically, the use of the term *andragogy* in the field of adult learning owes its origin to the thinker Malcolm Shepherd Knowles who proposed that adults' learning is not the same as children's learning and, therefore its science of teaching should essentially differ from children and adolescent's science of teaching (*pedagogy*).
3. Regarding the observance of the basic principles for the teaching–learning of the adults (*andragogy*), Knowles has laid down those as (i) principle of involvement of the learner, (ii) principle of experiential learning, (iii) principle of relevance and purposefulness, and (iv) principle of problem-centeredness.
4. Adults need to be taught on a different footing from that for the children by making use of some special techniques and means like (i) establishment of proper rapport, (ii) seeking proper motivation of the learner, (iii) proper pre-preparation on the part of teachers, and (iv) utilisation of appropriate methods for the teaching of adults by adopting the learner

centered, problem centered and task-oriented approaches in place of the teacher-centered, subject-centered and examination/evaluation/result oriented approaches generally used in the teaching–learning of school children.

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Role of Teacher in a Teaching–Learning Context

INTRODUCTION

The teaching–learning process in its variety of ways and situations always stands for helping the learners in their learning tasks and contributing towards the development of their abilities and capacities. A teacher occupies quite a key place and plays a substantial role in the realisation of teaching–learning objectives in one or the other teaching–learning situation. Although, in all the teaching–learning situations his goal to help the students in their learning and development is the same, yet the ways and means adopted and the nature of role played may differ from situation to situation. As a result, the teachers may be found to play different roles depending upon the needs of the teaching–learning situations and their own styles of teaching. With the changed scenario in the teaching–learning areas, it has become quite essential for the teachers to resort to techniques and strategies of teaching other than involving direct transmission of knowledge and skills. Thus, now he has to play many other roles besides the transmission of knowledge to his students. In this chapter, we would like to throw light on the different types of roles usually played by the teachers in the changed scenario of a teaching–learning context (Figure 26.1).

ROLE OF TEACHER AS TRANSMITTER OF KNOWLEDGE

In playing such role, a teacher may be found to focus on direct transmission of knowledge to the students by making use of the direct methods and strategies of teaching like lecture, demonstration, narration, exposition, explanation, illustration, description, etc. The basic assumptions lying in the minds of the teacher while resorting to such role may be listed as follows:

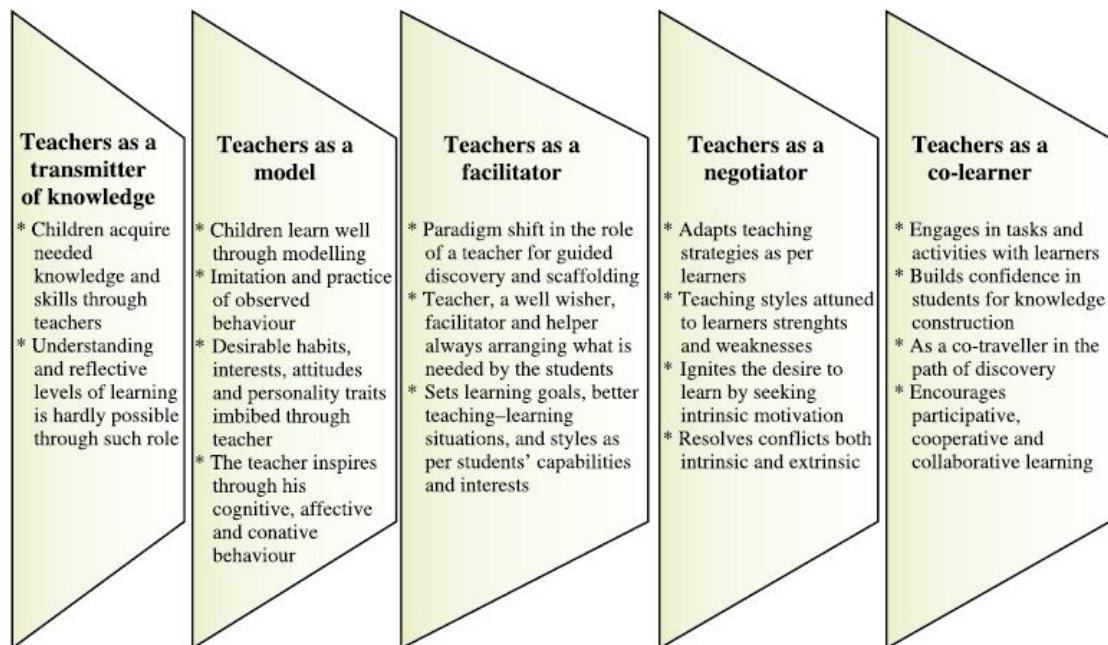


Figure 26.1 Various roles of a teacher.

- Children cannot acquire knowledge or skills through their own efforts. Needed knowledge and skills should be imparted to them by the teachers.
- Knowledge and skills should be directly told and demonstrated to the children with the use of direct methods like lecture or demonstration.
- There is too much that needs to be known to the children. The knowledge of the contents regarding their curriculum can only be infused through direct transmission of knowledge to them.
- Children can learn well when knowledge and skills are

transmitted directly by the elders/teachers to them.

With such assumptions, teachers then try to equip them with the needed knowledge and information regarding their subjects of teaching and then try to pour the knowledge into the minds of the students by adopting purely a teacher and subject centered approach. They transmit the knowledge and information and expect students to listen and watch, grasp the delivered contents, memorise and reproduce that in the manner transmitted to them on the part of teacher. It is purely a knowledge level of teaching–learning. Knowledge is transmitted by the teacher, received by the students, kept in their memory and reproduced at the time of assessment and examination. The understanding and reflective level of learning on the part of the students, thus can hardly be possible with the adoption of the role of a transmitter on the part of teacher in the ongoing teaching–learning situation.

ROLE OF TEACHER AS A MODEL

In such a role, teachers are found to act as a role model for being observed, and imitated on the part of their students for the required learning and modification in their behaviour.

The famous psychologist Bandura (1973), through his theory of social learning, has proposed that children learn well when they are given opportunity to learn through modelling, i.e. when they happen to observe the behaviour of their role model and begin to imitate and practice the observed behaviour. A teacher, thus in his role as a model, may provide needed opportunities to his students to learn the desired behaviours being modelled by the teacher. A number of desired habits, interests, attitudes and likewise personality traits, thus may be imbibed by the students well with the inspirational role of the teacher as model. Encouraging results are also received in the skill acquisition area. The model behaviour and actions of the teachers are properly imitated by the students in many of the skilled areas such as games and sports, performance in laboratory work, home science classes, arts and crafts, dance, dramatic activities, art and painting, etc. Much of what we know as problem solving ability may also be witnessed more in the students who carefully observe the problem solving behaviour of their elders, particularly the teachers. In this way, a teacher through his *role playing* model may help the students in learning and imbibing so many desired things in their behaviour, consciously or unconsciously, in a variety of ways. However, in such a role playing situation the teacher always remains in a dominant position, and, thus invariably the approach involved in this type of teaching–learning is absolutely a teacher centred approach. Through his unique specific position in the eyes of the students, a teacher's behaviour and actions related to cognitive, conative and psychomotor domains, always remains a thing to be closely watched and imitated by the students. In such a role, the teacher always needs to be quite conscious about his behaviour and actions. He should not do, say or demonstrate in his behaviour anything negative and harmful for the proper learning and development of the students. What he does not intend to see in the

behaviour and action of his students should not also be visible in his day to day usual behaviour.

ROLE OF TEACHER AS FACILITATOR

In such a role, teacher neither demonstrates his ability and strength by playing the role of a knowledge transmitter nor imposes his personality, behaviour and actions as a model for the keen observation and imitation on the part of his students. From a dominating position, he switches over his role to a well wisher, facilitator and helper, always standing by his students for arranging what is needed by them in their tasks of learning and development. The students themselves have to learn and make efforts from their side. No direct instruction or demonstration is available from the teacher's side. However, the path of their learning or imbibing desired behaviours get smoothened and facilitated with the total commitment of the teacher for the learning and development of his students. As a facilitator, he has to help them in setting their learning goals, arranging better teaching-learning situations, selecting appropriate learning styles, using appropriate devices, aids and equipments much in tune with their own capacities, and potential for learning and striving. He is there to guide their path and assist them in their learning. In no case he takes the driver seat and owes the whole responsibility of making them to learn what he thinks better for them as happens in the case of his playing the roles of knowledge transmitter and role model.

Actually there is a total paradigm shift in the scene where teacher is supposed to play the role of a facilitator instead of transmitting the knowledge or personalising his figure as a model. Here, cognitivism and constructivism emerge in the teaching-learning scene in place of the traditional behaviouristic perspective. The child centered approach takes the front seat leaving behind the teacher and subject centred approaches. The responsibility of learning is to be owned by the learner himself. He has to know, discover and construct the knowledge he needs or aims at with his own efforts. However, in doing so he may need timely assistance, guidance and help from the teacher. He wants the needed facilities, aids and equipments and necessary enlightenment for his learning path and it is here where the teacher may come to help him in his knowledge constructional task in the capacity of a facilitator, guide and helper. The role of the

facilitator played by the teacher, thus may result in guided discovery as proposed by Jerome Bruner in his guided discovery approach and scaffolding as suggested by Lev Vygotsky in his social constructionist learning.

ROLE OF TEACHER AS NEGOTIATOR

In such a role, a teacher's teaching and activities settle down in a negotiable, compromising and flexible position standing between teacher centred and student centered approach depending upon the need of the teaching–learning situations and the strengths and limitations of the learners. In fact, in playing such role in his teaching and teacher behaviour, a teacher tries to strike a golden mean between what a learner wants in terms of his learning and behaving and what is desirable in the eyes of the teacher for the proper learning and development of the student. In doing so, he tries to play the role of a true negotiator who knows the art and skill of helping both the parties in conflict, to arrive in a win-win situation. In playing the role of a negotiator, a teacher, thus tries to seek a proper negotiating state between him and the learner conducive to better learning and development of the learner as illustrated below:

- i. Teacher may try to adapt his teaching style in tune with the learning needs, strengths and limitations, interest and aspirations, and desires and wishes of the learners.
- ii. Teacher may organise the teaching–learning environment, methods and strategies of teaching, aids and equipments, time and schedule, etc. as per need and convenience of the students without sacrificing the necessary efforts to be done for the proper learning and development of the learners.
- iii. Teacher may try to make the students realise the need and importance of learning and efforts for their proper development and help them in seeking proper intrinsic motivation without sacrificing the inner call of their conscious, interests and likings for one or the other types of learning.

In addition to playing his role as negotiator as illustrated above, a teacher may also exercise his negotiating skill in resolving the conflicts arising between and among the students of his class or

group. He needs to study the frustrations and grievances of both the parties in conflict before making attempts for resolving their conflicts. In the light of such feedback he should try to help them in giving up their negative feelings, doubts and misgiving about each other the best way is to arrange a proper situation for a dialogue and communication between them to explain their respective position and then try to arrive a win-win situation for both without hurting their ego and self-identity and working together in their common interest.

ROLE OF TEACHER AS A CO-LEARNER

In such role playing, a teacher may be found to get himself engaged in the tasks and activities related to learning well in the capacity of a co-learner along with his students by giving up his ego and traditional authority as a teacher. In such a position, it is possible for the teachers to win the confidence and cooperation of the students for getting them fully involved in the ongoing teaching–learning process in the proper lime light of the following saying:

Tell them, they will forget. Show them, they will remember. Involve them, they will learn.

In fact, such role playing on the part of teacher fulfils the requirements needed for playing a proper role on the part of teachers in a constructive paradigm making students learn and construct their knowledge on their own with their efforts. The teacher, here remains in a position to convince the learner that he is with him in the journey of his learning as a co-traveller. In this connection, the things as below may prove quite fruitful for a teacher in playing the role of a co-learner in a proper way.

1. At the introductory stage of teaching a topic related to his subject, a teacher should always conclude the introduction of his topic by declaring *Well students, we will be studying about . . . (topic) or try to learn or know about . . . (topic)*. By declaring the objective of the current teaching–learning task in such a way, he will be in a position to convince or convey that he will be a co-traveller in the learning journey aimed to know and learn about the topic in hand.
2. While resorting to such role playing, a teacher should essentially remind himself that his goal is not to show his students how much he knows but to inspire, encourage and allow his students to show him how much they know.
3. Instead of telling or demonstrating about the knowledge and skill gaining related to the topic of the study by themselves through direct instruction—lecture or demonstration, they should try to work for providing the

students, full opportunity to know, discover and construct the knowledge related to the topic with their own attempts. In this venture, for playing the role of a co-learner, he should always insist, true, *we do not know much about this topic but let us work together for knowing what it is in its appropriate way.*

4. As a co-learner (but at the same time enjoying a leadership position due to his status) the teacher, here should always strive to give his students the necessary confidence and learning tools needed by them for the discovery or knowledge construction related to the topic. However, in doing so, he should keep reminding the students that he does not have all the answers for them, but he is with them to work together for knowing all related to the topic in hand.
5. Teachers should remember that these are the students who need to learn about the concerned topic, seek answers to the raised curiosity and apply the skills at the time of need. Therefore, they should be given opportunity to know and learn by themselves by owning the full responsibility for their learning. But since they are novel and novice in this discovery path, they may need a knowledgeable co-traveller in the path of their learning journey, and here the teachers are needed to play a role of a true co-traveller for jointly sharing the quest for knowledge, understanding and application of the topic in hand.
6. As a co-learner, when needed so they may often play the part of a more knowledgeable peer, or a wise leader for guiding and illuminating the learning path of the journey. They should however tell and guide only what is urgently and essentially needed in a teaching–learning situation and not snatch the opportunity of knowing and discovering the things with their own attempts by remembering that they are along with the students in their learning journey as a co-learner and not at all in the capacity of knowledge transmitter or role model.
7. For providing better platform and opportunities for playing the role of a co-learner, teachers should try to encourage

the use of such teaching–learning strategies, methods and devices that encourage participating, cooperative and collaborating learning as well as constructivist learning with independent efforts. The use of problem solving method, heuristic method, project method, assignment method, collaborative approach, seminar and group discussion strategies, brain storming strategy, inductive thinking or teaching model, etc. may prove quite beneficial for a teacher to play the role of a co-learner in one or the other teaching–learning situations in an effective way.

SUMMARY

1. Teachers have to play a variety of roles, such as transmitter of knowledge, role model, facilitator, negotiator, and co-learner for helping and guiding their students on their learning path depending upon the need of the teaching–learning situations.
2. In playing his role as transmitter of knowledge, a teacher may be found to focus on direct transmission of the needed knowledge to the students by making use of the direct methods and strategies of teaching like lecture, demonstration, narration, exposition, explanation, illustration, description, etc. Here, the students remain quite passive and get only what is transmitted to them by their teacher in his knowledge transmission role. The teaching–learning task here is carried out purely on the memory level footing.
3. The task of playing the role as a model on the part of a teacher is based on the *theory of social learning* propagated by Albert Bandura. In such a role playing act, teachers are, thus found to act as a role model for being observed, and imitated on the part of the students resulting in the required learning and modification in their behaviour. Through his unique specific position in the eyes of the students, a teacher's behaviour and actions related to cognitive, conative and psychomotor domains always remains a thing to be closely watched and imitated at the hands of the students and as a result, the teacher's role as a model may prove quite beneficial to the learning and development of the students. However, in such a role playing situation the teacher always remains in a dominant position, and thus invariably, the approach involved in this type of teaching–learning is absolutely a teacher centred approach much like the teacher's role as transmitter of knowledge.
4. In playing his role as a facilitator, a teacher may be found to switch over his role from a dominating and authoritative position to a well wisher, facilitator and helper always

standing by his students for arranging what is needed by them in their tasks of learning and development. The students themselves have to learn and make efforts from their side. No direct instruction or demonstration is available from the teacher's side. However, with the total commitment of the teacher for the learning and development of his students, he is always there for facilitating their learning and development path. As a facilitator he may thus be seen to help them in setting their learning goals, arranging better teaching-learning situations, selecting appropriate learning styles, using appropriate devices, aids and equipments much in tune with their own capacities, and potential for learning and striving.

5. In playing the role as a negotiator, teacher's teaching and activities settle down in a negotiable, compromising and flexible position standing between teacher centred and student centered approach depending upon the need of the teaching-learning situations and the strengths and limitations of the learners. In fact, in playing such role in his teaching and teacher behaviour, a teacher tries to strike a golden mean between what a learner wants in terms of his learning and behaving and what is desirable in the eyes of the teacher for the proper learning and development of the student. As a result, he may be found to seek desirable negotiation or compromise in the fixation of learning objectives, curriculum transaction, methods of teaching and learning, organisation of learning environment and evaluation modes, etc. in the interest of his learners.
6. In his role playing as a co-learner, a teacher may be found to get himself engaged in the tasks and activities related to learning well in the capacity of a co-learner along with his students by giving up his ego and traditional authority as a teacher. By travelling along with the students in their learning journey as a co-learner, it is possible for the teachers to win the confidence and cooperation of the students for getting them fully involved in the ongoing teaching-learning process. In this pursuit, here he may himself realise the

needs and difficulties of the students in the realisation of their learning goals and may suggest them to face the situation in a proper way by working along with them. However, as a co-learner he should never try to impose his position as a knowledge transmitter or role model but impress up on them that he is also with them as a co-learner for doing away with the hurdles on the learning path.

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Teaching Effectiveness and Effective Teachers

INTRODUCTION

It is no denying of the fact that teachers play a quite decisive role in any scheme of education. If destiny of a country is said to be shaped through the type of education to its children, then the actual destiny maker is the teacher. The child is turned into a social being, a good citizen capable of contributing a lot to his society and humanity at large through the unmatched efforts of his teacher. However, it can only be possible through the teaching responsibilities properly shared by the capable and efficient teachers designated as effective teachers in broad sense. While good and effective teachers may prove a boon to the welfare of the children and society, the poor and ineffective teachers may create havoc and darken the future of the youngsters in their charge. It is, therefore quite essential to have efficient and effective teachers in our schools for sharing their responsibilities as a capable teacher. The effective teachers and their teaching may prove a model for others to bring desired modification in their teacher behaviour and teaching. Through a careful study and analysis of some well identified effective teachers, we may also be able to know the goodness in them in their teaching and the some may work as a light house for illuminating the path of the *would be teachers* for turning them as a capable teachers. With this objective, in this chapter, we would like to deal with the issues like *effective teachers*, *effectiveness of their teaching*, the case study of the effective teachers and their teaching. Let us begin by considering—who are effective teachers, and what is that which is called teacher effectiveness or teaching effectiveness?

WHO ARE EFFECTIVE TEACHERS AND WHAT IS TEACHING EFFECTIVENESS?

The identification and judgement about the effectiveness of a teacher essentially rests on the quality of his roles played as a teacher, i.e. the extent to which he may be adjudged as good or poor in fulfilling his duty and obligations as a teacher. Here the question may arise what should be the criteria for passing judgement over the effectiveness of a teacher or in other words what are the things that may help us in evaluating teachers as *effective teachers* and their teaching as *effective teaching*.

While considering on this issue, *The Encyclopedia of Education* (1971, pp. 1482–84) has tried to classify the criterion of *teacher effectiveness* or *teaching effectiveness*, the scales or measures to rank a teacher as *effective teacher* and their teaching as *effective teaching* into the following three categories:

- i. **Product criteria:** The results or outcomes of the teachers' efforts measured through the gains achieved in terms of growth and development or changes in the behaviour of the students. It means that the outcomes or the net results of the students evaluation may be made a yardstick for the evaluation of teacher effectiveness.
- ii. **Process criteria:** In view of this criteria, the judgement over the effectiveness of a teacher or his teaching should be passed in consideration of the quality of his efforts made for the realisation of the set teaching–learning objectives irrespective of the products, i.e. student gains, student growth or changes. This criteria rests on the very assumption that the process employed or the efforts made are more substantial and important than the outcomes or the results achieved. Therefore, what goes at the time of ongoing teaching–learning process in terms of the typical situations involving classroom conditions and interaction of

students and teachers and the teaching competencies and skills demonstrated by a teacher, thus may be adjudged as the scale or measure for teacher or teaching effectiveness.

- iii. **Presage criteria:** The criteria neither tries to evaluate the ends of the teaching–learning process (like product criteria), nor lays emphasis on the nature of the means (like process criteria) for the determination of teacher/teaching effectiveness. On the other hand, it tries to focus on the evaluation of the total make up, nature, qualities and characteristics of that very source (the teacher), who is responsible for carrying out both the means and the ends through his own efforts. It may involve the factors like personality attributes of teachers, number of years of experience, academic and professional qualification, aptitude for teaching, interest and attitude towards teaching, personal and professional adjustment, knowledge of the subject, growth in basic skills of students taught, job satisfaction, etc.

MEASURES TO IDENTIFY EFFECTIVE TEACHERS

The criterion discussed above in the name of product, process and presage variables may thus form the backbone of taking decision about the methods and techniques employed for identifying effective teachers. In general, one can make use of the methods and techniques for this purpose as mentioned below:

1. The results of the house tests, monthly, terminal and annual examinations of the school, board and other accreditation agencies showing academic achievements of the students taught by the teachers.
2. The results of the performance shown by the students in sports, constructive and creative activities, curricular and other fields attributable to the efforts made by the teachers.
3. The change in attitude, interests, philosophy of life as well as overall growth and development in the personality of students measured through special means and devices in terms of behavioural changes brought by the efforts and influences of the particular teachers.
4. The measurement or assessment of the adjustment level of the teachers through adjustment inventories or tool so constructed and standardised for this purpose like Mangal's Teacher Adjustment Inventory published by National Psychological Corporation, Agra.
5. The measurement or assessment of the teacher effectiveness by employing standardised tool like Teacher effectiveness scale developed by Umme, Kulsum (Bangalore) and the other Teacher Effectiveness scale developed by Pramod Kumar and D.N. Mutha (Vallabh Vidyanagar, Gujarat).
6. The use of the properly constructed rating scales for rating the overall performance, teacher behaviour and personality characteristics of the teacher by the teachers themselves, their colleagues, head of the institutions, supervisors and

students, etc.

7. The use of the questionnaire, inventory etc., for collecting information about the product, process and presage variables of the teacher effectiveness from teachers themselves, their colleagues, students and heads of the institutions, supervisors, etc.
8. The information received through self-assessment or appraisal proforma filled in by teachers themselves.
9. The record of the inspection committee and other day-to-day supervision work.
10. The overall impressions, likings and dislikings expressed by the students about their teachers in terms of their respective personality characteristics and teacher behaviour.
11. The assessment of the teaching competency by employing proper tools and techniques like teaching competency scale developed by B.K. Passi and Lalita (Indore).
12. The observation and assessment of the teacher's classroom behaviour through special techniques such as Flanders' interaction analysis technique.
13. To make use of the personality characteristics of the good and effective teachers established through researches for the evaluation work.

Each one of the methods and techniques listed above for the identification of effective teachers in terms of product, process and presage variables has their own strengths and weaknesses. For taking a comprehensive picture of the teacher effectiveness, therefore we must try to employ as many methods and techniques practically employable and useful in a given situation.

CASE ANALYSIS/STUDY OF THE BEHAVIOUR AND TEACHING OF EFFECTIVE TEACHERS

Once we identify some teachers as effective teachers on the basis of assessment made about their teacher/teaching effectiveness, we can then proceed for the task of case analysis, i.e. performing case studies by taking each of the identified effective teacher as a case in himself. An appropriate proforma may be developed for carrying out such case analysis of the identified effective teachers. Such proforma may consist of a number of specific heads as below for collecting relevant information about the teaching or teacher effectiveness of the case under study.

1. **Identifying data:** It may help in providing personal identifying data about the effective teacher such as name, sex, residential address, name of the school, subjects of his teaching, date of birth, date of appointment in the school, length of the service (in the present as well as previous schools), etc. caste, race, religion and socio-economic background.
2. **Personality traits data:** It may contain data regarding his physical and mental health, scores on social, and emotional maturity scales, interests, aptitudes, attitudes, IQ and EQ measures, scores on personality measurement and adjustment assessment inventories, leadership scale, etc.
3. **Educational and professional qualifications data:** It may contain data regarding teachers academic and professional qualifications and background by specifying his specialisation or distinction in one or the other academic areas, professional preparation and achievements. It may reflect level of his expertisation in the subjects of his teaching in the form of academic and professional competency, teaching experience, professional development etc.
4. **Student's achievements or performances data:** It may contain information about the end results or outcomes of

the teaching and guiding efforts of the teacher. The subjects taught, pass percentage of the students in the subjects taught, merit positions earned in the scholastic and non-scholastic areas related with the efforts of teacher, may be highlighted through such data. We may have such information for a few years ranging from three to five.

5. **Teacher or teaching effectiveness measure data:** It may contain data obtained through the administration of the available measures of teaching/teacher effectiveness, teacher/teaching competency, teacher adjustment etc.
6. **Data related to evaluation done by others and the self:** It may contain the information available through the evaluation of the teacher and teaching effectiveness by other persons asked to do so or are supposed to assess the effectiveness of the teacher in routine. It may generally consist of the following:
 - i. Ratings on teacher or teaching effectiveness scales at the hands of colleagues, head of the institution and students.
 - ii. Opinions expressed about teacher (his behaviour and teaching) in interview or through responding to a questionnaire by colleagues, community people and parents, head of the institution and students.
 - iii. Teacher's annual or periodical assessment by head of the institution or other higher authorities, reports of the inspection committee etc.
 - iv. Self-evaluation or assessment at the hands of the teacher himself.
7. **Data reflecting qualitative aspects of teaching and teacher behaviour:** It may contain information of the nature outlined below:
 - i. Time and efforts devoted to self-study and preparation for classroom teaching.
 - ii. Record of punctuality observed in taking classes and other work related to welfare of the students.
 - iii. The information and assessment available about the quality of classroom interaction, class control and

management, home work, drill work and project work assigned supervised and guided by the teacher and success in winning cooperation of the students.

- iv. The nature and quality of the role played by the teacher as transmitter of knowledge, model, reflective practitioner, guide, negotiator and facilitator.
- v. The nature of the honesty, objectivity, impartiality and fairness shown in his behaviour in dealing and interacting with the students.

THE INTERPRETATION OF DATA AND USE OF THE FINDINGS

We can go for the case analysis or study of the teaching and teacher behaviour of the effective teachers by collecting relevant information through the use of a proforma specifying the heads discussed above. The collected information is then subjected to close scrutiny and examination for its proper interpretation. With the help of such interpretation a number of useful conclusions may be drawn and these may be used as an eye opener or guiding factors for helping others to become effective teachers. The conclusions reached or finding of the case analysis/study of the teaching and teacher behaviour of the effective teachers may help us in finding the answers related to the issues such as:

- i. Is there any significant relationship between teacher or teaching effectiveness and socio-economic status/caste/sex, colour/religion/rural-urban background of the teacher?
- ii. In what way do personality traits influence the teaching or teacher effectiveness?
- iii. What type of relationship does exist between one's educational and professional qualifications or back ground and teaching effectiveness?
- iv. How far may the end results or pass percentages of students be utilised for deciding about the teacher/teaching effectiveness?
- v. How far is the goodness and effectiveness of a teacher well recognised and accepted by his colleagues/senior officials/parents/community people/students?
- vi. How far is one able to know his strengths and weaknesses in terms of effectiveness of his teaching?

SUMMARY

In terms of its word meaning, the term *effective teachers* stands for the teachers who are equipped with a unique characteristic known as *teaching effectiveness* in their functioning and behaving as teachers. Going further, we may find that the identification and judgement about the teaching effectiveness (effectiveness of a teacher) essentially rests on the quality of his roles played as a teacher, i.e. the extent to which he may be adjudged as good or poor in fulfilling his duty and obligations as a teacher.

The *teaching effectiveness* of the teachers may be measured by employing the criteria such as (i) product criteria, (ii) process criteria, and (iii) presage criteria.

In following product criteria for measuring the effectiveness of teachers, we try to pay consideration to the resulting learning outcomes of the students, i.e. attainment of marks by the students in the public examinations. In adopting process criteria for measuring teaching effectiveness of a teacher, we pay consideration to the quality of his efforts made for the realisation of the set teaching–learning objectives irrespective of the products, i.e. student gains, student growth or changes. In the adoption of presage criteria, we pay consideration to the evaluation of the total make up, nature, qualities and characteristics of the teachers who are responsible for the processes and outcomes of the teaching–learning.

After making judgment about the *teaching effectiveness* of a teacher on the basis of the said three criteria, we can further consolidate the task by having an adequate case study of the concerned teacher. The proforma used for collecting relevant information in this regard may consist of the heads like (i) personal identifying data, (ii) personality traits data, (iii) educational and professional qualifications data, (iv) student's achievements or performances data, (v) teacher or teaching effectiveness measure data, (vi) data related to evaluation done by others and the self.

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Teaching Profession and Professional Ethics

CONCEPT OF PROFESSION

In their search and attempts for earning the livelihood and leading a comfortable life people get engaged in various types of work activities. According to the nature of their work, they are designated as farmers, carpenters, contractors, builders, lawyers, doctors, shopkeepers, industrialists, teachers, chartered accountants (CA), etc. It is however interesting to note that while most of the work activities adopted by the people in general are classified and designated as vocations or occupations, a few one's such as associated with lawyer's (legal practice), doctors (medical practice) and teachers (teaching), are designated as profession. Why is it such distinction in their designation? What makes the doctors, lawyers, and teachers to be called professionals and their work activity as profession in place of occupation or vocation? Let us think about it.

As a matter of definition according to Business dictionary.com (a dictionary available on line), a profession may be defined as an occupation, practice or vocation requiring mastery of a complex set of knowledge and skills through formal education and/or practical experience. Every organised profession (accounting, law, medicine etc.) is governed by its respective professional body.

In the light of this definition, we may come to the conclusion that the work activities or occupations like law, medicine, accounting and teaching are designated as profession only because they have the distinctions that:

- i. The people adopting these professions can engage in professional practice or enter into the respective profession only when they have gone through a formal professional pre-preparation program besides going through a required

experience/training period for earning a license or permission for doing their job as a specified professional. Doctors, lawyers, teachers and chartered accountants, etc. all may be found to fulfill this condition/criterion for making themselves enter into their professional field.

- ii. They enjoy the privilege of having an organised professional body such as All India Medical Association, All India Chartered Accountant Association, All India Lawyers Association and All India Association or Federations of Secondary School Teachers.

In addition to the above two conditions or criteria met by the professionals like doctors, lawyers, CAs and teachers, these professionals are also found to fulfill some other conditions or criteria for allowing their entry and keeping them well in their respective professions such as:

1. **Responsibility and accountability:** Every profession has to fulfill great responsibilities towards their clients, the people or masses it serves. Any type of carelessness, unpreparedness or breach of ethics would be significantly damaging to the client and/or his fortunes. It is in this sense that every professional must be made necessarily accountable for the quality of the service rendered to its clients.
2. **Autonomy:** A profession for doing justice to the work done by it must provide reasonable professional freedom to the practitioners. It is why professionals are found to enjoy the respective professional freedom and autonomy in exercising their responsibilities and fulfilling their obligations towards their clients in a desired way.
3. **Direct working relationships:** A profession is characterised by working environment where the concerned professionals habitually work directly with their clients rather than depending upon intermediaries or brokers.

4. **Ethical constraints:** Every profession for its proper working as well as for the enforcement of accountability on its members, is bound to a code of conduct or ethics specific to the distinct profession. A professional is essentially required to follow its professional code of conduct or ethics.

TEACHING AS A PROFESSION

We define teaching as a work done or responsibility exercised by the professionals called teachers for helping their clients (students) in their learning and development. Teaching, thus as a specialised job requires on the part of the service providers (teachers) to make use of their expertise (knowledge, skills and other attributes) for providing needed service to their clients (students) resulting in their proper learning and actualisation of potentialities. Now the question arises whether the work done by a teacher with their students may be called simply an occupation or it deserves to be termed as a profession? Let us see how teaching is eligible to be called as a profession and teachers are entitled to be designated as professionals. Do they fulfill the criteria of getting them designated as professionals? Certainly they do as may be revealed through the discussion carried out below:

1. **Possession of necessary academic and professional qualifications:** A teacher is required to go through a specific academic course such as at least earning a graduation in arts, science or commerce faculty along with a teacher education/training course such as B.Ed. for being employed as a secondary school teacher. In addition, like other professionals he is also supposed to go through for the necessary in-service teacher education programs from time to time for his needed professional growth and development as happens with other professions like medicine, legal practice etc. In this way, a teacher may be found to meet the criteria of possessing required knowledge, skills and other attributes necessary for functioning as a responsible professional.
2. **Presence of a professional organisation:** Teaching profession possesses well organised professional organisations for almost all stages of school and college education such as All India Association of Primary/Secondary School teachers, All India Association of College/University Teachers. Such organisations or

professional bodies also exist at the state level. As a member of such organisation, a teacher then may get enough scope for his professional growth besides having a body as a watch dog for maintaining ethical standard of the profession.

3. **Responsibility, obligations and accountability:** Teaching profession is known for its obligations towards the students and community. A teacher is designated as a true well-wisher and promoter of the students' well-being besides being called as a destiny maker of the society or nation. A teacher's responsibilities and obligations towards the clients are, thus quite specialised in nature and he is fully accountable for his work and behaviour much like or even more than the other professionals.
4. **Autonomy of the profession:** Teachers are found to enjoy the necessary academic freedom and autonomy for carrying out their teaching tasks and developmental activities. Their students are highly dependent on them for their learning and development. All the necessary decision regarding the organisation of learning experiences, preparation and delivery of daily lessons, classroom teaching-learning, practice, drill and homework, project work daily assessment, etc. are all taken by the teachers in an autonomous way. As a clear witness of the autonomy enjoyed by the teacher, it is well said that once the teacher is in the classroom, it is totally his work to guide the path of the learners or implement a curriculum in his own way.
5. **Direct working relationship:** Teachers serve the welfare of their students (the main client) by remaining in direct contact with them. In fact, teaching is process that is characterised by a clear distinction of being performed only with a direct contact of the teacher with his taught without involving any media or contact agent. A true profession really needs such direct working relationship between the professional and his clients for exercising the needed professional duties and rendering appropriate professional services to the clients. A doctor can do welfare of the

patient only when he is able to cure him by having direct working relationship with him. The teaching in the same spirit, thus may be well designated as a profession because of its virtue to have direct working relationship with the clients.

6. **Professional standard and code of conduct:** There is a full scope of maintaining necessary professional standard and implement a code of conduct in the teaching profession. Teaching profession strictly demands from the teachers to maintain a high ethical standard in terms of exercising their responsibilities towards students and the society. They are expected to demonstrate an exemplary behaviour and ethical model to their students and the society by observing a code of conduct enforced by their professional organisation.

In the light of the above features and characteristics, we may very well conclude that teaching has everything for being designated as a profession. Rather, it has a quite unique stand among the existing professions as being called a quite noble profession dedicated to the welfare of the future citizens and the society.

PROFESSIONAL ETHICS FOR TEACHERS

As discussed earlier, teachers as professional have to exercise a big responsibility of shaping the future of the youngsters as well as the society. The task is too serious that which demands proper accountability from them. Here the question may arise, how the needed accountability in the work for the teachers should be enforced. In general, there may be two modes for the enforcement of such accountability—one moral and the other legal.

We can observe the legal aspects of the accountability enforced in other professions or walks of life. A doctor or a nursing home found to be negligent in its duties may be subjected to legal punishment for maintaining a level of accountability in medical profession. Similarly, a businessmen, auditor, contractor, lawyer may be held responsible or accountable for its lapses and some or the other kinds of punitive measures may be taken for maintaining a level of accountability in their professions. However, such type of legal accountability is not at all tenable in the context of teaching profession or system of school or higher education. School is not a factory and teachers are not the factory workers. A real accountability in the system of school education can come only from within and this can become possible only when teachers themselves realise the need of following some code of professional ethics prescribed for them by their professional organisation or body. For the benefit of teachers we are hereby reproducing a code of professional ethics for teachers evolved by All India Federation of Primary and Secondary School Teacher's Associations and a group of educationists in a series of workshops facilitated by the NCERT.

Code of Professional Ethics for Teachers

It is universally felt that the status of teaching profession requires to be raised to ensure its dignity and integrity. Accordingly, it is considered necessary that there should be a code of ethics which may be evolved by the teaching community itself for its guidance.

There are five major areas of professional activities which encompass the work of a teacher. For each of these areas, certain principles have been identified to serve as guidelines for teachers'

conduct. These are preceded by a Preamble which provides a rationale for the principles identified.

Preamble

- Recognising that every child has fundamental right to receive education of good quality.
- Recognising that education should be directed to all-round development of human personality.
- Realising the need for developing faith in the guiding principles of our polity viz, democracy, social justice and secularism.
- Recognising the need to promote through education, our rich cultural heritage, national consciousness, international understanding and world peace.
- Recognising that teachers, being part and parcel of the social milieu, share the needs and aspirations of the people.
- Recognising the need to organise teaching as a profession for which expert knowledge, specialised skills and dedication are pre-requisites.
- Realising that the community respect and support for the teaching community are dependent on the quality of teaching and teacher's proper attitudes towards teaching profession, and
- Realising the need for self-direction and self-discipline among members of the teaching community.

We, the teachers of India resolve to adopt this code of Professional Ethics.

Part – I **Teacher in Relation to Students**

The teacher shall,

1. always be punctual in attending to his duties in the school.
2. always teach the curriculum after making thorough

preparation for the lessons to be taught.

3. treat all students with love and affection and be just and impartial with all irrespective of caste, creed, sex, status, religion, language and place of birth.
4. guide the students in their physical, social, intellectual, emotional, moral and spiritual development.
5. take notice of the individual needs and differences among students in their socio-cultural background and adapt his teaching accordingly.
6. refrain from accepting remuneration for coaching or tutoring his own students except for remedial teaching under an approved scheme.
7. refrain from divulging confidential information about students except to those who are legitimately entitled to it.
8. refrain from inciting students against other students, teachers or administration.
9. set a standard of dress, speech and behaviour worthy of example to the students, and
10. respect basic human dignity of children while maintaining discipline in the school.

Part – II

Teacher in Relation to Parents/Guardians

The teacher shall,

11. seek to establish cordial relations with parents/guardians.
12. provide information regularly to parents regarding the attainments and shortfalls of their wards, and
13. refrain from doing anything which may undermine student's confidence in their parents or guardians.

Part – III

Teacher in Relation to Society and the Nation

The teacher shall,

14. strive to develop the educational institution as a community and human resources development centre providing knowledge and information and developing skills and

attitudes needed for such development.

15. strive to understand the social problems and take part in such activities as would be conducive to meet the challenges posed by the problems.
16. refrain from taking part in activities having potential to spread feeling of hatred or enmity among different communities, religious or linguistic groups.
17. work actively to strengthen national integration and spirit of togetherness and oneness.
18. respect Indian culture and develop positive attitudes towards it among students, and
19. respect and be loyal to the school, community, state and nation.

Part – IV

Teacher in Relation to Profession, Colleagues and other Professional Organisations

A. Teacher in Relation to Colleagues and Profession

The teacher shall,

20. treat other members of the profession in the same manner as he himself wishes to be treated.
21. refrain from lodging unsubstantiated allegations against colleagues or higher authorities.
22. participate in programmes of professional growth like in-service education and training, seminars, symposia, workshops, conferences, self-study, etc.
23. avoid making derogatory statements about colleagues especially in the presence of pupils, other teachers, officials or parents.
24. co-operate with the head of the institution and colleagues in and outside the institution in both curricular and co-curricular activities, and
25. accept as a professional and individual responsibility of reporting to the concerned authorities in an appropriate manner, all matters that are considered to be prejudicial to the interests of the students and the development of the

institutions.

B. Teacher in Relation to Professional Organisations

The teacher shall,

26. take membership of professional organisations treating it as a professional responsibility.
27. participate, as a matter of right, in the formulation of policies and programmes of professional organisations and contribute to their strength, unity and solidarity, and
28. always function within the framework of the constitution of the organisation concerned.

Part – V

Teacher in Relation to Management/Administration

The teacher shall,

29. recognise the management as the prime source of his sustainable development, and
30. develop mutual respect and trust through his professional activities and outputs.

Observance of the code

A true professional organisation regulates admission of its members, exerts control over them and fights against all odds to promote their welfare. It, thus represents unified voice of its members. The professional organisations of teachers should take on themselves the moral responsibility to safeguard all clauses of this code by ensuring their observance by the teachers. They should accept the responsibility to evolve a suitable mechanism for its enforcement.

In addition to the availability of a professional ethical code for the teachers developed by NCRET, another mentionable effort in this direction has been made by National Council of Teacher Education (NCTE). It has been provided in the Appendix of this text for the benefit of the teachers.

SUMMARY

1. The term *profession* stands for an occupation, practice or vocation requiring mastery of a complex set of knowledge and skills through formal education and/or practical experience. Every organised profession (teaching, accounting, law, medicine, etc.) is governed by its respective professional body.
2. Teaching is well designated as a profession and the teachers are called professionals due to the presence of the attributes like (i) they follow the norms of prescribed qualifications and pre-service training requirements for entering in to their services, (ii) there exist professional organisations or bodies for the teachers, (iii) teachers have to own specific obligations towards the students and community, (iv) teachers are found to enjoy the necessary academic freedom and autonomy is available to the teachers for carrying out their teaching tasks and development activities, (v) teachers while performing their teaching duty have a direct contact with their students without involving any media or contact agent, (vi) they are required to maintain the necessary professional standard and follow the code of conduct in exercising their duties.
3. Every profession needs the enforcement of a proper accountability on the part of its members regarding the performance of their duties in a proper way. In general, there may be two modes for the enforcement of such accountability—one moral and the other legal involving punitive course. The adoption of a legal course does not suit the nature of the teaching profession. A real accountability in the system of school education can come only from within and this can become possible only when teachers themselves realise the need of following some code of professional ethics prescribed for them by their professional organisation or body.
4. Code of conducts for the teachers at the various levels as

primary, secondary, college and university levels have been prepared by their respective organisations at the regional as well as national level. The preparation of these codes has also been undertaken by the department of the education of the respective states. On the national level, NCERT and NCTE have also done a quite commendable job in this direction. In laying down ethical norms for the teachers generally in the code of ethics, attention has been paid to point out what a teacher is supposed to do in the maintenance of proper relationship with his (i) students, (ii) parents/guardians, (iii) community, (iv) colleagues, (v) profession and professional bodies, and (vi) administration personnel and managing bodies of the school.

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Information and Communication Technology (ICT)

INTRODUCTION

Today we are living in such a knowledge based society, and knowledge based global world where knowledge is a great power, economy and strength of an individual and the asset of a nation. It is also true that there is tremendous explosion in its quality as well as its growth. We are in need of new technologies to have access to and proper use of this fast growing knowledge. Moreover, a mere acquisition of knowledge is not enough, we must have a complete access to and mastery over the knowledge getting process. It can happen only with the assistance of the science of information and communication technology. In the present chapter, we would be learning some essentials about the nature and use of Information and Communication Technology (shortly designated as ICT).

MEANING OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Experience is said to be a great teacher. This experience may be gained by the learner through direct and indirect means. The direct access to the source for gaining first-hand experience is neither always possible nor desirable. Consequently, most of our learning is based on second hand experiences in the form of information received by us about the objects, places, persons, ideas or events. This information provides a base for our knowledge and understanding about them and the environment surrounding them. For this purpose the learner must be able to learn the art of getting information, store and make its use as and when desired. Such type of activities concerning information are said to be the part and parcel of the science and technology known as the information technology. However, the use of such information as well as access to it, remains incomplete without the involvement of the art of communication. Communication as a two way process stands for the sharing of ideas, thoughts, beliefs and information with others. The mutual sharing between the source of information and receiver of the information, thus tend to add in the increase, understanding and use of information which ultimately help in building up knowledge. In this way, both information as well as communication are utmost needed in acquiring knowledge as well as getting involve in the knowledge acquiring process. Now in case we want to have efficiency and effectiveness in the activities related to information and communication, we will have to take help from the science and technology of information and communication better known as information and communication technology or ICT. In this way *information and communication technology is that type of technology employed in the shape of tools, equipments and application support which helps in the collection, storage, retrieval, use, transmission, manipulation and dissemination of information as accurately and efficiently as possible for the purpose of enriching the knowledge and developing communication, decision making as well as problem solving ability of the user.*

ORIGIN AND GROWTH OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Communicating as well as collecting information and using that for the specific purpose is as old as the human civilisation itself. In the absence of the means and tools for information and communication, the primitive way was to carryout them orally, store them in the memory and transmit them orally to the user. In this way, invention of paper and ink must be regarded as the first breakthrough in the field of information and communication technology (ICT). The other scientific inventions which provided better means for this purpose may be named as movable type (invented by Gutenberg in 1438 A.D. in Germany). Print media has also helped a lot in the development of ICT. The advanced technological development, helping in the task of ICT may be outlined as below:

- Photography in 1849 by a Frenchman L.G.M. Daguerre and an Englishman W.H.R Talbot.
- Photostat in 1900, by Professor Abbe Rene Graffin of France.
- Xerography invented in 1938 by Chester F. Carlson of U.S.A.
- Micrography (obtaining copies of the recorded material in highly reduced format) invented in 1940 by an Englishman J.B. Dancer and Frechman Rene Dagan.
- Laser technology used for printing and memory device in 1960 by Theodore Maiman of U.S.A.
- Magnetic video camera, video disc and computers developed in 20th century.

Besides this, the advancement in the field of telecommunication technology has contributed a lot in the evolution of ICT. Starting from the era of sending messages through pigeons, we have reached the age of Satellite Communication. The land marks in such development can be cited as below:

- Telegraph invented by S.F.B. Morse of U.S.A. in 1837.
- Telephone invented by Alexander Graham Bell of Scotland in 1876.
- Radio invented by G. Marconi of Italy in 1895. Television invented by J.L. Baird of Scotland in 1925.
- Development of communication satellites (first Satellite Sputnik was launched by U.S.S.R. on 4th Oct. 1957), and cable and facsimile transmission (Fax) technology development work was carried out in the 20th century.

Equipped with the modern invention in the field of collection, storage, retrieval and transmission and exchange of information, the serious attempts in the direction of exercising scientific control over the process of information and communication was introduced in the latter half of the 19th century. The credit goes to U.S.A. where the term *information science* (later called as information and communication technology) was first introduced in 1950 for the effective handling of the interchange of scientific information among the scientists in U.S.A. and foreign countries. The objects of such information science services were as under:

- i. To provide or arrange for the provision of indexing, abstracting, translating and other services leading to a more effective dissemination of scientific information.
- ii. To undertake programmes to develop new and improved methods including mechanised systems for making scientific information available to the users.

Initially, the thrust of the ICT was primarily focused on the handling of bibliographic records and textual information in the scientific sector. Later on, around 1960, it was also applied in the field of industry. At this stage computer-aided techniques and systems were developed for more efficient information and communication purposes. In the later years, the use and application of ICT could not remain limited to the field of science and industry but gradually got broadened to encompass other fields of operation,

areas and professions like banking, management, education, medicine and health care, government offices, law and, judiciary, the police and military establishment and what not. As a result, today we are making its use in our classroom teaching–learning, distance and online education, establishing virtual classrooms and thus harnessing its power as an effective tool and media of formal, informal and non-formal education as well as quite reliable helping hand for the welfare and progress of the growing children of the country.

THE TRADITIONAL AND MODERN INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs)

Information and communication technologies as we can visualise through the previous discussion are in vogue from the olden days. These can be classified as traditional and modern. Both of these traditional and modern technologies may be found to include the tools, equipment and support material for the purpose of information and communication in the manner given below:

1. **Traditional information and communication technologies:** These technologies may include the means and media such as:

- Printed media in the form of textbooks, resource books, journals, news items and other literature available in the school and public libraries.
- The verbal information and ideas exchanged with peers, teachers, parents and other members of the society.
- The graphical aid material such as pictures, charts, maps, diagrams, posters and cartoons, etc.
- The three-dimensional aid material like specimen, model, puppetry, mock up, etc.
- The audio-visual hardware equipments like radio, television, slide projectors, overhead projectors, motion pictures, tape recorder, audio-video recording device and teaching machines, etc.

2. **The modern information and communication technologies:** The modern IC technologies are not single technologies like the traditional technologies. These are a combination of hardware and software, media and delivery systems. In addition, they have also gone digital. Some of these may be named as below:

- Digital video camera
- Multimedia personal computer (PC), laptop and note book

- Application software such as word processing, spread sheets, PowerPoint, simulation and speed recognition
- Multimedia projector (LCD or DLP) to communicate with large group
- Local area network (LAN), metropolitan area network (MAN) and wide area network (WAN)
- Multimedia PC/laptop with video card and web camera or digital video camera
- Computer database and data processing mechanism, CD ROM and DVD
- Digital libraries
- E-mail, Internet and world wide website (WWW)
- Hyper media and hyper text resources
- Computer mediated conferencing—video and audio conferencing
- Video text, tele text, Interactive video text, interactive video disk (IVD) and interactive remote instruction (IRI)
- The idea of virtual classroom and virtual reality

USES AND ADVANTAGE OF ICT IN EDUCATION

Information and communication technologies can play the same role in our information and communication processes and their outcomes as played by other technologies in making our lives quite comfortable and purposeful. As a result, they have become quite popular in all walks of our life. The modern information and communication technologies in fact have brought a revolution in the field of business, industry, insurance, banking, agriculture, medicine, transport, postal and telecommunications, service organisations and various other fields affecting our day to day activities. They have fundamentally changed the way we think, the way we communicate and the way we do most of the things in our life. The field of education is no exception. Here their use has a tremendous potentiality of serving the cause of education. And helping the persons connected with the processes and product of education in a number of ways. We can summarise the use and advantages of ICT in the field of education in two different ways namely (i) use and advantages to the people connected with education and (ii) uses and advantages in revolutionising the system of education.

Let us take these two types of uses and advantages one by one.

Use and advantages to the people connected with education

On this front, ICT may be helpful in the following way:

1. **Useful for the students:** Students may get the required opportunities and training for receiving and using information for their self-improvement. It may help them to satisfy their urges of curiosity, inventiveness, construction etc. They get acquainted with the relevant sources of information, the ways and means of extracting required information and methods of information processing etc. The training received in proper decision making and problem solving ability makes them able to bring necessary changes in their behaviour. Most of what they acquire in terms of knowledge, understanding, skill, interests, attitudes and appreciation is received through the process of information

and communication controlled by the ICT. It also helps them to get self-paced auto-instruction related to the curricular and non-curricular areas of education. The precision, speed and accuracy in receiving, transforming and using information and communication is well acquired through the ICT, as they become acquainted and trained for handling well, the sophisticated electronic appliances, softwares and techniques used for information and communication purposes.

2. **Useful for the teachers:** Teachers get sufficient help from ICT in their task of teaching. Their acquaintance with the relevant source of information in the form of books, journals and other reading material, audio-visual material and equipment and electronics and telecommunication media make them able to acquire necessary teaching material and techniques. They may also enjoy some sign of relief if they can make their students to make use of the ICT resources for their self-learning. Programmed learning material, self-learning modules, teachings machines and computers may help them much in this direction. The realisation of the teaching–learning objectives may also become quite easier for them if services of ICT are well employed.
3. **Useful for the counsellors:** The counsellors working in schools and outside the schools in the community can be greatly benefited through ICT. They can have proper access to the various sources of information through information technology. Use of ICT can enable them to communicate and interact well with their clients for providing desired educational, vocational and personal guidance as well as counselling to the students along with the parents. On the other hand, with the help of the recorded electronic devices, they may be acquainted with the educational level, interests, aptitudes, attitudes and other personality characteristics of the students which can further enable to meet the guidance and counselling needs of the students.

4. Useful for the educational administrators and planners:

ICT may help the educational administrators and planners in the task of exercising their professional responsibilities in an appropriate way. On one hand, it makes them well informed regarding the development in the field of education, educational administration and planning, and on the other hand, they can have proper access to the *information data* regarding the functioning of the institution, working of the teachers, achievements of their students and other personnels. With such *information data* in their hands and communication facilities, they can plan their administration in a proper way. It can also help them in chalking out the activities and work performed in the school by the students, teachers and other personnels. For the educational planners, such data bank may prove quite useful in taking decision about the courses of study, educational aims and objectives at the various stages, the evaluation strategies, the resources to be allotted to the various schools, etc. The communication facilities, they avail out of ICT services, may give additional advantage in the administration activities.

5. Useful to the educational researchers: The students of education desirous to undertake research projects in the field of education are greatly benefited through the processes and products of ICT. They need quite diversified, pinpointed and reliable information controlled through information technology. The channels of communication are open to them and they can have useful interaction for carrying out their research activities.

In this way, ICT may prove quite useful in helping all the personnels connected directly or indirectly with the processes and products of education. Information and communication are the keys to knowledge and learning. Their proper and scientific organisation and control is bound to lead towards the effective educational effort for the proper realisation of the educational goals.

Uses and advantages in revolutionising the system of education

The use of ICT has great potential in revolutionising the formal and non-formal system of education in a number of ways such as:

1. It can help in a big way to bring the existing educational systems into alignment with the knowledge-based information-rich society by providing the services of sophisticated tools, techniques and methods at its disposal. By our traditional approach to teaching–learning and ways of maintaining systems of education we cannot prepare our youngsters to face the coming changes in this age of globalisation. However, the use of ICT in a proper way may come to our rescue on this account.
2. The use of ICT has great potential in bringing a paradigm shift in the traditional views and methods of teaching–learning and instruction in the manner given below:
 - It can help in the process of transitioning from broadcast model of learning (teacher broadcasting the knowledge to the students) to interactive learning. As a result it can ensure that students be able to work actively in the knowledge getting processes going inside the classroom collaborately along with their peers.
 - It can help in the process of transitioning from teacher centered instruction to learner centered instruction. With the assistance of ICT, now students are able to get exposed through large amount of information, and opportunities for collaborating with others in accomplishing complex tasks and effectively communicating knowledge to others. In this way, the use of ICT has enabled students to become more self-reliant and self-directed in the acquisition and application of knowledge and skills as needed on their part for coping up the demands of the modern era.
 - The potential of ICT in shifting emphasis from

teaching to learning has helped in creating a more interactive and engaging learning environment for both the learners and teachers and, thus make the teaching–learning process as a quite cooperative enterprising and challenging pursuit for the realisation of the common goals in an interesting and purposeful way.

- It can help in bringing a necessary shift in the role of teacher from a mere knowledge transmitter to that of learning facilitator, knowledge guide, knowledge navigator and an active co-learner along with his students.
 - It can help in a useful process of transitioning in the shape of owing greater responsibilities on the part of students for their own learning as they are supposed to seek out the relevant information and knowledge through their own efforts, synthesise and share their knowledge with others and make them grow and develop for the realisation of the set educational objectives.
 - The use of ICT is able to help in the process of transitioning of the students from the position of a mere knowledge seeker and knowledge getting individual to those who can think critically and creatively, are able to reflect on their own learning processes and set their individual goals for the growth and development of their potentialities for being able to participate as an intelligent, most capable ways in the world in which they live.
3. The use of ICT has enough potentiality in preparing the teachers for meeting the challenges of the teaching–learning task of the modern age besides helping them in the proper execution of their multi-dimensional responsibilities of their work areas. ICT can now be properly infused into the entire teacher education programme (both pre-service and in-service) not only to help them use it for their own education and training but

learn to use it creatively and constructively for accelerating the educational growth of their students and playing the role of an effective teacher as demanded by the ICT ruled modern society.

In this way, use of educational technology has a bright vision and a number of uses for guiding the path of education of the growing children. Therefore, a sound system of education is earnestly needed to reap the rich dividend from the use and application of the information and communication technologies for the benefit of the children and society.

USE OF ICT IN TEACHING DIFFERENT SUBJECTS

Information and communication technologies mostly centered around the computers and their applications, in fact, these technologies have brought a revolution in the field of business, industry, insurance, banking, agriculture, medicine, transport, postal and telecommunication, service organisations and various other fields affecting our day to day activities. They have fundamentally changed the way we think, the way we communicate and the way we do most of the things in our life. The field of teaching and learning of the school subjects is no exception. The computer based ICT has a tremendous potentiality of being used by the teachers for the teaching of different school subjects. Let us think about the various possibilities on this account.

In general, we can visualise the potentiality of the use of ICT for teaching different school subjects in reference to the following three types of situations/conditions prevalent in the schools of our country.

- A. The school/students have no access to computer devices like PC, laptops, tablets or smart phones etc.
 - B. The schools/students have one or the other type of computer device, but no internet facility is available.
 - C. The schools/students have computer devices with internet facilities.
- A. In the first situation where schools/students are unable to get benefited from the computer based ICT, the other ICT options available for the teaching of school subjects may include the following:

1. They may avail/utilise the services of the radio broadcast and telecast. There are specific educational programs related to the teaching-learning of the subjects of the school curriculum in the schedules of *Akashvani* (through its special educational channel *Gyanvani*) and Doordarshan (through its special educational Channel, *Gyandarshan*) that may prove quite beneficial for the

teachers and students.

2. NCERT, through one of its wing *Central Institute of Educational Technology (CIET)* is engaged in providing valuable assistance to the teachers and students through EDUSAT. CIET is providing direct and lively link of its teaching– learning and training encounters of the students and teachers of the schools sitting far away from its location. The schools can avail these facilities for helping the students and teachers for gaining benefits in the teaching and learning of the school subjects.
3. There are slides, films, audio recordings and video recordings available for the teaching–learning of the various topics/themes/applications of the school subjects. Teachers and students may avail the services of slides and film projectors, tape recorders and DVD players etc. for their teaching and learning.
4. The traditional ICT sources being utilised in the form of pictures, charts, graphs, models, black-board, flannel board, newspapers, transparencies, educational visits and excursions, educational fairs and exhibitions, etc. may be utilised for gaining useful experiences for the teaching-learning and application of the school subjects.
5. The use of the manipulatives in the form of concrete objects and tools. For example, we may use tools like abacus, Napier’s rod graphical calculator etc. for the understanding and application of the related concepts in teaching and learning of the subject *mathematics*.

B. In the second situation, when schools/students have access to computer with no internet connection, the computer based ICT may help the students and teachers in the ways laid down below:

1. We can make use of computers in getting benefit of the recorded CD’s and DVD’s containing useful material related to the teaching–learning of the different subjects.

2. The word processing programs like M.S. Word may help in Writing text, and inserting graphics for a number of documents being utilised in the teaching–learning of school subjects. Teachers may prepare their lessons, write assignments, practice and drill work and project work for their students, prepare evaluation/diagnostic test, performance and progress reports of their students, correspondence with the parents and authorities, etc. With the help of MS Word students may also do their assignments, project work and have consultation with each other in the form of exchanging views and assignments with the help of the documents prepared on MS Word.
3. The computer spread sheets (e.g., MS Excel) can be used in the teaching–learning at all levels of the school curriculum. In the elementary and middle grades, spread sheets can be a valuable tool for the data collection, analysis and presentation. Let us take for illustration the use of Spreadsheet in the teaching of the subject mathematics. Using data collected in real life pertaining to relevant problem situation, students can use MS Excel to display attractive bar graphs or pie diagrams of their data. At the middle school level, algebraic thinking can be enhanced by exploring patterns with the aid of spreadsheet. In particular, the concept of slope can be developed fruitfully for investigating problems with linear functions. At the secondary level we can utilise MS Excel for solving various types of numerical problems, (especially *What if* type problems) and build a solid foundation for algebraic thinking and problem solving. In this way, as an effective tool, spread sheets are known for doing the manual calculations involved in solving various types of numerical and mathematical problem related to the teaching–learning of various school subjects particularly mathematics, physics, chemistry, economics and commerce. In addition, their chief value also lies in helping the students for their data

organisation, its representation in the graphical form, Bar graphs, Pie graphs, histogram, frequency polygon and ogive, etc.

4. The power point programs (e.g., MS PowerPoint) of the computer may help the teachers in the preparation and presentation of their classroom teaching lessons in a quite effective and efficient way. It may be well identified here that PowerPoint use has now almost replaced the use of other traditional audio-visual aid material including slides and transparencies. PowerPoint preparations can also be effectively utilised by the students for demonstrating/exhibiting their achievements/performance with regard to the acquisition of knowledge and skills in the various areas of school subjects learning as well as presenting the reports of their project work, assignments etc. at the individual or group level.
5. The drawing and painting programs of the computer (e.g., MS Paint) may help the teachers and students in learning the art of drawing various types of figures, patterns, diagrams for the various tasks related to the teaching and learning of almost all the subjects of the school curriculum.
6. The computer technology may also help the teachers and students take advantage of the services of the *Interactive White Boards* (IWB), also referred to as *Smart boards*. These boards are electronic/digital boards that help in showing students anything which can be presented on a computer's desktop (e.g., educational software, websites and others) with the help of a projector. It is fitted on the walls of a classroom or floor-stand like the traditional classroom black-board, but it can act as an input device for a computer, coupled with a projector. It is interactive in the sense that the things you write and do on the white board can be detected by the computer it is connected to (and vice versa) and when you combine that with the ability to project an image on it, you finally get a huge interactive computer display that can be effectively used

in the classroom as an aid to lecture, presentation, demonstration and other activities related to the teaching–learning of school subjects. The interactive white boards have a special advantage for providing the Touch Sensitive Screen facility. It helps the users to control the computer using a pen, finger or other devices. Its application/utility for teaching–learning of the school subjects may be summarised and illustrated as below:

- Interactive white board (IWB) helps in showing what is there in a computer file, computer software or web pages searched/saved in an effective way for the teaching–learning of a topic.
- IWB allows teachers to record their instruction and post the material for review by students at a later time. This can be a very effective instructional strategy for students who benefit from repetition, who need to see the material presented again, for students who are absent from school, for struggling learners and for serving review, assignment and examination purposes.
- With the help of their *drag and drop* facility interactive white boards can be effectively utilised for making the nature, structure and logic of a subject quite clear to the students. For example, in the earlier classes, their services can be utilised for learning the abstract concepts of numbers and letter sounds. Students can, for instance, drag three objects into an area of the board with the number *three* on it reinforcing an exercise in numeral identifications visually, kinaesthetically and auditorily.
- IWB have a unique advantage over traditional classroom black-boards. They can present not only static images but moving images as well. Consequently, a mathematics teacher can demonstrate dynamic processes (e.g., construction of angles, triangles, quadrilaterals

etc.) that can otherwise be difficult for pupils to grasp. Similarly, the phenomena like occurrence of day and night, change of seasons etc., in the subject social science can be properly demonstrated and explored with the use of IWB.

7. Computer technology may help the teacher and students in their teaching and learning in a quite effective, efficient and economical way by making them capable of utilising the services of various types of software programs especially developed for the teaching. The contributions of these computer software programs may be summarised as below.

i. **Interactive geometry software** such as the Geometer's Sketch pad has greatly eased the burden and increased the joy of teaching-learning geometry. It can be used to investigate all the geometric contents of Secondary School Curriculum. After installing, when sketchpad comes upon the screen, you will see a selection of tools located on the left hand side of the worksheet that can be used to construct a geometric figure of your choice, measurement of the sides and angles, and do necessary computing functions. For illustration, it may help you to derive the results in relation to the following in a proper way:

- The sum of the measures of the angles of any triangle (two right angles).
- The three medians in a triangle (meeting at the central point, centroid).
- Joining of the mid-points of the sides of a quadrilateral.

By witnessing the construction and conclusions regarding above it may be well realised that sketch pad can become a dynamic chalkboard on which teachers and students can draw more precise, more complex figures that, best of all, can be distorted and transformed in an infinite variety of ways without having

to erase or redraw for deriving useful valid generalisation. Let us make it more clear by elaborating the task carried out by sketch pad in the last case, i.e. *what happens when we try to join the mid points of the sides of a quadrilateral*. For this purpose, let us proceed as below:

- Draw a quadrilateral with geometer's sketch pad.
- Join the consecutive sides' mid points with segments.
- Drag the mouse to move away vertex of the larger quadrilateral to any position (i.e., distorting the original quadrilateral).
- Try to conclude/generalise the well known theorem that *the quadrilateral formed by joining the mid points of the sides of a quadrilateral is a parallelogram*.

(ii) **Instructional software** is now available in abundance for the teaching and learning of almost any topic related to school subject. Useful courseware related to the school curriculum may provide wonderful material and activities helpful for the teaching–learning of school subject. For example with the use of a course ware in maths, we can avail limitless examples almost instantly for deriving valid generalisation, practice and drill work as well as application of mathematics. Software has been developed for providing appropriate computer based tutorial classes/courses to the students. In addition to provide direct interactive instruction, they are quite capable of providing appropriate drill and practice work, assignments and project activities, self-evaluation measures etc., for the appropriate study of the school subjects. An intelligent software, while interacting with the students in its tutorial capacity, may tell where an error was made on the part of a student while solving problem and offer suggestions for reaching a correct answer based specifically on the student's incorrect answer. The course software are

today available in such a fine capacity as to suit the level of difficulty, number of problems, and mastery level of the variety of learners. Some of them also incorporate classroom management component and a record keeping facility for helping the teachers in planning lessons and tracking students' progress.

- (iii) **Simulation, gaming and recreational software** provide a rich source for the teaching and learning of school subjects in an appreciably interesting and absorbing way. These can help in removing the fear and phobias related to the study of a subject. On the part of students, besides providing them opportunities to learn while playing or engaging in the virtual applications of the principles and processes of a subject. Many programmes are now a days available for allowing students to play Mathematical, Scientific, Geographic, Artistic, Economics and Trade related games do recreational activities in terms of quizzes, riddles and puzzles and get engaged in simulated laboratory/practical and learning activities for helping them in promoting their thinking, reasoning and problem solving skills besides providing a motivational environment for the teaching-learning of the useful concepts of the teaching subjects.

C. In the third situation, where computers services are available to the schools/students along with internet facilities, great opportunities for the affective teaching–learning of the school subject are always within reach of the teachers and students.

Internet through its worldwide computer network and innovative application of its WWW technology, can serve entire population worldwide, including teachers and students through the useful information/data contained on its web pages. Its uses and application in teaching of school subjects are quite extensive and varied. Let us have a summarised view of these applications in the manner detailed below:

1. Internet proves a rich source for getting upto date and extensive information and knowledge related to the school subjects and their pedagogy both to the teachers and students at their will at any time and place of their choice (schools, homes or other places of the availability of internet facilities).
2. Teachers and students may get all types of needed subject material, reference material and support material online for the teaching and learning of school subjects on the web pages of the internet in the form of e-texts, e-reference books, e-libraries-encyclopaedias and dictionaries, e-news papers and magazines/journals and the websites containing useful data/information for the study and realisation of the teaching–learning objectives of the school education.
3. Internet is capable of providing all what is needed to the students for their self and independent study related to various school subjects as an online learner or supporting, supplementing and enriching their regular classroom learning with the variety of study and guidance material at its disposal in the manner summarised below:
 - It can provide appropriate tutorial services.
 - It can help them in the proper revision and practice of the learned material by providing online facilities for the recapitulation, revision, drill and practice work.
 - It can provide them facilities for self-assessment of their learning outcomes.
 - It can help them in doing the assigned project work or successfully engaging in the activities related to cooperative learning; constructivism learning and group activities concerning with their learning of different subjects.
 - It can help them in the organisation of activities under the banner Different Subjects Club such as Science, Mathematics Club, History Club, etc.
 - It can help them in carrying out activities related to

Science, Mathematics and Social Science laboratories and practical applications of the concerned subjects in day to day life.

- It can help them to have cooperation and consultation with their peers, teachers and experts with the help of e-mail, chatting, file transfer protocol and audio-video conferencing with the use of audio phones and web camera facilities attached with the PC or laptop.
 - Students can submit their assignments with their teachers by using e-mail file transfer protocol and receive guidance, instruction and follow-up from them in return.
 - It can provide them proper facilities with regard to simulation, gaming and recreational activities in the form of available mathematical, Scientific, Geographical or Commercial games, riddles, puzzles, quizzes and fun with numbers, etc. on the internet.
 - It can help them to seek integration of the study of a subject with their day to day life activities and experiences and also get acquainted with the applications of the subjects with the world of work, occupations, subjects and areas of knowledge around them.
4. Internet is capable of providing all what is needed by the subject teachers for helping them in their task of teaching and seeking the needed professional growth in the manner summarised below:
- They can get upto date study material, reference material and support material on the internet.
 - They can get acquainted with the latest methodology, strategies, devices, techniques for the teaching of this subjects.
 - They can help themselves in their professional growth by getting access to e-newsletters e-magazines and journals etc.

- They can enroll themselves and participate online through online conferencing (audio and video), chatting and e-mail etc. in the professional activities of teachers organisation.
- They can have valuable models and suggestion for planning their lessons, and preparing assignments, and drill work, project work and evaluation for their students.
- It can help them to provide required remedial measures for the diagnosed difficulties and deficiencies of their students, prepare and send their progress report to their parents and seek their involvement for the program and welfare of the students.
- It can help them to cater to the individual differences of their students including the children with special needs—gifted, creative, dyscalculic, slow learners and mentally retarded, well in the inclusive set up.
- It can help them to be in active consultation and collaboration with their colleagues, experienced teachers and experts for the mutual exchange of ideas, advice and opinions regarding the teaching of their subjects and welfare of their students.
- A medium for providing virtual manipulatives (things that students manipulate with their hands to gain better grasp of something (i.e., use of beads for counting) and have experiences for the learning and applications of a school subject.
- A window for collaborating and cooperating with all who are engaged in teaching and learning of a subject.
- A source and platform for those who are engaged in the task of carrying out research work in the discipline and pedagogy of a subject.
- A means for making the study of a subject meaningful, interesting and enjoyable as much as

possible.

In this way, Information and Communication Technology (ICT), in its traditional form and the modern form known for its developed computer technology combined with internet and web features has a great potential for positively influencing and directing the path of teaching and learning in almost all the subjects of the school curriculums. With its multi-dimensional application, it can help the teachers and students in their tasks of teaching and learning for the effective realisation of the objectives of different subjects at all the levels of school education.

SUMMARY

1. Information and communication technology refers to a technology employed in the form of tools, equipment and application support which helps in the collection, storage, retrieval, use, transmission, manipulation and dissemination of information as accurately and efficiently as possible for the purpose of enriching the knowledge and develop communication, decision-making as well as problem solving ability of the user.
2. Invention of paper and ink coupled with the print media may be regarded as the first breakthrough in the evolution of the concept of information and communication technology. It was further given a new impetus through the inventions related to photography, photostat technique, xerography, laser technology, and magnetic video camera, video-disc and computers. Beside this, the advancement made in the field of telecommunication technology in the shape of the invention of telegraph, telephone radio, television and communication satellites, cables Fax, etc. has contributed a lot in the evolution of ICT at the present age. But as far as the origin of the term information and communication technology (ICT) is concerned, the credit goes to U.S.A. where the term *information science* (later called as information and communication technology) was first introduced in 1950 for the effective handling of the interchange of scientific information among the scientists in U.S.A. and foreign countries. Later on, around 1960, it began to be used in the field of industry and today we may witness its wide use in all fields and walks of our life including education and instructions.
3. Information and communication technologies for the purpose of their better understanding and application may be properly classified into two broad groups, namely traditional and modern. In traditional technologies, we may include the means and media like printed media, verbal information and

knowledge and a variety of audio-visual aids and equipments. In the modern technologies, we may include the advanced and sophisticated means like digital video camera, multimedia personal computer (PC), laptop and notebook, multimedia projector (LCD or DLP), computer networking, internet and world wide websites, computer mediated video and audio conferencing, video text, tele text, virtual classroom, virtual reality, etc.

4. The use of ICT is playing a quite vital role in the field of education in many ways. It is providing immense help and assistance to all connected with the tasks of education like students, teachers, guidance and counselling personnel, educational planners and research workers for performing their responsibilities as adequately as possible. Besides this, it is also performing a great role in bringing desired changes and revolution in a big way in the whole system of formal and non-formal education and instruction.
5. Use and applications of ICT in our schools suffers from the limitations, difficulties and drawbacks such as (i) lack of needed facilities, material and equipment and favourable conditions for the use of ICT, (ii) a widespread ignorance about the use, applications and advantages drawn out of the ICT on the part of teachers, head of the institution and educational authorities, (iii) resistance on the part of teachers and students for its use due to their attachment to old ways and fear for the adoption of the new, and (iv) lack of provision to equip the teachers neither at the pre-service stage nor at the in-service stage in the utilisation of ICT for the instructional and other educational purposes in the schools.

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Diverse Teaching Strategies for Diverse Learners

WHO ARE DIVERSE LEARNERS?

Diverse learners are those learners who deviate or differentiate from other normal or average learners in terms of the possession of some traits, characteristics, abilities or capacities to the extent that they require the use of diverse or different teaching strategies for their proper education and development. As examples of such diverse learners we may cite the names of the following:

1. Gifted or talented learners
2. Backward or slow learners
3. Learning disabled children
4. Physically disabled or handicapped learners such as visually impaired or hearing impaired learners
5. Mentally disabled or retarded learners.

DIVERSE TEACHING STRATEGIES FOR DIVERSE LEARNERS

Diverse learners need diverse and special educational care for meeting out their learning needs. The type of teaching strategies and educational measures utilised for their education and development are quite diverse and special in nature. We would like to illustrate this fact by discussing special educational measures and teaching strategies for some of the specific diverse learners in the coming pages.

Gifted or Talented Learners

Gifted or talented learners are known to be quite superior in some ability or a group of abilities to the other students of their group or class. In terms of their learning or acquiring they may be equated with their learning at the pace of an express train in comparison to the normal speed of the passenger train of the average learner and slow speed of goods train of the slow learner. For nurturing their giftedness or special talent, special educational measures and teaching strategies are needed. A teaching strategy or educational measure in the name of *enrichment programs for the gifted* may suit their developmental purposes in an appropriate way. Let us try to present this measure or strategy in brief.

The term *enrichment program for the gifted learners* stands for enriching the already existing programs and activities usually meant for the average learners of the classroom to provide additional opportunities for satisfying the additional learning needs and thirst of the gifted. These additional learning opportunities may include the things such as:

- i. Special assignments (within or outside the class).
- ii. Work on independent projects.
- iii. Preparing reports and participation in panel discussion.
- iv. Visits to the places for getting first-hand information.
- v. Construction of models, aid-material and improvised

apparatus etc.

- vi. Participation in the organisation of activities.
- vii. Experimentation and independent research.

In this way, the learning experiences should be so enriched that gifted children find something new and challenging for them. In this situation, they can get adequate opportunities for their proper development and education and do not feel frustrated or discouraged with what is going in a normal speed for the presentation of average learning experiences to the average learners of the class.

Backward or Slow Learners

Backward or slow learners feel a great difficulty in keeping pace with the normal school work. They fall far behind other children of their age and grade in terms of learning and studying the things. Their pace of learning is quite slow and discouraging as compared to other normal/average students of the class. In the classroom, they need special care and push up for them for their study. In terms of the adoption of suitable teaching strategy and educational measure, the following things may suit their purposes well.

1. **Provision of suitable methods of teaching and strategies:** Backward or slow learners should be provided with the learning experiences matching their learning potential and abilities. They should be provided more practical and concrete experiences. Methods of teaching for such children should be, accordingly, modified. They require short and simple methods of instruction based on concrete living experiences with concrete materials. Teacher should try to adapt with the learning speed of these learners. There is also a need of using appropriate aids and providing rich direct experiences to such children. Also, the backward or slow learner should be treated quite sympathetically and their difficulties should be understood and addressed by adopting suitable ways and means.

2. **Provision of special coaching and proper individual attention:** When the area and nature of the weakness is being spotted out through proper diagnostic tests in various subjects, arrangement for special coaching should be made for backward children individually or collectively as the situation demands. It can be given in terms of more practice, drill, repetition, review or explanation, etc. By providing such special coaching their deficiencies and gaps can be removed.
3. **Checking truancy and non-attendance:** Backwardness in some cases may be the result of irregular attendance, truancy or long absence from the schools. The cases for such lapse should be discovered and the required steps should be taken to remove them.
4. **Provision of activities, rich experiences and diversified courses:** In some cases the backwardness is caused due to lack of interest in the school studies or some particular subject. The child sometimes does not find anything challenging or stimulating in the routine class instruction or does not get opportunity of studying the subject or performing activities of his choice. Therefore, adequate provision should be made for the diversified courses and varied rich experiences in the form of various co-curricular activities and instructional programmes.
5. **Maintenance of proper progress record:** Examination and testing programme of the school needs essential modifications. There should be a well-planned regular evaluation of the progress of the children in all curricular or co-curricular aspects. The record of this regular evaluation should be maintained properly. For this purpose, progress charts and cumulative record card can be kept. It helps in knowing the child's attainment level and his speed of progress.
6. **Rendering guidance services:** Lack of guidance in making proper choices for the selection of courses of instruction and field of work is also considered one of the contributory factors to backwardness and slow learning.

Therefore, in every school, guidance services should be organised properly. State authorities should also pay due attention in making the parents conscious of their children's ability, interest and aptitudes and accordingly aspiring for the careers of their children.

Learning Disabled Children

There may be considerable presence of the students in the class who suffer from one or the other type of learning disabilities. Now the question arises, *what measures and strategies need to be taken for the education and development of these learning disabled children?* In brief, these measures and strategies can be summarised as under:

1. Methods of teaching as well as handling of the learning-disabled should be so structured as to cater to the needs and difficulties of the learning disabled present in a particular group, a section or class.
2. There are a number of remedial programs available for the teachers for being used with the learning-disabled. A teacher should try to make their use by borrowing it from the available resource centers. These programs have been developed to provide remedial measures for covering up the deficiencies and learning problems caused on one or the other account. For example, if the deficiency and deficits of the suffering children are related to the neural impairments in sensory motor system, one can follow remedial programmes like (i) Strauss Lehtinen-Cruickshank perceptual motor programme, (ii) Getman's Visuo—Motor programme etc. Similarly, if their deficiencies and deficits are related to their psycho-linguistic ability, these can be rectified through standardised remedial programmes like (i) Witmer's psycho-educational, (ii) Fernald kinesthetic remedial reading method, (iii) Pragmatic general diagnostic remedial approaches by Blanco or Morgan etc.

3. If the learning disabilities are so severe as to demand very special care and attention then learning-disabled should be placed in full time special learning setting under the guidance of a specially trained teacher. Here they must be given full opportunity and training for improving their poor study habits, methods of improper learning and modifying their undesired and inappropriate socio-emotional and psycho-educational behaviour. After putting the learning-disabled into a highly structured environment and getting satisfactory results he should be moved back into a less isolated setting and then into a normal classroom setting.
4. Whether we employ specialised trained teachers or the usual classroom or subject teachers with some extra knowledge and training to deal with learning disabled, the one thing which is most important is their behaviour and attitude towards these children. One should not lose patience as these children are essentially slow learners, underachievers and far from satisfactory in their socio-psychological behaviour. They should be accepted with all their weaknesses and deficiencies. Snubbing, ridiculing, or punishing these children in any form brings negative and harmful results. The teachers should exhibit love and care while dealing with them. Their approach towards them, as far as possible, should be very constructive, pleasant as well as encouraging so that these disabled children may learn the proper method of learning and behaving and develop required self-confidence and positive attitude for their educational progress by getting rid of some or the other learning difficulty and deficiency in their behaviour.
5. Special measures and strategies should be applied for dealing with a particular type of learning disability such as dyslexia (learning disability related to language) or dyscalculia (learning disability related to learning or performing in mathematics). Let us see what types of teaching strategies or educational measures may be adopted for the learners suffering from these learning disabilities.

Teaching strategies and measures for the learners suffering from dyslexia

The following things may help in teaching children with dyslexia:

- i. They may be persuaded to get help in the reading tasks by tracing over letters, using the sense of touch, showing pictures along with the word, using toys and other concrete material along with the word.
- ii. A direct approach in this concern may include a systematic study of phonics.
- iii. There may be some well thought attempts involving general language enrichment programmes for helping them in solving their language problems.
- iv. There must be structured formats or programmes and they should receive training on the task of processing information into language or cognitive systems (e.g., asking the child to listen to a taped lecture or see video-recording of a presentation and then respond to a series of oral or written questions).
- v. In all cases of implementing the required treatment plan one should always focus on strengthening the child's weaknesses while utilising the strengths.
- vi. Techniques designed to help all the senses work together efficiently, can also be used. Specific language learning approaches that require a child to hear, see, say and do something (multisensory) may also be used.
- vii. The mobile and computer technology may suit the requirements of these children by providing valuable opportunities for the learning and usage of language skills.
- viii. The children with dyslexia should be taught and trained in the acquisition of necessary compensation and coping skills for doing away with the academic and psychological problems.
- ix. As far as possible, the required individual attention should be paid for arranging the optimum learning conditions and alternative avenues to them for demonstrating their

language learning performances in and outside the school.

- x. The work strategy for these children should be planned wisely. Because the academic demands on a child with dyslexia may be great and the child may tire or frustrate easily, work increments should be broken down into appropriate chunks. Frequent breaks should be built into class and drill work or homework time. Reinforcement should be given for efforts as well as achievements in a judicious way as to promote learning and achievement.
- xi. In the last, wherever needed, earnest attempts should necessarily be made to make use of the behavioural and psychoanalytic approach for the correction and reinforcement of the desired behaviour of the children suffering from dyslexia.

In addition to these, the following few suggestions by Frost and Emery (1995) may work well in seeking a comprehensive academic intervention for the children suffering from Dyslexia.

- **Teach metacognitive strategies:** Teach children similarities and differences between speech sounds and visual patterns across words.
- **Provide direct instruction in language analysis and the alphabetic code:** Give explicit instruction in segmenting and blending speech sounds. Teach children to process progressively larger chunks or words.
- **Use techniques that make phonemes more concrete:** For example, phonemes and syllables can be represented with blocks where children can be taught how to add, omit, substitute and rearrange phonemes in words.
- **Make the usefulness of meta-cognitive skills explicit in reading and make them practice these:** Try modelling skills in various reading contexts. Review previous reading lessons and relate to current lessons.
- **Discuss the specific purposes and goals of each reading lesson:** Teach children how meta-cognitive skills

should be applied.

- **Provide regular practice with reading materials that are contextually meaningful:** Include many words that children can decode. Using books, that contain many words children cannot decode, may lead to frustration and guessing, which are counterproductive.
- **Teach for automaticity:** As basic decoding skills are mastered, regularly expose children to decodable words so that these words become automatically accessible. As a core sight vocabulary is acquired, expose children to more irregular words to increase reading accuracy. Reading-while-listening and repeated readings are useful techniques for developing fluency.
- **Teach for comprehension:** Try introducing conceptually important vocabulary prior to initial reading and have children retell the story and answer questions regarding implicit and explicit content. Teach children the main components of most stories (i.e., character, setting etc.) and how to identify and use these components to help them remember the story.
- **Teach reading and spelling in conjunction:** Teach children the relationship between spelling and reading and how to correctly spell the words they read.

Teaching strategies and measures for the learners suffering from dyscalculia

The following things may help the teacher in teaching children with dyscalculia:

1. Allow the use of finger count, circles, pencil-marks etc. if the child feels comfortable in doing so.
2. Try to provide clear and concise instructions for the meaningful understanding of the basic concepts, skills related to diagnosed areas of weakness/difficulties.
3. Try to provide examples and non-examples for the clarification of the fundamental concepts and principles.

4. Present yourself as a model for learning the right way of doing calculation and solving problems and also use peers as models.
5. Try to provide enough time for explaining mathematical symbols and mathematical language. Often repeat this information in a different manner to ensure that the learners understand it well.
6. Make sure that the child understands the process that occurs in a calculation.
7. Create an environment where making mistakes is seen as part of the learning process.
8. Make use of concrete manipulative, meaningful examples and materials for the understanding of mathematical concepts, problems, processes and functions.
9. Allow the use of note taker or a tape recorder for the learners whose visual processing speed poses problems in classroom learning so that they can concentrate on the lessons rather than on taking notes.
10. Use real life situations that make problems functional and applicable to everyday life and provide them opportunity to see patterns, rhythm, symmetry and reasoning in the structure and functioning of mathematics.
11. Always follow the teaching maxims *simple to complex* (teaching easier knowledge and skills before difficult ones) and *concrete to abstract* (use of concrete material visual and auditory examples for understanding abstract concepts and processes).
12. Remember that the acquisition of skills in mathematics needs a lot of practice. Hence provide enough opportunity to do so through distributed practice (plenty of practice in small doses). Do not forget to have proper supervision for preventing students from practicing misconceptions and *misrules* and help them in their learning through immediate corrective and positive reinforcement.
13. Use visuals and rhymes to make the children learn mathematics facts and build retention by providing review

within a day or two.

14. Help the students in visualising math problems by drawing and following systematic problem solving steps via structural work sheets, video display or modelling.
15. Teach that much of mathematics is interconnected. For example, you can teach that division is the opposite of multiplication and show how this is beneficial in actual work. (e.g., for example, 180 divided by 15 can be rephrased as $15 \times ? = 180$ or $12 \times ? = 180$).
16. Help students to track their progress; which facts they have mastered and which remain to be learned.
17. Make use of well-prepared programmed material, remedial programmes and computer assisted instructions.
18. Allow the dyscalculic children to make use of the required manipulatives such as abacus, calculators and computers etc. for learning and performing tasks in mathematics.
19. For dealing with a dyscalculic go back to what he knows and understands. This will almost certainly help as it is important to build on a firm base and bring him on the track of his learning.
20. Keep in mind that child should be taught in such a way as not to take mathematics as a dry, boring and a subject beyond his comprehension and utility. Try to make use of the proper strategies by setting a required level of mastery for inculcating self-confidence in the art of calculation and problem solving.
21. When you find a child feeling difficulty in performing a mathematical task by considering it over-demanding or beyond his comprehension, try to adjust the content of the task or way of performing the task. For example, a child may encounter problems concerning number transposition, that is writing 51 for 15. Here the cause of the problem lies in our saying *fifteen*, that is, *five ten*, and consequently the child may fall in the trap of writing it as 51. In this case, correction should come immediately before it becomes a habit for the child.

Visually Impaired Learners

In the category of visually impaired learners, we can have two types of children (i) totally blind children and (ii) partially blind children. In view of the differences in the nature of visual impairment and difficulties, different educational measures and teaching strategies have to be employed for their education and development. Let us discuss these one by one.

Education and development of the blind children

The measures and strategies utilised for the education and development of the blind children may be summarised as below:

1. The methodology used for teaching blind children requires the use of other senses than the sight, as a result, touch, smell and hearing become the important instruments for them for their acquisition of learning experiences and adaptation to physical and social environment. Teaching-learning process of the classroom is carried out through Braille scripts. By this script they are taught to read and grasp the written communicated ideas through their sense of touch. Later on, the writing skill is developed through the help of other special devices.
2. In the beginning of their education, much emphasis may be laid over the attempts for making them adjusted to the physical and social world and arouse their interest towards learning. Their earlier curricular experiences can be directed to make them learn the simple facts of reading, writing, arithmetic and knowing of the local environment. Gradually, they may be given more knowledge and understanding through the Braille books and classes.
3. Attempts may then be made to organise learning experiences (co-curricular and work experiences) for them in view of the realisation of following objectives:
 - i. The blind children should be trained for becoming independent in terms of carrying out their day to day activities and having, necessary movements related

to their social environment and work situations. With the use of sticks and their sense of hearing and touch they can be trained in their physical movements so much so as to cross the busy road as much independently as possible.

- ii. They should be trained to carry out the different types of co-curricular activities with the help of special programmes and equipments used in these schools. As a result, they may learn many things regarding physical education activities, sports and games, debates and declamation contests, literary activities like poem recitation, dramatisation and acting, music and dancing, working with clay and plasticise etc.
- iii. The blind children have special attitude for music, hearing and listening, touching and smelling, sensational activities. Therefore, much attention should be paid to train and provide curricular and co-curricular experiences to the blind children in the activities related to these sensory experiences.
- iv. The blind children can be properly trained in the craft activities and vocational works of varying nature for becoming economically independent.

Education and development of the partially blind children

Partially blind children are those children who have defective vision or impairment even after adopting corrective measures (bearing numbered lenses). The measures and strategies such as below may prove helpful for the education and development of these children.

1. Since they are not totally blind and are left with some sort of vision. This left out vision or sense of sight must be utilised in their education as minimum as possible. Consequently, they should never be loaded with unnecessary reading and writing work. Similarly, delicate artistic work, geometrical construction, drawing and painting, minute observation work, etc. should be altogether

avoided with such students.

2. A little extra care in terms of the usual set up of the classroom and work places may also be taken for these children. They must be made front liners in the teaching-learning situations and the adequate arrangement for the proper lighting must also always be made so that these children may be helped to make maximum use of their low vision.
3. In addition to this, a number of other measures may also be undertaken for making the things helpful to them. A few mentionable are:
 - i. Paying individual attention for removing their difficulties with regard to their perception of the instructional material written on the blackboard, charts, maps etc.
 - ii. Taking precaution to speak out the things written on the blackboard and other visual aids.
 - iii. Making much use of the aid material and devices needing senses other than the vision, e.g. making use of audio cassettes, radio broadcasting, tape recorder etc.
 - iv. Equipping them with the extra vision equipments like hand lens, magnifying glass etc.
 - v. Provision of having bold lettered books in the library for the use of these children.
 - vi. Taking other helpful measures for making the things perceived depending upon their disability, e.g. a colour blind or any such perception impaired child may be told about the facts in some other ways.

Hearing Impaired Learners

In the category of hearing impaired learners, we can have two types of children (i) deaf and (ii) hard of hearing. In view of the differences in the nature of hearing impairment and difficulties, different educational measures and teaching strategies have to be employed

for their education and development. Let us discuss these one by one.

Education and development of the deaf children

The measures and strategies utilised for the education of the deaf children may be summarised as below:

1. Deaf children are quite incapable of communicating orally. Therefore, the use of oral means, i.e. the use of sense of hearing should be totally abandoned in their education.
2. They should be specifically trained in learning the special means and methods of visual communication modes such as sign language, fingerspelling and cued speech (as you must have seen in the news broadcast of the television for hearing impaired).
3. Necessary pains should be taken for the language development of these children with the help of training received in visual communication as well as utilisation of other senses (senses of sight, smell, touch and taste). The special provisions is, therefore made in their curriculum for making them to learn vocabulary, grammar, word order, idiomatic expressions, and other aspects of verbal communication.
4. The curricular and co-curricular experiences for them should be so organised as to impart them all the necessary learning experiences for their adjustment and education with the help of the utilisation of all other senses, besides the hearing. They may thus be allowed and encouraged to see, touch, taste, smell and work out the things and experiences by themselves for getting the desired learning experiences.
5. The deaf children are seen to be specifically endowed with the increased abilities and capacities in terms of their power of sight, smelling, touching, tasting and physically as well as mentally working capacity, etc. as a matter of compensation for their disability in hearing. Therefore, special provisions in the form of curricular and co-curricular

experiences are always made to the deaf children for developing their inner abilities to make them good artists, cartoonists, writers, fashion designers, architects, scientists, and craftsmen, etc.

6. Vocational training and education should be also, made a compulsory part of their curricular programmes for making them able to learn the means of their livelihood and becoming self reliant in the future life.
7. The developed communication technology and advances in computer applications must be well harnessed for the education and adjustment of the deaf children. Many useful devices and facilities such as text telephone (enabling persons to type phone messages over the telephone), e-mail messages and chatting, web text material etc. should be well utilised for the education and development of the deaf children.

Education and development of the hard of hearing

The task of educating and adjusting the *hard of hearing* is relatively simple than those of deaf children. With a little more efforts, they can be made to learn the art of better adjustment and developing educationally along with the normal children in the normal school set up. The mentionable important things regarding their education and development may be outlined as below:

1. The first and foremost task in the education and development of the hard of hearing is to help them to acquire specific bearable hearing aids (selected according to the degree of hearing loss) and make them habitual in its proper use and handling. The early bearing of such hearing aid may prove quite advantageous to some of the hearing impaired as it may bring desired improvement in their hearing functioning.
2. Care should be taken in their upbringing and schooling so as not to make them feel small or inferior due to their hearing impairment. They should never be ridiculed, made

a matter of amusement or sympathy or ignored and hated. Contrarily, they should always be treated in a normal way like other normal children for helping them not to become unnecessarily conscious of their disability.

3. Teachers and audiologists both should try to work together to teach the child to use his residual hearing to the maximum possible extent for the task of learning and educational progress.
4. These children as well as the parents and teachers should be trained in the utilisation of proper means of communication in the task of adjustment and education of these children. The oral or manual means of communication or a combination of the two can be utilised with these children. Oral communication includes speech, speech reading and the use of residual hearing. Manual communication involves signs and fingerspelling. Total communication as a method of instruction may, thus be a combination of the oral method plus signs and fingerspelling.
5. The *hard of hearing* may be trained and made habitual to listen the sound of low intensity and frequency (by keeping the hearing aids at the time of training) with the help of the services of audio aids like radio, tape recorder, VCR, television and computer assisted multimedia presentation, etc.
6. The use of television, video recording and computer-assisted multi-media presentation as well as the living efforts of the teachers, parents and instructors may help the *hard of hearing* not only to get the desired learning experiences and instructional material like the normal children but also to make them trained in making maximum use of their residual hearing in close combination with the learning of the art of lips reading and language of the body movements, gestures and postures.
7. The *hard of hearing* usually remain backward in terms of proper language development specifically in the areas related to communication of speech. The specific efforts

need to be made for the proper development of the languages. For example, some of them are unable to maintain a proper level of the loudness or pitch of their voice in their communication. It happens due to their hearing impairment, they have no idea about the proper level of the loudness or pitch in communication at a given situation or time. Here, they should be helped and trained for communicating properly with the proper intonation, intensity and frequency, pronunciation etc. specifically with the use of modern aids and equipment.

8. In the case of hearing impairments of psychogenic origin, the services of qualified therapists, counsellors and psychologists may be taken for providing necessary assistance to the affected children for getting rid of the maladaptive behaviour and symptoms of hearing impairment.
9. Help of one or the other suitable special educational service and measures such as below may also be taken for helping the hearing impaired in their proper adjustment and educational development.
 - favourable seating in the class and other learning situations (front bench and near to the teacher).
 - taking regular help of blackboard writing, sketching, charts, maps and other visual presentation along with the oral communication.
 - using captioned films/videos etc. in the instructional process.
 - regular speech, language and auditory training from a specialist.
 - services of an interpreter for those students who use manual communication.
 - use of amplification systems.
 - assistance of a note-maker, who takes note for the hearing impaired, so that the impaired child can be fully benefited from instruction.
 - training facilities for the parents, teachers and peers in alternative communication methods such as sign

language, speech reading, body language etc.

- appropriate counselling and therapeutic measures for the proper adjustment of the hearing impaired to the socio-psychological environment.
- use of the modern helpful devices available to hearing impaired like text telephones, computer assisted or managed instructions and multi-media presentation etc.

Mentally Disabled or Retarded Learners

As a matter of definition, mentally retarded or disabled children may be known as the type of children who suffer from the retarded subnormal or deficient growth and development of their brain affecting their intellectual capacities to the extent that they feel handicapped in their adaptation to the environment and, thus require special care and provision for their welfare and development of their capacities.

On the basis of the deficiency in adaptive behaviour and low scores on an intelligence test, (Stanford Binnet Test) mentally retarded children may be classified as:

- i. Children suffering from mild mental retardation (with an IQ of 52–67).
- ii. Children suffering from moderate mental retardation (with an IQ of 36–51).
- iii. Children suffering from severe mental retardation (with an IQ of 20–35).
- iv. Children suffering from profound mental retardation (with an IQ of under 20).

Out of these four categories of mentally retarded it is the children belonging to the top most category, i.e. children suffering from mild retardation with an average IQ of 52–67 who are considered educable, i.e. capable of receiving education. Therefore, attempts for providing some type of education are only limited to this category of

mentally retarded. The following things may prove useful in planning measures and strategies for the education and development of the children suffering from mild mental retardation:

1. We should try to accept the reality that due to their low level of intellectual capacities, these student cannot pick up the speed or level of learning of the average learner. Hence, we should try to help them in reaching a reasonable level of educational achievement as expected from them on the basis of the capacity of their intellectual functioning.
2. Attempts should be made to make use of concrete material and audio-visual aids much suited to their level of understanding and grasping the learning experiences.
3. The principles of learning by doing and experiencing, learning through observation and imitation etc. should be much utilised in the education and training of these children.
4. As far as possible, we should avoid to make use of higher order of intellectual functioning such as thinking, reasoning, analysing, synthesising, problem solving, etc. in the education and training of these children.
5. The curriculum planned for their learning and education should fit into their learning capacity and learning expectations from them.
6. Their educational planning should include more practical experiences, co-curricular activities, and learning through play and amusement etc. as they have little interest and also have little mental ability for grasping the intellect driven theory and curricular knowledge.
7. They can learn well through the help of peers. Hence, peer tutoring or peer observation must be well utilised for helping these children for reaching an expected level of their education.
8. As far as possible, attempts should be made to realise their limited intellectual level and, therefore no attempts should be made to ridicule or expect more from them than their

level.

SUMMARY

1. The term *diverse learners* stands for those learners who deviate or differentiate from the normal or average learners in terms of the possession of some traits, characteristics, abilities or capacities to the extent that they require the use of diverse or different teaching strategies for their proper education and development. The children named as gifted, backward or slow learners, learning disabled, physically or mentally handicapped, etc. may be termed as some examples of these diverse children.
2. The specific or diverse teaching strategy used for teaching the gifted is termed as *enrichment programs for the gifted*. It asks for enriching the already existing programs and activities, usually meant for the average learners, in the manner as to suit the needs, aspirations and motivations of these gifted children.
3. Backward or slow learners feel a great difficulty in keeping pace with the normal school work. For helping these diverse learners in their learning and development, we need to make use of certain specific measures like (i) provision of suitable methods of teaching and strategies suiting their learning potential, needs and abilities, (ii) providing them special coaching and proper individual attention, (iii) putting proper reins over their truancy and irregular attendance, (iv) making provision for diversified courses and varied rich experiences in the form of the various co-curricular activities and instructional programs, (v) maintenance of proper progress record, and (vi) rendering proper guidance and counselling to them for dealing with their specific problems related to their backwardness.
4. Learning disabled children need the help of using suitable teaching strategies and programs for dealing with their particular learning problems like (i) making use of some appropriate remedial programs for covering up their deficiencies and learning problems (ii) placement in full time

special learning setting under the guidance of a specially trained teacher, (iii) behaving with them with a great patience and encouraging them for getting rid of their learning difficulty and (iv) making use of special measures and strategies for dealing with a particular type of learning disability such as dyslexia (learning disability related to language) or dyscalculia (learning disability related to learning or performing in mathematics) etc.

5. The measures and strategies utilised for the education and development of the visually impaired children, particularly the totally blind, may consist of (i) the use of other senses than the sight, such as touch, smell and hearing etc. (ii) carrying out their teaching-learning in the Braille scripts, (iii) providing necessary training for becoming independent in terms of carrying out their day to day activities and having necessary movements related to their social environment and work situations such as participating in co-curricular activities, craft work and sports etc.
6. The measures and strategies used for the learning and development of the hearing impaired may consist of (i) training them for learning the special means and methods of visual communication modes such as sign language, fingerspelling and cued speech, (ii) helping and training them in the use of other senses (senses of sight, smell, touch and taste) for their learning and development, (iii) making special provisions in the form of curricular and co-curricular experiences for developing their inner abilities to make them good artists, cartoonists, writers, fashion designers, architects, scientists, and craftsmen, etc. (iv) making vocational training and education as a compulsory part of their curricular programs, and, (v) harnessing the use of the developed communication technology and advances in computer applications for their education and adjustment.
7. Mentally retarded or disabled children may be known to suffer from the deficiency in adaptive behaviour and low scores on an intelligence test. The severity of their retardation gets increased depending upon the decrease in

their level of low intelligence (i.e., low IQ scores on a standardised intelligence test). All of the mentally retarded, thus are not capable of being benefited through the educational efforts. Among them, the children suffering from mild retardation with an average IQ of 52–67 only are considered educable, i.e. capable of receiving education. Therefore, attempts for providing some types of education are only limited to them with the adoption of measures like (i) to help them in reaching a reasonable level of educational achievement in tune with the capacity of their intellectual functioning, (ii) to make use of concrete material and audio-visual aids much suited to their level of understanding, (iii) to follow the principles of learning by doing and experiencing, learning through observation and imitation etc. in their education and training, (iv) to bring adaptation in the curriculum, learning, learning methods and environment according to their learning capacity, (v) making use of peer tutoring and peer mediation in the learning and adjustment of these children, and (vi) to accept them as they are with no attempt to ridicule, ignore or expect more from them than their level.

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