



M.A. (EDUCATION) PART-I (SEMESTER-I)

PAPER-IV

PEDAGOGY OF TEACHING

UNIT NO. A, B

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Lesson No. :

UNIT-A

- 1.1 : Pedagogy : Concept, Importance, Teaching and Learning : Concept and Relationship
- 1.2 : Objective Specification : Bloom's Taxonomy, Writing Objectives in Behavioural Terms
- 1.3 : Principles of Teaching, Maxims and Devices of Teaching
- 1.4 : Methods of Teaching : Lecture Method, Lecture Cum Demonstration Method, Project Method, Heuristic Method
- 1.5 : Micro Teaching and Its Skills

Note : Students can download the syllabus from department's website www.dccpbi.com

**Pedagogy : Concept, Importance, Teaching and Learning
: Concept and Relationship**

Structure of Lesson

1.1.1 Objectives

1.1.2 Introduction

1.1.3 Concept of Pedagogy

1.1.4 Importance of Pedagogy

1.1.5 Teaching

1.1.6 Learning

1.1.7 Relationship between Teaching and Learning

1.1.8 Conclusion

1.1.9 Suggested Questions

1.1.10 Suggested Books

1.1.1 Objectives :

After reading this lesson, students will be able to :

- (i) Define the term pedagogy.
- (ii) Understand the importance of pedagogy.
- (iii) Explain the concept of teaching and learning
- (iv) Understand the relationship between teaching and learning.

1.1.2 Introduction :

Education is a tri-polar process. It involves teacher, learner and teaching learning experiences. When people talk about the teaching, they will be referring to the way teachers deliver the content of the curriculum to a class. Teaching is always goal oriented and a planned activity in all aspects. When a teacher plans a lesson, they will consider different ways to deliver the content. That decision will be made on the basis of their own teaching preferences, their experience, and the context that they teach in. Teacher has to consider student's needs, abilities and mental level while planning the classroom actions, importance of all this planning and analysis gave the path to origin of the term pedagogy of teaching.

1.1.3 Concept of Pedagogy :

Pedagogy refers broadly to the theory and practice of education, and how this influences the growth of learners. It involves the methods and practice of teaching, especially as an academic subject or theoretical concept. Pedagogy is considered as an academic discipline that study how knowledge and skills are exchanged in an educational context and the interactions that take place during learning. Pedagogy is the art of teaching. Theory of pedagogy identifies the student as an agent, and the teacher as a facilitator. Conventional western pedagogies however hold the view that the teacher is a knowledge holder and student as the recipient of that knowledge. In simpler words Pedagogy is defined simply as the method and practice of teaching. It encompasses teaching styles, feedback, assessment and teacher theory.

Pedagogy is an art and a science of teaching effectively. Effective teachers use a wide range of teaching strategies because there is no single or universal approach that can be used in all situations. Various strategies are used in different combinations with diverse groups of students with the aim of improving their learning outcomes. Some teaching strategies are better suited to teaching certain skills, area of knowledge, student backgrounds, learning styles and abilities than others. Pedagogy is all about incorporating versatile teaching strategies in teaching to support intellectual engagement, connectedness to the wider world, supportive classroom environments and recognition of individual differences and subject areas. Pedagogy promotes the wellbeing of students, teachers and the school as well by improving student and teacher interaction and contributes to their sense of purpose for being at school. It also builds community confidence in the quality of learning and teaching in the school.

In this way the pedagogy adopted by teachers shape their actions, judgements and other teaching strategies through deep understandings of students and their needs, backgrounds and interests of individual students. The general aims of pedagogy are development of human potential and imparting and acquisition of specific skills up to maximum levels.

The term pedagogical analysis is a composition of two words pedagogy and analysis that stands for a type of analysis based on pedagogy. Analysis is a process of breaking a thing into its smaller parts, elements or constituents. We break a teaching unit into its constituents like subunits, topics or single concepts through the process of unit analysis. In addition, we can break the contents of the prescribed course in a subject into its various constituents such as major and minor sections, sub-sections, units and sub-units, major concept and minor concepts, topics etc by carrying out a process of content analysis. Therefore, the

analysis of a given content material in any subject any topic carried out well in the spirit of the science of teaching or pedagogy is known by the term pedagogical analysis of the content. Pedagogical analysis involves following four components :

- 1. Content Analysis :** Analysis of the unit/topic/single concept being taught by the teacher in the subject.
- 2. Objectives formulation :** Setting of the teaching or instructional objectives of the content material of the topic in hand by writing them in specific behavioural terms.
- 3. Selection of teaching strategies :** Methods, techniques, teaching learning activities, aids and equipments helpful for the teaching learning of the topic in hand quite in tune with the realization of the determined instructional objectives.
- 4. Evaluation :** Appropriate evaluation devices in the form of oral, written or practical activities and test questions etc for evaluating the outcomes of the teaching learning process carried in relation to the teaching of the topic in hand.

When a teacher is asked to perform pedagogical analysis of the contents of a subject/unit under the light of the relationship and interdependence existing among the above-mentioned four components he has to go through the cycle of the following steps :

Step-1 : Dividing the contents of the selected unit into suitable sub-units and arrange the selected sub-units in to a number of required periods.

Step-2 : Briefly write the essence of the content of the selected sub-unit.

Step-3 : Write appropriate previous knowledge required for the sub-unit.

Step-4 : Write appropriate instructional objectives to be selected for the sub-unit.

Step-5 : Select appropriate teaching strategies for the sub-units such as methods applied, teaching aids required, necessary demonstration or experimentation required, necessary board work required, questions related to the sub-unit and provide appropriate answers for them and a work sheet for the sub unit.

Step-6 : Give suitable examples/illustration/analogies for the sub-unit.

Step-7 : Prepare a table of specification for the sub-unit. Write at least six criterion referenced test-items each with specific criteria for the sub-unit.

It is quite clear from above discussion that pedagogy refers to the interactions between teachers, students, the learning environment and the learning tasks. This broad term includes how teachers and students relate together as well as the instructional approaches implemented in the classroom. There are some forms

of pedagogy as given below :

- 1. Teacher-Centred Pedagogy :** In teacher-centred pedagogy the teacher occupies the central position in the learning process and typically uses methods such as class lecture method, rote memorization and chorus answers. This approach is often criticized especially when students complete only lower order tasks and are afraid of the teacher. Here teacher feels less burdened but students are not actively involved.
- 2. Learner-Centred Pedagogy :** This pedagogical approach has many associated terms like constructivist; student-centred, participatory, active etc. It suggests an active role of students in learning process. Students here use prior knowledge and new experiences to create knowledge. The teacher facilitates this process and creates and structures the positive learning environment.
- 3. Learning-Centred Pedagogy :** Learning-centred pedagogy is a relatively new term that incorporates both learner-centred and teacher-centred pedagogy can be effective together. Main considerations of this approach include the number of students in the class, the physical environment, the availability of teaching and learning materials, etc. It is a flexible approach of pedagogy.

Pedagogical approaches are often placed on a spectrum from teacher-centred to learner-centred pedagogy. Though both the approaches may seem contradictory, they can often complementary to each other in the realisation of educational goals through learning centred approach.

1.1.4 Importance of Pedagogy :

Based on the latest developments in pedagogy, teaching has become more than an activity that conserves valued knowledge and skills by transmitting them to next generations. Therefore, teachers have the responsibility to challenge existing structures, practices and definitions of knowledge; to invent and test new approaches; and where necessary, to pursue organizational change in a constant attempt to improve the school. Pedagogy is a vital component of teaching learning process now days. Importance of pedagogy is as follows :

- 1. Effective Teaching :** Teaching effectiveness always relies on appropriate selection of content, methods, teaching aids and evaluation methods. An effective teacher always carefully plan and implement appropriate pedagogy.
- 2. Effective Learning :** Learning is dependent on the pedagogical approaches that teachers use in the classroom. A variety of pedagogical approaches are common in schools, but some strategies are more effective

and appropriate than others. The effectiveness of pedagogy often depends on the particular teaching strategies. In general, the best teachers believe in the capacity of their students to learn and carefully utilize a range of pedagogical approaches to ensure this learning occurs.

3. **Inclusiveness and Equity** : Teachers with positive attitude towards their students can effectively achieve the inclusiveness, equity and classroom. Students can be made more attentive and responsive with effective planning of teaching. Pedagogy helps the teacher to achieve inclusiveness and equality among student with help of pedagogy.
4. **Maintain Classroom Routine** : When teacher deals with large classes it becomes important to plan classroom activity more intensively to cater needs of each and every student. Many effective teachers set up routines for group-work, peer review, group discussions etc., to help reduce chaos and increase instructional time for large number of students.
5. **Pedagogy and Professionalism** : The other side of pedagogy that is important, particularly as it relates to professionalism, is the idea that a teacher plays a certain role and as such a professional must act in a certain way. A teacher is not a child's friend, not that they cannot be trusted or someone that the student can come to, but a teacher that strives to be friends with all their students can also create all kinds of problems given their other responsibilities that include evaluating student progress, handing out grades, handling discipline issues, etc.
6. **Content Knowledge** : Pedagogy involves the content analysis that deals with division of subject matter into small parts and study subparts to teach them with suitable method, techniques, teaching aids and other useful devices. In this way pedagogy helps a teacher to understand the content thoroughly and its shortcomings.
7. **Quality of Instruction** : Pedagogy aims at improving the quality of teaching process. A teacher goes through pedagogical analysis before teaching a particular course. This provides opportunities for improved teaching learning process.
8. **Classroom Climate** : Pedagogy helps a teacher to maintain conducive environment for the students in class. Intensive planning of units and sub units, selection of techniques and devices helps teachers to generate a positive environment in class.
9. **Classroom Management** : Effective planning including clarity of content, proper division of subject matter, proper time management,

selection of method, teaching aids and other techniques generate a better learning experience for the learners. In this way pedagogy helps to provide overall effective learning experiences in classroom.

Pedagogical effectiveness often depends on the effectiveness approach for specific school and student contexts. For example, certain learner-centred techniques that are effective in classrooms with fewer students may be difficult to accomplish in crowded or under-resourced classrooms. These strategies includes a strong grasp of pedagogical approaches specific to the subject matter and age of the learners, appropriate use of whole-class, small group, and pair work, a meaningful incorporation of teaching and learning materials in addition to the textbook, frequent opportunities for students to answer and expand upon responses to questions, helpful use of local terms and languages, varied lesson activities and a positive attitude towards students and belief in their capacity to learn.

1.1.5 Teaching :

Teaching is a science and an art. Teaching is an act of imparting instructions to the students in the classroom situation. In traditional classroom teaching the teacher provides information to students, or one of the students or one of the students reads from a text-book, while the other students silently follow him. Teaching is not merely imparting knowledge or information to students.

Teaching is to cause the pupil to learn and acquire the desired knowledge, skills and also desirable ways of living in the society. It is a process in which learner, teacher, curriculum and other variable are organised in a systematic and psychological way to attain some predetermined specific goals.

Some Expert Views about Concept of Teaching are as following :

Ryburn stated "Teaching is a relationship which keeps the child to develop all his powers".

According to Burton's view "Teaching is the stimulation, guidance, direction and encouragement of learning".

Whereas, in words of B.O. Smith, "Teaching is a system of actions intended to produce learning".

In simple words, the teacher consciously designs and plans educational experiences in the light of social environment. This is possible when the child participates in the social situations and there is an interaction between him and the environment. Nature of teaching can be explained under following points :

- 1. Teaching is social process :** Teaching is undertaken for the society and by the society. School is considered as miniature of society. One of the aims of teaching is social development of the learner.

2. **Teaching is giving information** : Teaching tells students about the things they have to know and students cannot find out themselves. Communication of knowledge is an essential part of teaching.
3. **Teaching is an interactive process** : Teaching is an interactive process between the students and the teaching sources, which is essential for the guidance, progress, and development of students.
4. **Teaching is a process of development** : Teaching causes development among learners. Being a goal oriented activity, teaching aims at all round development of learners. Teaching leads to physical, intellectual social and cultural development of students.
5. **Teaching leads to modification in behaviour** : Teaching is a planned activity that aims at modification of the behaviour of learners through various methods and techniques.
6. **Teaching is art as well as science** : Teaching is an art because teacher has to act as an artist while modifying the behaviour of students. It is science because teaching is based on certain scientific principles and maxima.
7. **Teaching is observable, measurable and modifiable** : Teaching is altogether a planned activity. It can be observed and can be measured in actual settings. One can modify his/her teaching based on feedback and evaluation.
8. **Teaching is skills occupation** : Every successful teacher is expected to know the general methods for teaching-learning process. Being a teacher requires a certain level of qualification and training for specific skills.
9. **Teaching facilitates learning** : Teaching and learning are supplementary to each other. Teaching and learning goes sidewise. Teaching actually causes the learning.
10. **Teaching involves guidance** : Teaching is a sort of guidance. Teacher is a guide and a mentor to learners. Teacher shows the path to students for successful living.

1.1.6 Learning :

Teaching and learning are two sides of the same coin. Learning is a lifelong process. It starts from the birth and it continues throughout the life of human. We learn things accidentally and incidentally in routine life. Learning is considered as core of the educational process. In general, learning includes a permanent change in learner's behaviour and is also manifestation of behaviour which is influenced by practice and experience.

Learning is an act of getting information, knowledge and skills. Learning brings change in behaviour of an individual or termed as modification of behaviour. Learning also involves new ways of doing things. It is a universal phenomenon that may involve various methods and means. Learning is a comprehensive process that involves cognitive, affective and psychomotor domain of human.

According to Webster's dictionary learning is "The act of experience of one that learns; knowledge of skill acquired by instruction or study, modification of behavioural tendency by experience".

According to Crow and Crow, "Learning is the acquisition of knowledge, habits and attitudes. It involves new ways of doing things and it operates in an individual's attempts to overcome obstacles or to readjust to new situations. It represents progressive change in behaviour. It enables him to satisfy interests to attain goal".

According to Gardner Murphy, "The term learning covers every modification in behaviour to meet environmental requirements".

From above definitions it can be concluded that learning is the modification of behaviour through practice and modification, and is a continuous process to meet environment requirements and involves acquisition of knowledge and skills.

Learning as development, is free to move towards either direction i.e. positive or negative. There is no guarantee that the individual will always pick-up good knowledge, desirable habits, interests and attitudes. He has equal chances to pick up opposite of this. Learning can be defined as the process leading to relatively permanent behavioural change or potential behavioural change. Maturation and learning are closely related to each other. Maturation helps in the process of learning which can only take place if the stages for that type of learning have been achieved through a process of maturation. Nature of learning can be explained in the light of following points:

Learning as adjustment :

Right from birth, the individual is faces problem of making adjustment to his physical as well as social environment. Learning is the proper means to achieve this end.

Learning as development :

Here the development is free to move towards either direction may be positive or negative. Learning results in all round development of the learner. Human development includes social, intellectual, mental, physical etc. type of development.

Learning is behavioural change :

Learning brings changes in the behaviour of an individual through which the individual gets himself adjusted to the changing situation. Learning can be defined as the process leading to relatively permanent behavioural change.

Learning and Maturation :

Learning is a natural developmental process. It is the growth which take place within the individual. Maturation and learning are closely related to each other. Maturation helps in the process of learning which can only take place if the stages for that type of learning have been achieved through a process of maturation.

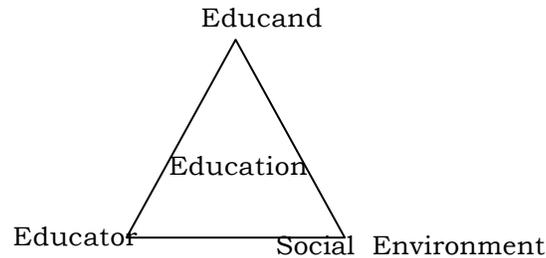
Learning and Motivation :

Motivation is the process of affecting, supporting and regulating activity. In the field of education, it is assumed that an individual's action and behaviour is determined by some internal or external stimuli. Motivation is an important factor in learning. The teacher cannot arouse the interest of the children without motivation, without which no learning is possible. Motivation is important in learning due to modification of the behaviour of the child; develop their personality in the right manner and proper motivation helps to maintain discipline.

1.1.7 Relationship between Teaching and Learning :

A teacher is someone who has acquired knowledge and is working to share that knowledge with learner. Teaching means imparting knowledge or skill, while learning refers to acquiring new information to a degree. Now question arises that how are they related to each other and to what extent? Does a relationship between good teacher and student exist? Learning and teaching are interrelated concepts. Relationship between teaching and learning is quite complex.

The modern concept of education is three-dimensional. John Dewey advocated education as a tri-polar process. Education is imparted in the society. The whole environment of the individual becomes the source of the setting. The teacher consciously designs and plans the experiences of the child in the light of the social environment. The process of education includes three things namely the teacher, the taught, and the social environment. Thus the Educator, the Educand and the social environment form the main poles in the tri-polar process of education as shown in figure 1.

**Fig. 1**

Teaching and learning is a sort of communication between teacher and learner. There is a movement or exchange of information from teacher towards learners in oral written or cue forms. On the other hand information moves from learners towards teacher in form of feedback or queries. So there teacher and learners act as two ends of a communication system where one act as a sender and other act as a receiver in certain educational settings.

A cause and effect relationship also exists between teaching and learning. Teaching causes learning that means teacher plans actions and use various methods and strategies to cause learning among students. Similarly learning is effect of teaching. Moreover, teaching learning process is cooperative in nature. Teaching is possible if learners cooperate and learning is solely depends upon the cooperation from teacher's part. Teacher guides, assist and motivate learners.

Teaching and learning both are goal oriented activities. When a teacher plans to teach he/she has some specific objectives in mind. Similarly learning is always directed by some aims and objectives determined by learner. Both the processes can occur in formal as well as informal setting.

Teaching and learning lead to modification of behaviour. In general education is defined as the modification of behaviour among learners through experience. Teaching is always based on the aim of modification of student's behaviour. Similarly learning results in behaviour modification of learner. In this way both the processes end up with one significant output i.e. modification of behaviour of the learner through teaching learning experiences in social setting. Apart from this both go through same means and ways to achieve the ends.

Teaching and learning are integrated circlers. There is always an interaction between teacher and learner and the subject being taught. These three things altogether names as the teaching learning process. It is the combined process where an educator assesses learning needs, establishes specific learning objectives, develops teaching and learning strategies, implements plan of work and evaluates the outcomes of the instruction with the aim of modifying the behaviour of learners.

Teaching and learning always coexist. Without learning there is no teaching. Teacher can only teach if learner is present physically or through online medium. On the other hand learning is possible if someone or something is teaching. Teaching and learning are two inseparable constructs. Learning may occur without the physical presence of teacher but an alternative, to teacher such as recordings, books, machines are always required. These alternatives can never completely replace the teacher. In formal learning teacher and learner should be in continuous contact. Thus it can be said that teaching is not possible without learners and learning is not possible without teacher. Teaching and learning are co-occurring process in any educational setting.

Moving further, it can be said that teaching is a mean and the learning is end of teaching learning process. Various methods, skills and techniques used by the teacher act as means of learning and lead to an end termed as learning. In this way teaching provides medium to get knowledge, information and learn various skills. Different theories of teaching are based on theories of learning. There are many cognitive, behavioural and social theories of learning. Classical conditioning theory, operant conditioning theory, insight theory, sign learning theory etc. are common theories used in field of teaching to effectively teach the students. Various psychological laws, principles, rules associated with learning are followed by teacher while teaching process. In this way sharing of common principles, rules, laws and theories between teaching and learning witnesses the strong relationship between both the variables.

1.1.8 Conclusion :

To cap it all, it can be concluded that pedagogy is science of teaching. Teaching and learning are interrelated concepts. The pedagogy adopted by teachers shape their actions, judgements and other teaching strategies through deep understandings or students and their needs, backgrounds and interests of individual students. The general aims of pedagogy are development of human potential and imparting and acquisition of specific skills up to maximum levels. Learning is what student does whereas, teaching is what teacher do. Between teaching and learning there is movement of information, information moves away from teachers towards learners. A good teacher is someone who always learns and always uses an effective pedagogy to teach learners and on the other hand a good student is someone who tries to find a new way to develop the current theme of teaching.

1.1.9 Suggested Questions :

- (a) Define pedagogy of teaching. Explain its importance in detail.

- (b) What do you mean by teaching? Discuss its nature.
- (c) Define learning. How it is associated with teaching.
- (d) Teaching and learning are two sides of the same coin. Explain.

1.1.10 Suggested Books :

- Bhatia & Jindal : A Text Book of Curriculum, Pedagogy and Evaluation, Paragon International Publishers.
- Sharma & Chaturvedi : Pedagogy of School Subject Social Science, R. Lall Educational Publications.
- Sharma et. al. : Teaching Learning Process, Twenty First Century Publications.

**Objective Specification : Bloom's Taxonomy, Writing
Objectives in Behavioural Terms**

Structure of Lesson

1.2.1 Objectives of Lesson

1.2.2 Introduction

1.2.3 Meaning of Objectives

1.2.4 Specification of Objectives

1.2.5 Educational Objectives

1.2.6 Instructional Objectives

1.2.7 Bloom's Taxonomy of Educational Objectives

1.2.8 Writing Instructional Objectives in Behavioural Terms

1.2.9 Summary

1.2.10 Self Evaluation

1.2.11 Suggested Readings

1.2.1 Objectives of the Lesson :

After reading this lesson students will be able to :

- (i) know about objectives and its significance.
- (ii) understand the concept of Educational and instructional objectives.
- (iii) explain Bloom's Taxonomy of Educational objectives.
- (iv) formulate objectives in behavioural terms.

1.2.2 Introduction :

The process of education involves three steps - (1) determining objectives, (2) providing experiences designed to achieve the objectives and (3) measuring and evaluating the results to determine if the objectives have been achieved. During planning of teaching, the learning objectives should be written in clear terms so that it can be explored what behavioural changes in what areas of the pupils are to be brought about.

Teaching is a purposeful and meaningful process. A teacher has a delimited set of objectives. The teaching objectives are identified often by analysing the content to

be taught. These are determined in planning step. The teacher can identify his teaching objectives with the help of his knowledge and understanding of educational objectives. Specification means atomising the objective by defining them in operational terms. It provides an insight into the whole teaching learning process. Specification identifies the testable objectives.

1.2.3 Meaning of Objectives :

As objectives is a normative concept which carries with it the idea of goodness or the desirable. What is desirable, depends on what we consider good for the learner. Thus what an individual or learner do we visualise as a result of having educated him through the instructional programme. This means particular types of behaviours or desirable changes that we can expect our students to acquire after undergoing education. It is those intended changes or learning outcomes or expected modes of behaviours that we like to appraise also in the pupils in order to judge the effectiveness of the educational process. The intended product of learning and not the content of learning is reflected in an objective.

An objective refers to values which are judged as desirable and are given priority for transmission through the educational process, yet it is not a value by itself. It is a product of value judgement. Likewise, an activity content, a learning situation or an experience of a process of learning, the medium of learning etc. are all means towards attainments or expected learning outcomes but are themselves not the end product of learning. Thus an objective is concerned with the learning rather than with the process of learning. An objective represents the end point toward which activities are directed. They reflect the purposefulness of the teaching learning process. Goals and objectives are often used synonymously. However, educationists, planners and evaluators use the term 'goal' as a general statement of desired outcomes, aims or purpose having long-range implications and involving complex behaviours. They are useful in stating the purpose of education, purposes of curriculum to assess a view point, in identifying priorities for a policy statement and to communicate with the layman. Statement of goals helps the teachers in communication of programme goals to administrators, students and parents besides conceptualising the desired outcomes in proper perspective i.e. Objectives indicate intended learning outcomes at different levels thereby providing direction to pupil's, growth. They provide a basis for planning and organisation of the learning experience and selection of an evaluation instrument. It is through objective that a link is established between teachers, evaluators, parents and students by focussing their attention on the intended product of learning. The teaching objectives are identified after analysing the content to be taught because teaching is a meaningful and purposeful activity. The teaching objectives

are determined in the planning step. The teacher can identify his teaching objectives with the help of his knowledge and understanding of educational objectives. The objective is statement or a form of category which suggests any kind of change. The objective has the following characteristics

- (a) It provides the direction for the activity, which is designed for achieving the ultimate goal.
- (b) It helps for the planned change.
- (c) It provides the basis of organizing activities.

1.2.4 Specification of Objectives :

The specification of objectives is primarily meant by visualising the scope and nature of each objective. It helps the teachers and evaluators to focus their attention on the terminal behaviour of students. It is intended learning outcomes that becomes the basis for evaluation as well as instruction. As far as testing is concerned, it is almost imperative that the testing situation should be so selected as to cover all these behaviours or learning outcome or at least adequate sample of those behaviours. Each of these behaviours can be tested singly or in combination of two's or three's as we normally do by using essay-type questions. Such a possibility of testing learning outcomes one by one is quite desirable, especially when we are interested in diagnosis of pupils weakness and providing remedial instructions to improve their achievement.

On the other hand it should not be considered that teaching can also be done one to one basis. For example, it is quite ridiculous to say, "I am now teaching for interpretation, then for analysis and then for developing ability to hypothesis". If we purposely do this, it means that we teach for a behaviour and test for that behaviour. We teach for another behaviour followed by testing for the same behaviour. Obviously, If we do that we are teaching at a lower level. In reality this is not the case. Teaching is an integrated act. It is neither possible nor desirable to visualize that a teacher is teaching for one particular objective for ten minutes. For the second objective for five minutes and so on. This is not the intent of specifying objectives in behavioural terms. What is needed is to appreciate the relationship between objectives, teaching or learning and testing. An examination is a sampling process while teaching is an integrative process. But what is worth realisation to the objective based teaching and objective-based testing so that the one could be related to the realisation of objectives and the other to the testing for those objectives. Specification means atomising the objectives by defining them in operational terms. More often than not, the focus of teaching remains more on the subject content than on the child's overt behaviour. What the child does in a subject, the subject does to the child in the form of bringing about changes in his

behaviour. If the objectives are specified in terms of intended pupil's behaviour which are listed as specifications under each objective, it serves a number of purposes like the following

1. It makes the **goal clear** by delimiting the scope of each objective.
2. It helps to **identify the objective** which are testable and those which are not testable.
3. It facilitates **identification and organisation** of teachable and learnable elements to the objectives.
4. It helps in deciding instructional strategies and selection of instructional material in terms of clearly defined outcomes.
5. It provides a **basis for selection** and **application** of evaluation procedure to judge instructional outcomes.
6. It helps to **communicate more effectively the desired outcomes** of instruction to students, parents and administrators.
7. It improves the **accountability** operations of a programme project.
8. It facilitates the **policy-planning** and the **decision making process** because of more adequate data on the strengths and weaknesses of instructional effects.
9. It reflects better the **individual needs** of students and **special needs** of different groups of students.

In fact, specification of objectives provides an insight into the whole teaching learning process.

1.2.5 Educational Objectives :

The educational objectives imply the changes that we try to produce in the child. The educational objectives are generally in the statement form. These are broad and philosophical in nature while the teaching objectives are specific learning objectives. When the list of specific objectives is prepared it may run into hundreds in a particular subject. It is therefore, essential that selection must be made on the basis of some criteria agreed upon by the specialists in the field. Following criteria may be useful for the selection of objectives :

1. Objectives should be worthwhile and have educational significance.
2. They should agree with the broader goals of education.
3. They should be in accordance with the psychology of learning.
4. They should be comprehensive enough to cover all areas of human development.
5. They should be attainable under the school conditions.

6. They should be testable in terms of observable and verifiable changes.
7. They should be acceptable to teachers from our stand point of teaching resources, availability of time and instruction.

The educational objectives are broad and they are related to educational systems and schools. The educational objectives are achieved with the help of teaching or learning objectives. The definition of educational objectives may be achieved in long period. B.S. Bloom has given a very comprehensive definition of educational objectives.

“Educational objectives are not only the goals towards which the curriculum is shaped and towards which instruction is guided, but they are also the goals that provide the detailed specification for the construction and use of evaluative technique”.

1.2.6 Instructional Objectives :

Instructional objectives are intended learning outcomes towards which pupils progress. They are the end results of learning stated in terms of changes in pupil behaviour. An increase in knowledge, a broadening of understanding, an improvement in a physical skill, a shifting of attitude and a deepening of appreciation are all classified as changes in behaviour. Learning outcomes can generally be divided into those that provide for maximum individual development. The mastery outcomes are typically concerned with the minimum essentials of course, that is, with those learning tasks that must be mastered if the pupil is to be successful at the next level of instruction. The developmental outcomes are concerned with those objectives that can never be fully achieved. Mastery objectives are typically concerned with relatively simple knowledge and skill outcomes.

Instructional objectives at the development level are typically concerned with the more complex learning outcomes (e.g., understanding, application, thinking skills). Thus, each general be listed for it. Mastery objectives are typically concerned with simple learning tasks on which pupils are expected to demonstrate a uniformly high level of performance. These objectives tend to be limited enough in scope that all, or nearly all, intended outcomes can be specified for each objectives. Development objectives are concerned with complex outcomes towards to which pupils can be expected to show varying degree of progress. Since these objectives emphasize higher order learning, that stress the transfer of knowledge and skill to new situations, only a sample of the infinite number of possible learning outcomes can be specified for each objectives.

1.2.7 Bloom's Taxonomy of Educational Objectives :

Bloom's Taxonomy is a set of three hierarchical models used to classify educational learning objectives into a level of complexity and specificity. This taxonomy was

named after Benjamin Bloom who published this taxonomy in 1956. This taxonomy is consisted of three domains as given below :-

- (1) **Cognitive domain** : The cognitive domain involves mental skills and is divided into 6 parts as shown in Table 1.
- (2) **Affective domain** : This domain involves growth in feelings and emotional areas and is divided into 5 parts as shown in Table 2.
- (3) **Psychomotor domain** : This domain of Bloom's Taxonomy deals with manual or physical skills. It is further divided into 5 sub parts as shown in Table 3.

TABLE-1

Cognitive Domain (Bloom)		
Level	Definition	Sample Verbs
Knowledge	Recall and remember information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states, memorizes, tells, repeats, reproduces
Comprehension	Understand the meaning, translation, interpolation and interpretation of instructions and problems. State a problem in one's own words. Establish relationships between dates, principles, generalizations or values	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives examples, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates, shows relationship of, characterizes, associates, differentiates, classifies, compares distinguishes
Application	Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the workplace. Facilitate transfer of knowledge to new or unique situations.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, solves, uses, systematizes, experiments, practices, exercises, utilizes, organizes
Analysis	Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates, investigates, discovers, determines, observes, examines
Synthesis	Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure. Originality and creativity.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates reorganizes, revises, rewrites, summarizes, tells, writes, synthesizes, imagines, conceives concludes, invents theorizes, constructs, creates

Evaluation	Make judgements about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports, calculates, estimates, consults, judges, criticizes, measures, decides, discusses,, values, decides, accepts/rejects.
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**Affective Domain
(Bloom)**

TABLE-2

Level	Definition	Sample Verbs
Receiving phenomena	Awareness, willingness to hear, selected attention	asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.
Responding to Phenomena	Active participation on the part of the learners. Attends and reacts to a particular phenomenon. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation)	answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes
Valuing	The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment.	completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works
Organization	Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system. The emphasis is on comparing, relating and synthesizing values.	adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.
Internalizing values	Has a value system that controls their behavior. The behavior is pervasive, consistent, predictable and most importantly, characteristic of the learner	acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.

**Psychomotor Domain
(Dave)****TABLE-3**

Level	Definition	Sample Verbs
Imitation	Includes repeating an act that has been demonstrated or explained, and it includes trial and error until a appropriate response is achieved.	begin, assemble, attempt, carry out, copy, calibrate, construct, dissect, duplicate, follow, mimic, move, practice, proceed, repeat, reproduce, respond, organize, sketch, start
Manipulation	Includes repeating an act that has been demonstrated or explained, and it includes trial and error until an appropriate response is achieved.	(similar to imitation), acquire, assemble, complete, conduct, do, execute, improve, maintain, make, manipulate, operate, pace, perform, produce, progress, use
Precision	Response is complex and performed without hesitation	achieve, accomplish, advance, exceed, excel, master, reach, refine, succeed, surpass, transcend
Articulation	Skills are so well developed that the individual can modify movement patterns to fit special requirements or to meet a problem situation	adapt, alter, change, excel, rearrange, reorganize, revise, surpass
Naturalization	Response is automatic. One acts "without thinking"	arrange, combine, compose, construct, create, design, refine, originate, transcend

1.2.8 Writing Instructional Objectives in behavioural terms :

The task of preparing instructional objectives can be simplified, if we constantly observe expected outcomes of teaching-learning situations. We are not identifying subject matter of content but the reaction of the pupils are to be made for this content. We have to note changes in pupil's behaviour resulting from experiences likewise, we have to list the expected results of instruction and not describing what we intend to do during instruction.

Writing objectives means to not down the changes in pupils behaviour during teaching learning process. So it is beneficial to define our instructional objectives in terms of learning outcomes. The main advantages of writing objectives in behavioural terms are :

1. Teaching activities are determined.
2. Teaching and learning process may be integrated for effective learning outcomes.
3. Teaching and testing can be made objective-centered.

4. The appropriate teaching strategies and tactics can be selected for effective learning.

In developing a list of objectives for a course of study, we have two immediate goals in mind. One is to obtain a list of instructional objectives. The other is to state these objectives so that they clearly indicate the learning outcomes that we expect from the course.

1. Identification of Instructional Objectives :

Identification of general instructional objectives for any course of study includes :

- (i) To identify the general purpose of the course and analyse each purpose of the course into definite statement of general instructional objectives.
- (ii) To analyse the content of the course and add the instructional objectives suggested by content analysis.
- (iii) Addition of instructional objectives resulting primarily from methods of instruction by examining the teaching methods.
- (iv) Consult experts for making list of objectives and add those instructional objectives that are be sure that all important outcomes have been included.

2. Stating the general instructional objectives :

- (i) State the general instructional objectives as intended learning outcomes and include only one objective in each statement.
- (ii) State the general instructional objectives so that each encompasses a class of behaviour that can be further defined by a set of behaviourally stated learning outcome and group the objectives in terms of type of learning outcome indicated by each objective.

3. Defining the general instructional objectives :

- (i) List a representative sample of the specific learning outcome that characterize the attainment of each objective.
- (ii) State the specific learning outcomes in terms of observable components of those concepts that are lacking common meaning.

In defining instructional objectives, it is, of course, impossible to list all specific learning outcomes that characterize the attainment of each general instructional objective. However, enough should be listed for each objective to clarify the typical behaviour of pupils who have satisfactorily achieved the objective. When instructional objectives are viewed as outcomes and are defined in behavioural terms numerous types of behavioural changes might be included. In addition to the more obvious knowledge outcomes, those in areas of understanding, application, thinking skill, performance skills, attitudes, interests, appreciation, and adjustment

should also be considered. Although our emphasis has been on the process of preparing instructional objectives, the adequacy of the final list of objectives can be appraised in terms of the extent to which it includes all important outcomes of the course, it is in harmony with sound principles of learning. It is realistic in terms of the abilities of the pupils and the time and facilities available and it clearly indicates the intended learning outcomes in terms of changes in pupil behaviour. No matter how comprehensive a set of instructional objectives may be, however, there are likely to be some unanticipated outcomes of instruction.

Methods of Writing, Instructional Objective in Behavioural Terms :-

There are various methods of writing of objectives in behavioural items. It have five historical basis :

1. Drucker (1954) advocated that the activities of management should be explained in terms of objectives. He emphasized the behavioural aspects of the objective.
2. B.S. Bloom (1956)-emphasize objectives in examination system inspite of content. Pie suggested that in examination system achievement tests should be objective- centred, rather than content-centred. Thus, he made an effort to write these objectives in behavioural terms.
3. Robert Mager's Approach (1962) is most popular in the development of programmed instruction. In this approach he gives emphasis on action verbs rather than mental processes. The cognitive objectives can best be realised by programmed instruction strategy. He considers that the behavioural objectives can be written in following manner :
 - (i) Identify the terminal behaviour by name.
 - (ii) Describe the important conditions under which the behaviour is expected to occur.
 - (iii) Specify the criteria of acceptable performance by describing how well the learner must perform to be considered acceptable.
4. Robert Miller's Approach (1962) is used for writing psychomotor objectives in behavioural approach. The origin of this approach is from the military science. Thus, the training objective can be best written by Miller's approach.

In this approach, he emphasised skill analysis. He outlined the following procedure for writing psychomotor objectives in behavioural terms :

- (i) Description of the indicator, indicating the relevant or essential activity.
- (ii) Description of indication or stimulus which calls for a response.
- (iii) Controlling of the object which is to be attended.

- (iv) Writing or description of the activity to be performed.
- (v) Indication of the response should be adequate or feedback.

Miller points out that a specific objective written with above procedure can be used as an action manual.

5. NCERT (1972) (Regional College of Education Mysore-RCEM) also developed an approach for writing objectives in behavioural terms. This approach is applicable for cognitive objectives and psychomotor objectives of teaching and training.

1.2.9 Summary :

Teaching is a system of activities which are likely to result in learning, whereas learning is the modification of behaviour through practice and experience. But both teaching and learning are closely related to each other. As learning theories and principles of Learning become the basis for designing teaching theories. Teaching is always based on certain objectives. These objectives are based on three domains i.e. cognitive, conative & psychomotor objectives of teaching should be specific, attainable and of Educational significance.

1.2.10 Self Evaluation :

- (i) Define Objective specification.
- (ii) Explain Educational objectives in detail.
- (iii) What are the techniques in writing instructional objectives in behavioural terms?
- (iv) Explain Bloom's Taxonomy of Educational Objectives in detail.

1.2.11 Suggested Readings :

- | | | |
|-------------------------------|---|--|
| Bloom, B.S. | : | Taxonomy of Educational Objectives, Hand Book-I Cognitive Domain, Longman Green and Co. New York, 1956 |
| Ruhela | : | Educational Technology, A Systematic Text Book, The Associated Publishers, Ambala Cantt, 1991 |
| Sampath, K. et. al. | : | Introduction of Educational Technology, Sterling Publishers Private Limited, New Delhi, 1984 |
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Principles of Teaching, Maxims and Devices of Teaching Structure

1.3.0 Objectives

1.3.1 Introduction

1.3.2 Principles of Teaching

1.3.2.1 General Principles of Teaching

1.3.2.2 Psychological Principles of Teaching

1.3.3 Maxims

1.3.4 Devices

1.3.5 Summary

1.3.6 Self Evaluation

1.3.7 Suggested Questions

1.3.8 Suggested Reading

1.3.0 Objectives :

After reading this chapter students will be able :

- (i) To understand the principles of teaching.
- (ii) To explain the meaning of maxims.
- (iii) To describe the meaning of teaching device.

1.3.1 Introduction :

Teaching is a planned activity that thrive to attain determined objectives. Teacher plays a vital role by using various methods & techinques in achieving these goals. Teacher always try to give maximum benefits to learners. These techniques mainly include principles of teaching, maxims of teaching and teaching devices let us discuss about these techique in detail.

1.3.2 Principles of Teaching :

1.3.2.1 General Principal of Teaching :

(a) In Accordance with the Level of Students

All matters pertaining to any subject cannot be taught to all the students of all the ages. Primary students are to be given different type of information than secondary

and higher secondary students, It is, thus, imperative that subject-matter should satisfy the requirements to the children of different age groups. In fact that funds of knowledge with subject is so vast that one could easily arrange it according to the age and understanding level of the child.

(b) The Information should be Valid

The world is changing fast as a result of researches and innovations. The old is giving a place to the new. The old information needs to be deleted and new provided in its place. For example, a few years ago, Walki Talki was not known to the local people. Similarly the technique of recording of telephone message wasn't at all known.

Had we taught the smaller students of primary level at that time, when these innovations were not available, it would have been incorrect. But when all the information has been made or can be demonstrated at local level it will be appropriate to teach it to them. Similarly, at times the historical facts are interpreted in accordance with the rules. What happened in 1857 when some Indian soldiers of British Army in India revolted against the empire to get India liberated. Britishers termed it as mutiny. But later on the researchers found substantive information to term it as first war of Indian Freedom. The need is that only that information is given to the students that is valid and reliable.

(c) An Organic Whole

For instance when social study is a compound of different sciences and the subject-matter of different sciences is to be taught to the students, the fact remains that it is to be taught and organised in such a way that the strings of different disciplines are not visible and the subject-matter is an organised whole. It is better if the information to be provided in this year is based on the information provided during the previous year of the students. At times cheap publishers, in order to sell their books, do not record correct facts. Such text books should not be recommended for the students to read.

(d) Experience Based

It is practical science where attitudes, values and habits are formulated and deformed. The curriculum should be such that it should contain not only information but series of skills and activities. It is absolutely necessary that whatever information the subject passes to the students it should become as part of their daily life. It should modify their behaviour in the required direction.

(e) In Accordance with the Aims and Objectives of teaching Subject :

There are different aims of teaching any subject at different levels. The curriculum has to be in accordance with these aims. It should be ensured that no such matter is included which does not lead towards that objective. For example, if the objective of teaching social studies is to teach about the construction of road, electricity and

water supply, the curriculum should include the functions of municipality and Panchayat. Similarly, if national integration is to be taught the emphasis should be on the knowledge of different religions, different states and different sub-cultures of India. The logic behind all religions is the same but different religions have different interpretation of the reality. The need of the hour is that all similarities of values of different religions should be highlighted and explained to the students in the correct perspective.

(f) Comprehensiveness

One of the functions of is to widen the comprehension from self to international level. When the child is born, he is member of the family only. Then he is to be Integrated in the neighbourhood, locality, states, nation and then international level. It is an indication that the subject-matter is so organised that it should not only look after health, survival, outlet of instincts and emotions but should cover wider levels also. First of all let one feel community feelings in the class, followed by school, the neighbourhood and nation. For this purpose the curriculum is to be so arranged and managed that the information seems to be an integrated whole and students step up in the right direction without knowing that he is entering a difficult field.

(g) Life-Long Learning Progress

The attitudes, values and problems solving process should be so organised amongst the students that a zeal for further learning is cultivated and an ambition to learn further is developed amongst them. It will be possible if the framework of curriculum organisation is guided by customs, morals and values of the community. It should grow out of the actual life situations rather than away from actual living. It is one of the duties of the teacher to initiate the student in the attainment of knowledge in such a way that learning becomes his way of life. The funds of knowledge are growing so rapidly that it is practically impossible to live with the state knowledge. That is why the people consider the present era as the era of life long process of education.

(h) Community Living

Community is the laboratory of learning any subject. The horizon, experience and values of the children are formulated and broadened in context of the prevailing conditions of the country. That curriculum is so arranged that it initiates an individual for his/her participation in community activities and develops interest in it. It is a democratic country and it is the responsibility of all to take it in the right direction by active participation in socio-cultural affairs.

(i) National Integration and International Understanding

The principles of curriculum construction must include the goal of national integration as well as world understanding. For example, India is a vast country, with extreme

types of topography, diversified climate, lots of religions, many subcultures and a good number of races. The country is to be kept intact as a nation and efforts are to be made so that a sense of patriotism is cultivated amongst the people. It has been possible to keep this great country as a unit. The lives of great persons need to be taught so that the question of national integration comes to the forefront. For example, if the lives of Guru Gobind Singh, Shivaji Maratha and Netaji Subhash Chander Bose are taught to proper context, the love for country can be brought to the forefront and feeling for love of the country will be cultivated. All this can be done at primary and post-primary stage. It can be helped for international understanding as in this world almost all countries are dependent upon each other. A world war, now means end of humanity. It is thus essential that world values should be encouraged. International figures, saints civilisation etc. need to be included in the curriculum of secondary stage. Similarly, the values of democracy need to be taught to the students in such a way that students work in oneness and one world rather than narrow, parochial interests. The economics should bring out and emphasise the need for inter-communication and co-operation between nations and continents. The course of civics in higher secondary classes should teach and paint a picture of United Nations and international agencies and an objective account of their great towards international co-operation and maintenance of peace and harmony. It should also present the picture of the other nations of the world in such a way that tourism is encouraged. The love for world tourism can also be cultivated by giving photographs of other nations and cultures. It is interesting for an Indian to go to Denmark and to observe the open life of that country. Similarly the people in Denmark have deep interest in Indian theology and culture. Such knowledge should be made a part of the curriculum.

1.3.2.2 Psychological Principles of Teaching is made effective by taking into account the psychology of the child. These principles are made by keeping in mind the abilities, aptitudes, capacities and potentialities of the learner. They are formulated from the student's point of view only. They would always generate interest in the child for learning. The desire to learn not only makes his learning more effective and easier but it also helps him to retain the subject matter in mind for a longer time.

General principles are followed by the teachers to make teaching-learning process effective whereas the Psychological Principles take the help of motivation of the students. General Principles cover a wide range as compared to the Psychological principles which work within limited range. A few Psychological principles of teaching are explained here below :

(a) Principle of Motivation : Teaching is a triple process which involves the interaction of the teacher, the taught and the subject matter. For this, co-operation between the teacher and the taught is a must. Now the conception of teaching and

learning has changed. It is no longer a process of teaching only. The emphasis has now shifted from the teacher to the learner. The important thing is to see whether the learner co-operates, whether his interest is there. The teacher's job is to motivate the learner by creating different methods and techniques of his interest. Motivation, therefore, is of supreme importance, How to motivate the learners is the pertinent issue.

The children are interested in their surroundings. The teacher should, therefore, provide to them relevant material. Some problems linked with their life situations may be put forth. The learners will try to be inside that problem and make all efforts to find out its proper solution. The Students should, therefore, be motivated towards the topic. The teacher has to teach. It is motivation which will make them interested in the topic and they actively participate in the class. Better learning on the part of students will be there if they are motivated towards the topic. Environment of the class can be changed to break the monotony of the class. Aids can be used for the smaller children and for the matured students. Previous knowledge testing can be a potent motivation.

For example, while teaching English grammar, the teacher should first explain the importance and need of learning English in present day world-how English can help them choose a better career and how it can be helpful for securing a good job. In this way, the students will be motivated to learn English well. Undoubtedly, motivation and interest are the two central factors in any process of teaching and learning.

(b) Principles of Repetition and Exercise :

The teacher should show several times what he supposed to teach in the class so that the learners are able to grasp and understand the subject objective clearly. It also helps them to retain it in their minds for a longer lie. Exercises for further practice may also be given as class work or as home assignment. Practice makes a man perfect. The students will fully grasp a thing when they are in a position to do it themselves. The teacher who makes use of exercises like revision, recapitulation, application of what has been taught to the students etc. can teach the students efficiently.

(c) Principle of Feedback :

During teaching the teacher should try to give positive reinforcement to the students. Some sort of feedback helps the students to learn things better. The knowledge of results should also be given to the learners side by side and as quickly as possible. In the classroom situation's there are some students who have cramming habits, for to win the attraction of the teachers. The teacher should be able to judge about tins type of students. There are some other students who are creative type. He should encourage them to the maximum.

(d) Principle of Sympathy and cooperation :

During teaching, the teacher should pass sympathetic attitude and a co-operative bent of mind. Usually the students are afraid of the teacher. A good teacher is always kind and tries to understand every student. He shows fatherly affections and motherly cooperation to his students. Whatever may be the situational good teacher remains sympathetic and affectionate.

(e) Principle of Self Learning :

A good teacher encourages the self efforts made by the students for learning anything. He teaches in such way that the learners acquire habit of self learning. The teacher no longer believes in spoon feeding while teaching. He may start with the lecture method but gradually he takes the students to self learning situations. He remains there in the background helping and guiding them wherever they need some help or guidance.

(f) Principle of group dynamic :

The teacher should understand group-dynamics. He should try to inculcate among the learners a suitable type of group-behaviour For this purpose he does his job of teaching in such a way that he succeeds in making his students well behaved in every type of situation may be as individuals or in group. The children learn better in a group. They are also able to develop qualities of tolerance, co-operation, sacrifice etc. The teacher should, therefore, encourage group learning.

1.3.3 Maxims

The teacher must follow basic maxims of learning. The teacher should always proceed from simple to complex, from known to unknown, from particular to general and from concrete to abstract. It will simplify things and make them understandable for the learners. Suppose the teacher wants to teach the two words table and honesty. He should take up the word 'table' first because it is concrete and the other word 'honesty' being abstract should be taken up after-wards. Besides, the teacher should also take the child into consideration, his age, ability, physical environment, general aims etc.

- (a) Known to Unknown :** This maxima is based on the assumption that the student knows something we are to increase his knowledge and widen his outlook.
- (b) Simple to Complex :** According to this maxim in earlier phase simple things are presented to students. When students become comfortable with simpler version then complex things are introduced gradually.
- (c) Concrete to Abstract :** This maxima emphasize using concrete concept first and followed by abstract concepts. As concrete thinking is easy as compared to abstract thinking.

- (d) **Particular to General** : While teaching the teacher should first of all take particular statements and then on the basis of those particular cases, generalization should be made.
- (e) **Emperical to Rational** : Emperical knowledge is based on observation and first hand experience while rational is always based an our arguments and explanation. So the safe approach is Empirical knowledge followed by rational knowledge.

1.3.4 Devices of Teaching :

Teaching is an art. Its special role is to impart knowledge, develop understanding and skill of students. Teaching is a skillful function. Teacher uses different skills to make teaching effective. Firstly, he determine the aims of lesson and then he uses different teaching methods and techniques to achieve them. In the science of teaching learning these techniques are called teaching devices.

The teacher has to make use of devices in order to facilitate the learning process and to economise efforts. A great variety of teaching techniques are being used in schools. The teacher chooses his techniques to suit the subject matter, class and number of other factors.

1.3.4.1 Meaning of Teaching Device :

A.H. Garlick defines, “Teaching devices are the teacher’s tool and if good work is to be produced the right tools must be used in the right way”. So Garlick has clearly explained that the educator begins by deciding the subject he wants to teach. Then he follows it up by section and proper arrangement of the subject matter and finally arrives at the question of the method he should adopt to teach the subject to his pupils. Sometimes he turns to explanation, at other to exposition, at yet other time he turns to story telling. The teacher must also makes use of many illustrations. The main teaching devices are the following :

1. Questioning and answering.
2. Narration
3. Explanation
4. Descriptive
5. Exposition
6. Illustration
7. Using Teaching Aids
8. Using Library
9. Evaluation

10. Drill work
11. Home work
12. Assignments

(i) Assignment Device

Assignment means the work has been allotted to the pupil or class. Assignment means for substituting and supplementary teaching work.

(ii) Characteristics of Good Assignment :

1. It should be useful and definite for pupils.
2. It aims at motivating the students.
3. It must be stimulating and co-operative.
4. It should be related to curricular activities of the students.
5. It also provides understanding of the subject-matter and learning by insight.
6. It should be related to the problem solving.
7. It provides directions to learning activities.

(iii) Purposes of Assignment :

1. To Encourage Initiative : It provides opportunities to encourage initiative of pupils.
2. To Provide Direction : It aims to provide guidance to pupils about learning activities.
3. To Develop Good Study Habits : It aims to develop good study habits and right attitudes.
4. To Provide Motivation : It motivates the pupils and arouses interest in study.
5. To Develop Learning by Insight : It develops learning by insight and understanding of the subject-matter.

(iv) Material of the Assignment : The material should be suited to the needs of the pupils.

(v) Evaluation of the Assignment : Assessment is part of a measurable education system. If we have a system that is going to offer credits, certificates and other qualifications, we will also have assessment. It must be evaluated by teacher so that they may be able to produce positive results.

1.3.4.2 QUESTIONING DEVICE

The oldest and most famous of the various techniques of teaching is asking questions. The good teacher allows his pupils to express their own ideas, stimulating them to think by interposing questions in their recital. In view point of our eminent educationist Thring, "Teaching means skillful questioning to force the mind to see to arrange and to

act.” In this context Parker says, “questioning is the key to all educative activity.” Parkers says questioning plays very important role in education, activities. In the words of Colvin, “No teacher of elementary or secondary subjects can succeed in his instruction who has not a fair mastery of the art of questioning. So Colvin emphasis that putting question is art.

(i) Purposes of the Questioning : Purposes of the questioning are given below:

1. To motivate and arousing interest of pupils.
2. To test previous knowledge and understanding.
3. To locate difficulties and solving them.
4. To increase active participation of students.
5. To maintain social discipline.
6. To promote intellectual development.
7. To impart knowledge.
8. To arouse self-confidence.
9. To provide stimulating environment.
10. To test the understanding of students.
11. To recapitulate the lesson.

(ii) Types of Questioning :

1. Preliminary or Inductory Questions : These questions are asked in the beginning of the lesson and the purpose of asking these question are to test the previous knowledge and to motivate the students.

2. Developing Questions : These questions are asked by the teacher during the lesson. Teaching develops in subject-matter with the help of students’ answering. The purpose of asking these questions are to stimulate mental activity in pupils, to discover new facts and to direct attention to important points.

3. Recapitulatory Questions : These questions are put at the end of the whole lesson as well as at the end of each unit in the progress of the lesson. The purpose of asking these questions are to revise the lesson and to fix the knowledge learnt in the minds of the students.

(iii) Characteristics of Good Questioning

1. **Clarity :** The question must be clear. It should not be vague. For example “Who is the Chief Minister of Punjab”? is a good question but “Who is the Chief Minister?” So question should not be ambiguous lengthy and vague. It should be clear, brief and to the point.
2. **Simplicity :** The language should be simple. Question should framed according to the age, abilities and interest of the pupils.

3. **Specificity** : Question should be specific. Questions should be framed in such a way that these do not encourage guess work.
4. **Stimulating** : A good question should be challenging the child to think.
5. **Relevance** : Question should be relevant to the topic and subject-matter.
6. **Single Question** : A good question involves a single idea.
7. **Question to Whole Group** : Questions should be addressed to the whole group and not to individuals.
8. **Grammatically Correct** : Question should be grammatically correct.
9. **Definite Purpose** : Questions should reflect a definite purpose. A question has no value unit if it does not have a definite purpose.
10. **Avoid 'Yes' or 'No' Response** : Question should avoid yes or no response.

Suggestions for Effective Questioning

1. Questions should always be asked seriously. It is improper to laugh.
2. Questions should be addressed to the whole class.
3. Preparation for putting questions should be in lesson plan.
4. To provide opportunity to all students of the class.
5. After the question is addressed, sufficient time should be given to the students to think and formulate the answer.
6. The teacher should not repeat questions unnecessarily.
7. The structure of question should not be changed.
8. Question should be relevant to topic and developing subject-matter.
9. The form and language of the question should be varied in order to bring variety.
10. Teacher should occasionally ask questions to back-benchers and inattentive students.
11. Question should be asked in a pleasing and affectionate manner.
12. Teacher should avoid double-barrelled questions.

1.3.4.3 ILLUSTRATION DEVICE

In the illustration device of teaching, a subject is explained by providing examples of facts or experiences of which the learners are already aware. In this device it is implicit to adopt the principle of proceeding from known to unknown. Illustrations are used to explain some abstract idea or theory. It is implied a progress from the concrete to the abstract. In each case, the real aim in providing an illustration is to create an association between present facts and the learner's past experience in order to create the right background for presenting new knowledge.

(i) Advantages :

1. Students easily understand the concept.
2. Illustrations not only help in teaching and understanding, but also memorizing or retaining the subject-matter.
3. It helps to overcome the difficulties faced by the learner, in understanding the concept.
4. It tends to increase the learner's interest in the subject and to enhance his curiosity to know more about subject.
5. They are provided mental exercise because increased interest and attention lead to greater observation and better retention and recall.
6. It also helps in the explanation of abstract concepts and many scientific principles. For this reason, teaching by illustration is considered essential for the teaching of many sciences.

(ii) Suggestions for Effective Use of Illustrations :

1. Illustrations should be relevant to the concept ;
2. It should be simple and comprehensive. They should be easily understood.
3. Large number of illustration should not be used in a single concept. Too many illustration sometimes spoil their value.
4. It should be exact and accurate.
5. It should also be interesting.
6. They should be presented at suitable time.

So illustrations should be wisely selected, effectively prepared, timely presented, proper handing and intelligently used.

1.3.4.4 EXPOSITION DEVICE

In this teaching device, the more difficult aspects of a subject are exposed or explained in detail in order to help the learner to understand them. According to an eminent educationist, "To expose means to open, to exhibit, to display, to disclose." Exposition means to give new information to the pupils. Exposition is part of the teaching of almost all subjects, but it has its greatest utility in the teaching of languages.

(i) Advantages of Exposition Teaching Device

1. Facts and concepts becomes clear to the students.
2. It helps the students to memorize and retain the subject matter.
3. It is more beneficial for science and languages students.
4. Students explain the subject-matter easily.

(ii) Suggestion for Effective Use of Exposition Teaching Device

1. The teacher should make clear the objectives of the lesson.
2. There should be logical sequence and systematic exposition.
3. It is not desirable to make the exposition rapidly. The speed of exposition should conform to the linguistic abilities of the learners.
4. The teacher should use simple and comprehensive language.
5. In an exposition, the teacher should stress the main features of the lesson and if necessary also write them on the chalk-board.
6. To make the exposition useful, the teacher should also make extensive use of proper illustration and examples.
7. During exposition the teacher should be asked questions in order to sure the success of the exposition. The teacher should encourage the students to ask questions to clear their doubts.
8. Exposition should come to proper time.

1.3.4.5 Importance of Devices of Teaching :

Devices of teaching are very important in teaching learning process. John Mandler has given the following justification of the use of teaching devices.

1. **Teach Quickly :** Devices of teaching are used in order to teach quickly and effectively.
2. **To Increase Interest :** Devices of teaching are used in order to create or sustain interest in the pupils.
3. **To Integrate Work :** Devices of teaching serve as means of integrating number of other pieces of work, already learned by other means.
4. **To Bring Something New :** Devices of teaching are helpful in bringing something new to children in a simplified way.
5. **To Teach Thoroughly :** Devices of teaching are used in order to teach more comprehensively, so that the children may retain the subject matter taught. So that why proper use of teaching devices are makes teaching and learning quick, effective, purposeful and interesting.

1.3.5 Summary : It can be concluded that there are a number of General & Psychological principles, Maximas in teacher's hand for better teaching. Many Devices are there to furnish teaching in classroom these all are tools. and if good work is to be produced, the right tools must be used in a proper way. Sometimes he turns to explanation, exposition, at another time he turns to illustration etc. So the teacher uses different devices of teaching. The major devices of teaching are ; Questioning and Answering Narration, Descriptive, Exposition, Illustration, Using teaching aids,

Using library Drill work, Evaluation, Home-work and Assignments, etc.

1.3.6 Self Evaluation:

- | | | |
|------|--|---------|
| i) | Teaching is a skilful function | Yes/No |
| ii) | The teacher must not make use of many illustrations. | Yes/ No |
| iii) | Good assignment should be related to the project method. | Yes/No |
| iv) | Illustration should be relevant to the concept. | Yes/No |

KEY

- | | | | | | | | |
|----|-----|-----|----|------|----|-----|-----|
| i) | Yes | ii) | no | iii) | No | iv) | yes |
|----|-----|-----|----|------|----|-----|-----|

1.3.7 Suggested Questions

1. What do you mean by term maxim of teaching ? Discuss some major maxim of teaching.
2. What do you mean by assignment? Discuss its characteristics in detail.
3. "Questioning is a tool in the hand of a teacher to make the teaching effective". Comment.
4. Define the term 'Illustrations'. How to make effective use of illustrations?
5. What is the meaning of 'Exposition'? Discuss its merits.
6. Write short notes on the following :
 - (a) Meaning of Teaching Device.
 - (b) Purposes of Assignment.
 - (c) Characteristics of Good Questioning.
 - (d) Advantages of Illustration.
 - (e) Importance of Teaching Devices.

1.3.8 Suggested Readings

1. Sharma, R.N. (2000) : Principles of Techniques of Education, Surjeet Publications, Delhi.
2. Ahuja, M. and : Educational Technology, Bawa Publications, A. (2002) Publications, Patiala.
3. Mohanty, J. (2003) : Modern Trends in Educational Technology, Neelkamal Publication Pvt. Ltd., New Delhi.
4. Manjeet Kaur : Teaching of Social Studies (English)
Gurmeet Singh (2004)
5. Sodhi, Suri, Sodhi (2003): Teaching of Social Studies, Bawa Publications, Patiala.
6. Sandhu, P.K. (2003) : Teaching of Social Studies, 21st Century Publications, Patiala.

**LECTURE METHOD, LECTURE CUM-DEMONSTRATION METHOD,
HEURISTIC METHOD, PROJECT METHOD****1.4.1 Objectives****1.4.2 Introduction****1.4.3 Lecture Method****1.4.4 Lecture-cum-Demonstration Method****1.4.5 The Heuristic Method****1.4.6 Project Method****1.4.7 Conclusion****1.4.8 Suggested Questions****1.4.9 Suggested Reading****1.4.1 Objectives :**

After reading this chapter students will be able :

- (i) To understand the concept of Lecture, Heuristic and Project Method.
- (ii) To know procedure of project method.
- (iii) To understand the merits and demerits of various teaching methods.

1.4.2 Introduction :

Teaching was considered as an art, but as per the emerging concept of microteaching it is a very complex process and consists of many skills. In simple words, teaching constitutes a number of verbal and non-verbal teaching acts, like questioning, accepting pupils response, rewarding, smiling, nodding to pupil response, movement, gestures etc. These acts in particular combination facilitate the achievement of objectives in terms of pupil growth. A set of related teaching acts or behaviours performed with an intention to facilitate pupil's learning can be called as a teaching skill.

From the experience we feel that there is a lot of teaching in our schools, but there is a very little good teaching in our schools. Again a very little research has been done on the nature of teaching. We have not formulated the theories of teaching, laws of teaching and principles of teaching to match with various theories, laws and principles of learning.

Again a skilled teacher will not know a wide variety of methods of teaching but also know how and when to use each of these most advantageously. A teacher should not be a slave of a particular single teaching method. He should use a variety of

teaching methods according to his own abilities, interests and experiences and also that of the students working under particular circumstances. A method 'best' for one teacher and applicable for a class under same circumstances may totally be a failure for another teacher to teach the same or other class under the same or different circumstances.

A "method" is careful thought-out plan to achieve definite goals, using one or more techniques of teaching. As applied to science education, methods refer to techniques used to provide the best kind of a learning environment possible wherein the pupil's behaviour can be shaped and directed.

1.4.3 LECTURE METHOD

This is the method which is generally followed in colleges and in schools with big classes. In this method only the teacher talks; the students are passive listeners and they do not take any active part. Pupils listen, get bored, yawn and sometimes go to sleep as well. The teacher acts like a chatterbox, talking and talking all the time without ascertaining whether the students are following him or not. The students are spoon-fed and their powers of observation and reasoning, the exercise of which is so essential in the learning process, are not stimulated.

Perhaps this method originated in very ancient times, when printing press had not been invented and hand-written manuscripts were very few, is hardly of much use for teachers in today's class rooms.

According to L. Ghanshayam Das, "The lecture method is very attractive and easy method of teaching. It gives both teacher and pupil a great sense of satisfaction with their progress." For past several decades, this method has been vogue in the teaching of science. In those days, it was believed that teacher could impart knowledge only with the help of the text-books and by delivering lectures. Now, with the information of psychology in the field of education, this practice has been given up to some extent. It is believed that this method can be useful at the college level only. In primary, junior high school and secondary classes, this method is not very useful.

No doubt this method is very useful in completing the course of the curricula. The teacher and the taught, both may feel satisfied that they have completed the course but one lacuna remains. It is that teacher remains active in the process of education. The faculties of the pupils remain dormant. There is no scope for observing and reasoning.

1.4.3.1 Merits

1. It is very attractive, speedy, concise and very easy to follow without much botheration on the part of the teacher and the taught. The teacher feels secure and satisfied.

2. It is economical because no laboratory is needed and one teacher can teach a large number of students at a time.
3. Lengthy syllabi can be covered in a short time by this method.
4. Factual information and historical anecdotes can be easily imparted by this method.
5. The logical sequence of the subject matter can be easily maintained. Since the teacher has to plan the lectures in advance, there cannot be gaps or over-lapings in the development of the lesson.
6. Good lectures have high inspirational value, sometimes students pick up motivation, inspiration, instigation, zeal, ambitious ideas and do some-things creative in life.
7. It visualizes ideas which too often appear cold and impersonal when printed in the pages of books. They say, that spoken words are frequently far more effective than the printed one. While lecturing, the teacher can indicate by tones, gestures and facial expression.
8. It provides better opportunity for clarification of concepts and emphasis upon important meanings.
9. It can be adapted to the abilities, interest, previous knowledge and needs of the pupils.
10. It can be organised in accordance with the principles of educational psychology rather than the logical organisation of the text book materials.
11. Lecture serves a pattern of good oral expression, which may tend to counteract careless and incorrect speech of the pupil. Good lectures can stimulate even brighter pupils.

1.4.3.2 Demerits

1. It lays too much stress on memory work. Experimental work is neglected and the power of observation of a child is seldom exercised.
2. It does not encourage independent thinking, discovering, exploring and taking initiative. It is a type of spoon feeding and all the faculties of the child are not allowed to develop.
3. When the teacher lectures and talks there is no guarantee whether the pupils are concentrating and understanding all what the teacher is teaching.
4. The rate of imparting knowledge and information may be too rapid and the students may not get necessary connections of thought in the learning process.
5. In this method the teacher is active participant while the students are passive listeners which is opposed to the principles of psychology. The interest, aptitudes and capabilities of the pupils are ignored.
6. It does not help to inculcate scientific attitude and training in scientific

method among the pupils.

7. There is no place for 'learning by doing' in this method. The very root of science is cut when practically nothing is done, for 'science is something which must work.'
8. This method is undemocratic. Rather it is authoritarian. The pupils are encouraged to depend upon one authority i.e., the teacher. They cannot challenge or question his verdict. Obviously, to develop critical thinking and reasoning power, so essential for democratic living, is ignored altogether. For the success of lecture method, the teacher should choose occasion for his lectures with great care. It is always better to prepare a synopsis of the lecture. The teacher must be very careful about the delivery of the lecture. Lecture should often be followed by written test.

At the school stage lecture method should be used to the minimum. It can be used to motivate, to clarify, to review or to expand the contents. While using this method efforts should be made to make it interesting so as to keep the students involved in the teaching-learning process.

1.4.4 LECTURE-CUM-DEMONSTRATION METHOD

This method combines the merits of lecture method with that of demonstration method. So it is named as Lecture-cum-demonstration method. In a lecture method the teacher merely talks whereas in a lecture-cum-demonstration method he really teaches. The teacher performs experiments before the class and meanwhile goes on asking relevant questions from the class. The students are encouraged to observe carefully, because they have to describe each and every step of the experiment accurately and draw inferences. The students are questioned and cross-examined concerning the problem in hand and their inferences are discussed in the class. Thus, unlike in a lecture, they are active participants in a demonstration and their faculties of observation and reasoning are properly exercised.

Demonstrations are useful in helping children to understand the way of doing something, such as the proper way to remove insulation from wire or how to connect two batteries in series. They are also of value in providing experiences which extend the meaning of a concept, principles, or theory. For example, a teacher helps the class to understand—Newton's third law of motion 'to every action there is an equal and opposite reaction', by having pupils observe the direction of motion of a wagon as he steps from the rear of the wagon.

In this method, the practical application of the theoretical knowledge is demonstrated. This method can very easily act as a complimentary method of lecture method. The teacher gives a demonstration and the students observe it carefully. Students are expected to be active participants in the demonstration.

The lecture method without demonstration is like still picture with sound and the

demonstration method without lecture a picture is motion without sound. Mere lecture would make the students passive listeners. While presenting the experiments of demonstration, new facts are also presented. In order to make this method successful, the following precautions must be taken.

1. While demonstration is going on, questions should also be posed to students. These questions help the students to understand the underlying principles.
2. While giving demonstrations, the teacher should try to illustrate the facts and the principles with the help of pictures, models, films etc.
3. The teacher should present the demonstration in a very exact lucid manner. There should be perfect accuracy in demonstration and explanations, being made by the teacher.
4. The demonstration should be bright and interesting. As far as possible attempt should be perfect accuracy.
5. Demonstration should be simple and speedy.
6. The teacher should prepare the demonstration thoroughly well. He should not come to demonstrate without thorough preparation.
7. Demonstration should be properly spaced and it should be striking clear and convincing.
8. In order to develop originality in the students, as far as possible, only the demonstrations and experiments given in the text books should not be repeated. Attempt should be made to present similar experiments.
9. The students should be made active participants in these demonstrations. They should be asked to observe the things and answer the questions.
10. Background and the class arrangements should be scientifically planned. Demonstration should be such that the students may be able to see things clearly.
11. A big black-board behind the teacher's table in class-room is essential for drawing necessary sketches and diagrams and noting readings, observations etc.

1.4.4.1 Conduct of a Demonstration Lesson

There are following six essential steps to be followed in a demonstration lesson.

1. Planning and preparation
2. Introducing the lesson
3. Teaching
4. Experiments
5. Black-Board work
6. Copying and supervision

A vast majority of the science teachers follow demonstration method. So there is a

need to discuss the above six steps in detail.

I. Planning and Preparation

Demonstration method is in fact an essence of the teacher's ability and therefore he must be thoroughly prepared for it. While preparing he must bear in mind the following points.

- (a) Subject matter;
- (b) Lesson notes including the type of questions to be asked;
- (c) Rehearsal of experiments;
- (d) Collection and arrangement of apparatus required.

The teacher may be fully conversant with the topic concerned. Still it is a wise policy to go through the relevant pages of the text book of the students. This will enable him to be exact and to the point. Drawing up a lesson-plan is equally necessary and this should include a list of the principles to be explained, a list of the experiments to be demonstrated and the type of questions to be put to the students. This will make his teaching very systematic. Nothing discourages a student more than a badly prepared demonstration where nothing works. Each and every experiment, therefore, should be rehearsed under the same conditions that prevail at the time of demonstration. Rehearsal of experiments will enable the teacher to collect all the requisites for the demonstration work. But it is all the more important that each and everything is arranged on the demonstration table in a wise and proper manner for the lesson as thoroughly as a girl prepares for her wedding.

II. Introducing the lesson

It is useless to start a lesson without properly motivating and preparing the minds of the students for it. The lesson should be introduced in a problematic manner so that the students can appreciate and realise the importance of the topic in hand. For, when a teacher is able to awaken the keenness and enthusiasm of his pupils, half the game is won. Much depends upon starting a lesson in the right way. The teacher should begin the lesson with some personal experience or incidents, a simple and interesting experiment, a familiar anecdote or by telling a story. He should keep in mind the value of an interesting experiment, the experiment which will set his pupils talking in school and out of it, about the wonderful things they have seen or done in the science lesson. Not to speak of the start, it should be the constant enthusiasm of the teacher to maintain interest and enthusiasm of the pupils alive through the lesson. He should, on every suitable occasion, introduce and experiment which will arrest their attention by its striking results.

Examples

- (i) The anecdote of Guericke's experiment with hemispheres of 18 inches radius being pulled apart by a team of sixteen horses can be related to create interest

- in a lesson.
- (ii) To start the topic of carbon dioxide, the teacher may open a soda water bottle in the class and ask about the visible gas coming out of that.
 - (iii) To introduce various methods of transmission of heat, the teacher may bring a few toffees in the class and tell the students that he wants to distribute the toffees before starting the lesson. Let them give three possible methods of distribution in which the teacher does not move from his seat. These methods may then be related to conduction, convection and radiation.
 - (iv) The story of the shepherd boy and his crook is very suitable for introducing a lesson on magnetism.
 - (v) Hydrogen can be introduced by bringing two balloons of equal shape, size and colour, one filled with air and the other with hydrogen. When both are left, one goes up and the other comes down. Why?

III. Teaching

- (a) Lesson should not consist of 'dry bones' of an academic course but a breath of treatment is essential. Teaching, in fact, should be kept on as broad basis as possible. The actual lesson may be concerning some prescribed topic, but the teacher is at liberty to treat it in narrow sense or to introduce into his teaching material and illustrations from a wide field of knowledge and experience. For example, in a lesson on the principle of Archimedes, "the narrow academician" will feel content when he has demonstrated two or three experiments, the results of which prove the law. On the other hand a better teacher will describe his pupils many and varied illustrations and applications of the principle met within different phases of life. Such as ships, floating bodies, diving and rising of submarines, the use of balloons and air-ships. Even if the lesson deals with a particular branch of science, a widely read and well-informed teacher will draw illustrations from all branches of science. In addition to this wherever practicable, reference should be made to the names of great scientists and their works. The lives and achievements of great men are always sources of inspiration and an acquaintance with their early difficulties encourages the young pupils.
- (b) Teaching, as far as possible, should be through well thought out and judicious questions. The questions should be so arranged that their answers form a complete teaching unit.
- (c) For effective teaching the lesson should be properly delivered. In the delivery of a lesson the voice of the teacher plays an important role. The teacher should speak slowly, deliberately and with correct pronunciation.

While delivering the lesson the teacher should keep an eye on each and every

pupil and absent minded student should be made attentive.

IV. Experimentation

The work at the demonstration table should be a model for the students to copy. An unclean and untidy demonstration will lead to bad work in the practical class. The main points about experimentation are summarised below.

- (a) The experiments must work and their results should be clear and striking. The teacher should never try to make an experiment succeed by illicit means. Every time the teacher has to say, "Well, this is what should have happened." Otherwise the confidence of the pupils is lessened in learning.
- (b) Experiments should be simple and speedy. Long drawn-out experiments with complicated apparatus defeat the purpose of demonstration.
- (c) Experiments should be well-spaced throughout the lesson. It is wrong teaching to complete all the experiments at an early part of the lesson or rushed in at the end.
- (d) Large number of experiments do not always make the topic very clear. In fact one big convincing and striking experiments is of more value than half a dozen experiments not closely related.
- (e) Reserve apparatus should always be kept near the demonstration table so that much time is not wasted in collecting the apparatus in case of breakage.
- (f) Apparatus should be arranged in an order in which experiments are to be shown.
- (g) It is a wise policy to store the demonstration apparatus intact until it is to be used again. This results in much economy of time for the busy science teacher.

V. Blackboard work

As the face is an index of mind, blackboard work is an index of teacher's ability. The writing on the blackboard should be neat, clean and legible. Blackboard is a very useful aid in demonstration lesson. It is mainly used for two purpose :

- (a) for writing important results and principles in a summarized form.
- (b) for drawing necessary sketches and diagrams.

VI. Copying and supervision

The demonstration lesson will remain incomplete if the students do not copy the blackboard summary and the sketches drawn on the blackboard. A record of the blackboard is that of the student and there is no harm in copying it. The students are not mature enough to make their own notes and sketches and therefore copying of the blackboard summary is useful for them. The teacher should go to the seats of the students and see if they are copying properly.

1.4.5 THE HEURISTIC METHOD

Prof. Armstrong of the Imperial College, London advocated Heuristic Method half a century ago, by which the pupil was to find the answer to his problems by his own unaided efforts. When science first became a school subject, it was often taught without the laboratory practice which provides first-hand contact with concrete things. Consequently, it became a list of facts and technical terms to be memorised and discovery and experiment played little part. The Heuristic method attacked the evil boldly instead of the pupil being told everything, they were to be told nothing. The teacher was to set a problem for them in the laboratory and then stand aside while they discovered the answer. It was presumed that if knowledge is to acquire genuine meaning it must be experienced if it is to be conserved and used as a passive recipient of information he become a discover of knowledge, an active independent agent.

It is contended that acquiring of knowledge is to be a pursuit after truth, an outcome of personal experience. The purpose is to utilise the instinct of curiosity in children and prompt them to make a fact finding approach to all aspects of learning. A spirit of enquiry and adventure is to be awakened through self-observation and experimentation. The pupils are trained to discover facts, principles and laws to systematise the knowledge learnt and to arrive at generalisation, all through self-efforts. The main aim of teaching by the Heuristic method is not so much to teach facts of Physics & Chemistry, but to teach how knowledge of these may be obtained, systematised and used. In short, process is considered more important than the product.

1.4.5.1 Meaning

The term 'heuristic' has been derived from a Greek word 'heuristic; means to 'find out or discover'.

Prof. Armstrong defines it in these words : Heuristic Methods of teaching are methods which involve our placing students as possible in the attitude of the discover. "So any method which excites children to work and think for themselves can be called 'Heuristic Method'".

The method requires that the pupil should approach his scientific studies from the position and in the spirit of a research worker, for science is not a subject and the correct way of learning is by doing. Armstrong believed in doing and not in observing what was being done. So this method is opposed to the Demonstration Method in this respect.

Again to learn science is to do science is the concerned view of veteran man of science as well-known Indian educationist Dr. D.S. Kothari. He further says, there is no other way of learning science. This must be learnt at the beginning of the study of science, even at the school stage.

It may be concluded that any method is opposed to dogmatic methods of teaching

in which the observing and reasoning powers are most exercised; in which the pupils work and think for themselves; in which habits of self-activity and self-dependence are fostered is called the 'Heuristic Method' of teaching.

1.4.5.2 Procedure

Each student is given a sheet of instructions and is required to perform the experiment concerning the problem in hand. The students perform the experiments following these instructions and may sometimes get a bit of guidance from the teacher. Some people are of the opinion that the students are to be told nothing. They should follow the instructions and do everything themselves. But there are situations when even a little of guidance from the teacher can do not of good.

The students are to work according to instructions, perform experiments and keep a record in their note-books. They also put down the conclusions arrived at and the bearing which these conclusions have on the problems in hand.

Regarding the selection of the problem there is a view that the problem must be suggested by the pupils themselves, as far as possible. The students cannot take a lively interest if the problems are imposed from above. For, it is demand for activity rather than receptivity, for discovery rather than dogma.

1.4.5.3 Method of training

An eminent educationist pointed out that the objective of Heuristic Method is "to make pupils more exact, more truthful observant, thoughtful, dexterous, to lay the solid foundations for future, self-education and to encourage the growth of a spirit of enquiry and research'. In their daily life, the students face so many social problems and they try to solve them by gathering information from different sources. There is no spoon-feeding on the part of the teacher and in this way the students get a training in the scientific method of attacking and solving a problem. Westway has aptly remarked." Essentially, therefore, the heuristic method is intended to provide a training in method, knowledge is secondary consideration altogether".

Again the importance of the Heuristic Method has been given as "If the Almighty were in the one hand to offer me truth and in the other search after truth I would humbly but firmly choose search after truth. "Even Huxley said, "The great end of life is not knowledge but action."

1.4.5.4 Merits

1. It develops a scientific and a critical attitude among the pupils so that they may learn how to arrive at truth and make important decisions through trial and error method.
2. Pupils become self-dependent, self-reliant and self-confident as they learn through self-activity.
3. Pupils becoming attention seekers of the teacher through their activities is possible and the relation between the teacher and the taught becomes more

intimate.

4. Habits of industry and hard-work are encouraged.
5. The facts learnt are retained for a much longer time because they are the result of child's own efforts. He learns from direct experience.
6. It prepares the child for life by giving him training in scientific method. He can solve any social problem that may arise in his future life by attacking it scientifically.
7. The problem of home-work is solved. The students carry out all the work in the school and if they felt it necessary to read and consult some references at home they are free to do so. The teacher has no worry to give home-work to the students.
8. The method is based on the psychology of the child and the principle of learning. The maxim "learning by doing" forms the basis of this method.

1.4.5.5 Difficulties and demerits of Heuristic Method

In spite of the several advantages this method has also certain difficulties in it :-

1. This method presupposes a very small class and a gifted teacher. It is, therefore, not suited to our country because the number of students in each class is quite large in our country. It cannot work very well if the class is large and the teacher is not very gifted.
2. The progress is very slow when this method is employed because when we make an investigation or discovery, we take enough time. The heavy syllabi cannot be covered smoothly in due course of time.
3. Since this method takes a lot of time the teacher as well as the taught do not have the satisfaction of having accomplished something worthwhile in the given framework of existing school conditions.
4. Heuristic treatment can be applied to certain branches of science more as compared to other branches. Due to this, sometimes we find that the great stress is laid on those branches of the subject that involve measurement and quantitative work. This work is sometimes not suitable for a particular group of students or a particular branch.
5. This method sometimes leads to mechanical carrying out of the experiments. Experiments are carried out only for the sake of carrying out the experiments.
6. No text-books are available for this method. Hence students as well as the teacher feel a sort of difficulty in adopting this method.
7. It is very costly method and it requires well-equipped laboratories and big libraries.

However, inspite of all the difficulties and drawbacks, this method is useful for the teaching of science under certain circumstances.

1.4.6 Project Method

Project Method is the outcome of John Dewey's philosophy of pragmatism. He says "What is to be taught should have a direct relationship with the actual happenings in life,". In order to understand this method, let us try to think over the meaning of the term "project".

According to Stevenson-"A project is a problematic act carried its completion in its most natural setting".

According to Kilpatrick-"A project is a whole-hearted purposeful activity proceeding in a social environment".

According to Ballard-"A project is a bit of real life that has been imported in to school". These definitions present to us the following characteristics of a project:

1. A project is an act related to actual life activities.
2. This act is undertaken to solve a emerging or felt problem in order to realize some useful and purposeful objectives.
3. It is always accomplished in a social environment and a natural setting.
4. The project activity will remain interesting and absorbing throughout for the learner.

Project plan is a more modified form of an old method 'concentration of studies'. The main feature of this plan is that some subject is taken as the core or center and all their school subjects, as they arise, are studied in connection with it. It is also based on the principle of learning by doing. It assumes that knowledge grows by application. It is also based on the fact that the different branches of knowledge are not separable, though they are studied separately for some superficial convenience. Knowledge is invisible, and project method is a method in accordance with this natural correlation. It is method of spontaneous and incidental teaching. As the project progresses, the learner go on picking up any piece of knowledge that may happen to be relevant, necessary and useful.

1.4.6.1 Procedure :

The carrying out of a project involves the following six steps :

1. Providing a situation.
2. Choosing and purposing.
3. Planning of the project.
4. Executing the project.
5. Evaluation of the project.
6. Recording of the project.

1. Providing a Situation :

In the first step, a situation is provided to the students to think over in choosing some project to work on.

2. Choosing and Purposing :

In this step students try to choose a definite project keeping in view of the resources in hand. They are properly guided by their teachers in the selection of a project.

3. Planning of the Project :

In the planning phase, the project chosen is again discussed in terms of laying down a plan and procedure for the execution of the project.

4. Executing the Project :

At this stage the project is in process. All the students play their roles according to their abilities and capacities.

5. Evaluation of the Project :

The work done on the project is evaluated from time to time.

6. Recording of the Project :

In this step the students note down the whole process of the project, i.e. how the project was chosen, planned and executed, what type of difficulties were faced and how they were solved. This is kept as record for the future guidance.

There cannot be any rigidity about these steps and stages. Modification and adjustments can be made according to the nature of the project and the level of the students. The teacher has to make among the pupils an equitable distribution of work, according to their abilities and stamina. On the whole the project work remains a cooperative activity of the teacher and the taught and it is joint venture before the students.

A project should arise out of a need felt by pupils. It should not be forced on them. It should be important and purposeful. It must be interesting for the students.

Ex. 'Understanding about a local industry' may be a project for the students. The following aspects may have to be dealt with for the accomplishment of the project.

1. The name of the industry (e.g., sports goods)
2. Location of various important factories engaged in the industry, and the names of the concerns.
3. The reasons justify the location of the industry in that area.
4. The source of its raw material.
5. The geography of its raw material.
6. The expansion of the industry over a span of time.
7. Whether factory is individual enterprise, joint concerns or cooperative societies.
8. Approximate number of people employed in that industry.
9. Their ranks, grades and salaries.
10. Annual turn out of various factories.
11. The share of profit for different share holders.

12. The progress of different factories in the matter of production and income from year to year. The graphs of this progress.
13. The scope of further expansion of the industry.
14. The relation of the industry with other social institutions.
15. The contribution of the industry in the overall development of the area.
16. The type of qualifications-general and technical which can enable a person to get employment in that industry.
17. Any scientific, chemical or mechanical processes involved in various factories.
18. Visit to important factories.
19. An essay on this local industry.
20. A quiz competition on the local industry.

While answering these and many other possible queries, the students will acquire a through knowledge of local industry and at the same time learn many relevant topics of different subjects. The teaching of relevant mathematics will also come in incidentally.

1.4.6.2 Merits of Project Method :

1. Better learning takes place in a project plan because the pupils get the opportunity of active participation and creative self expression.
2. The project enables the pupil to apply the principles learnt in school of life situations.
3. It is interesting to the pupils because it is an active programme.
4. It is based on the psychological laws of learning.
5. Education is related to life and is acquired through meaningful activity.
6. It upholds the dignity of labour.
7. There is an ample scope for the transfer of training.
8. It introduces democracy in education because the studies have to cooperate and act together for a common cause.
9. It brings about concentration of studies and correlation between knowledge and activity.
10. It emphasizes problem solving rather than cramming or memorizing.
11. It inculcates social discipline through joint activities.
12. It develops self-confidence and self-discipline.
13. Teaching becomes incidental as the child is motivated by the desire to learn.
14. A project tends to illustrate the real nature of a subject and its application.
15. Project can be used to arouse interest, justify the study, encourage initiative and give the students joy at the successful completion of a given work.
16. It poses a challenge to the capacities and abilities of the learner and puts him on the track to think and act.
17. It provides opportunities of mutual exchange of ideas.

18. It develops a number of social virtues like sense of responsibility, resourcefulness self-respect, tolerance, patience etc.
19. Even backward children learn things with ease.

1.4.6.3 Drawbacks of Project Method :

1. Project method creates many challenges for the teacher right from the selection of the project till its execution. Every teacher is not adequately equipped and informed to provide required enthusiasm, and leadership for the carrying out of a project.
2. Mathematics cannot be taught adequately by this method. Incidental teaching does not suffice in this subject which needs well-organized, systematic and continuous teaching. There are so many branches, topics and aspects of Mathematics that may hardly be covered through projects.
3. The drill and practice work which is the backbone of the Mathematics teaching cannot be provided through project method.
4. Through long drawn out project, hardly a part of the syllabus can be covered, therefore it does not suitably replace the present day speedy classroom teaching.
5. Our schools can neither afford sufficient funds nor provide competent personnel for teaching through project method.
6. Suitable books are not available which may help the teacher to follow this method.
7. A limited opportunity available in a project for practical experience cannot develop skill, speed and efficiency in problem solving.
8. Our educational structure is examination oriented. The project method does not prepare the students adequately for the examination.

1.4.6.4 Conclusion :

This method brings the life to the school atmosphere. Learning becomes a pleasure and a cooperative activity. Its approach is quite scientific and psychological. Irrespective of having so many points in its favour, the project method suffers from so many handicaps and limitations, as it is not suitable for drill, problem solving efficiency and systematic teaching. It is not very desirable to use it freely. The present classroom teaching can not be replaced by project work. However, if the teacher can devise and plan a good project on something, the students will gain a lot. Mathematics must be frequently taught in the way it is utilized in our practical life. Here lies the need of working out some useful and productive activity in the form of projects. A wise teacher should employ project for the teaching of real and useful Mathematics. Project will be useful to show the application of new tool, application of a new formula, application of the subject life and produce spirit of enquiry and

self reliance.

1.4.6.5 Some Suitable Projects :

A few projects suitable for the subject of Mathematics are listed here for the teacher's guidance :

1. Running a school bank.
2. Running a cooperative store.
3. Collecting data about municipal, provincial and national budgets.
4. Graphs of employment, population etc. in the locality.
5. Mathematics in the school campus.
6. Use of Mathematics in large business.
7. Bus and railway fares from their locality to important stations.
8. Running and hostel mess.
9. Purchase of items for the school.
10. Collecting rates of commodities from a number of sources in the bazaar.
11. Model of the town.
12. Model of the state.
13. A picnic, its organization, expenditure etc.
14. The sports day.
15. Planning and constructing a house.
16. Speed records of cycle, scooter, car, bus, train and aeroplane over a number of years.
17. The uses of Mathematics in a large establishment.

1.4.7 Conclusion :

A good method of teaching always results from the observation of certain principles of teaching and learning. Learning becomes a pleasure and a cooperative activity when he is at the central point of the teaching process. To make teaching effective, a teacher must be in a position to use any permutation and combination of methods, devices and techniques to make the subject interesting, vital and living, so that there is maximum learning at the part of the students. The use of different methods for teaching different subject or to use combination of different methods in the teaching of one topic is also essential for avoiding monotony against the students, class and the teacher.

1.4.8 Suggested Questions :

1. Compare and contrast the lecture-cum-demonstration method with heuristic method.
2. "If the Almighty were in the one hand to offer me truth and in the other search after truth. I would humbly but firmly choose search after truth, "Explain the same and write your views on the heuristic method.
3. What is Project Method. What are its merits and demerits.

1.4.9 Suggested Books :

1. Armstrong. H.E. The teaching of Scientific Method, Macmillan Co., New York.
2. Duggal, S.D. Teaching Chemistry in Indian School.
3. Heiss, E.D., Obours, E.S., Hoffman, C.W. Modern teaching, Macmillan Co., New York.
4. Kothari, D.S. Report of Education Commission 1964-66.
5. *The teacher of Mathematics* by K.S. Sidhu, Chapter Seven, Pages 120-137.
6. *A Course in Teaching of Mathematics* by S.M. Aggarwal, Chapter Six, Pages 78-103 A.
7. *Text Books on Teaching of Mathematics* by S.K. Mangal, Chapter Seven, Pages 52-80.
8. *Teaching of Modern Mathematics* by S. Packiam, Chapters four and five, Pages 14-30.

Lesson No. 1.5

Micro-Teaching and Its Skills

- 1.5.0 Structure
- 1.5.1 Objectives
- 1.5.2 Introduction
- 1.5.3 Concept of Micro Teaching
- 1.5.4 Phases of Micro Teaching
- 1.5.5 Self Evaluation
- 1.5.6 Skills of Micro Teaching
 - 1.5.6.1 Introducing a Lesson
 - 1.5.6.2 Questioning
 - 1.5.6.3 Illustrating with Examples
 - 1.5.6.4 Stimulus Variation
 - 1.5.6.5 Reinforcement
 - 1.5.6.6 Using blackboard
- 1.5.7 Summary
- 1.5.8 Questions for Practice
- 1.5.9 Suggested Books

1.5.1 Objectives

After going through this lesson the students will be able to

- (1) Understand the meaning of micro-teaching
- (2) Explain the phases of micro-teaching.
- (3) Elaborate the skills of micro-teaching, such as questioning, stimulus variation.
- (4) Explain the reinforcement and blackboard skills of micro-teaching.

1.5.2 Introduction

National policy in Education (1986) and its Review Committee Report (1992) emphasized the need for reform in the context and process

of teacher education. The establishment of National Council for Teacher Education (NCTE) as a statutory body is an evidence of the serious concern of the Government of India for quality in teacher education. Teacher competency is central in improving the quality of educational system. There are various feedback devices which are being used currently in India as well as in other countries for developing teaching competency and for the modification of teacher behaviour. These are considered new innovations and current practices in teacher education programmes. Microteaching is one of the innovations in teacher education programmes.

1.5.3 Concept of Micro Teaching

'Micro' in layman's language is small. When a big complex task is divided into small parts or units, each part is known as 'micro'. The concept of micro-teaching, which aims at improving teacher training, involves making complex things simple. It was originally evolved by Dwight W. Allen and his colleagues at Stanford University in USA in 1961. Since then it is widely being used in its original form as well as in its modified form. It is also used as a research technique to understand the skills of teaching, because the process involves making complex things simple, is also called 'scaled down sample of teaching'. In India, it was first used by Centre for Advanced Study in Education in Baroda in 1970.

The term microteaching was first used by Dwight Allen and his colleagues at Stanford University in 1963. They experimented with the help of videotape in modifying teacher behaviour towards desired objectives. Since then a number of researches have been undertaken in the area of microteaching.

Basically, microteaching is a "scaled down teaching encounter" in which a teacher teaches a small unit to a group of 5 or 10 pupils for a period of 5 to 10 minutes. Microteaching is a design for teacher training, which provides trainees with information about their performance immediately after completion of their lessons.

Microteaching has been defined in different ways. According to Flanders, N.A. (1960) says "Micro-teaching programme is organized to expose the trainee to an organized curriculum of miniature teaching encounters, moving from the less complex to the more complex".

Allen (1966), "Microteaching is a scaled down teaching encounters in class size and class time". The Encyclopedia of Education (1971) defined micro-teaching as "a real, constructed, scaled down teaching encounter which is used for teacher training, curriculum development and research". Passi and Lalita (1976) have stated that, "Microteaching is a training technique which requires student teachers to teach a single concept using specified teaching skills to a small number of pupils in a short duration of time". L.C. Singh (1977) elaborated the concept of micro-teaching as "a scaled down teaching encounter in which a teacher teaches a small unit to a group of five pupils for a small period of 5 to 20 minutes. Such a situation offers a helpful setting to an experienced or inexperienced teacher to acquire new teaching skills and to refine old ones". In the words of Jangira and Singh (1982), "Microteaching is a scaled down teaching encounters or miniaturized classroom teaching". Definition of L.C. Singh highlights both the process as well as the purpose of micro-teaching.

1.5.4 Phases of Micro Teaching

According to Clift and others (1976) Micro teaching procedures have the following three phases :

1.5.4.1 Knowledge Acquisition Phase : Knowledge acquisition phase of micro-teaching involves two sessions viz; (i) Introductory session, (ii) Demonstration session. At this stage, the student teacher tries to get knowledge of the skill to be practised. During introductory session he reads relevant literature concerning that skill. During demonstration session he is made to observe a demonstration lesson in which that skill figures prominently. The person who demonstrates the skill is an expert of the subject and the skill. By observing that lesson, the teacher under training gets theoretical as well as practical knowledge of that skill.

1.5.4.2 Skill Acquisition Phase : This phase incorporates the following three session (i) Plan session, (ii) Teach session, (iii) Feedback session. The student teacher acquires the skill in hand through a lot of practice. The pupil teacher first of all prepares a micro-lesson and implements the lesson plan for the skill. He then teaches it to have practice and then through feedback he evaluates

his performance. Then he replans the lesson with modifications and improvement and then reteaches that lesson. Again there is re-feedback in order to enable him to have mastery of the teaching skill. In this way, different skills are learnt by the student teacher one by one.

1.5.4.3 Transfer Phase : The transfer phase is actually the synthetic stage of micro teaching process where different skills are united to constitute a complex teaching behaviour. At this stage, teacher integrates the different skills. Instead of artificial situation he teaches in the real classroom where the number of students is full class. His lesson is of 30 to 35 minutes, duration and there he tries to integrate all the skills for which he made efforts in Phase Nos. I and II.

1.5.5 Self Evaluation :

(i) What is the Concept of micro-teaching.

(ii) Explain the phases of micro-teaching.

1.5.6 Skills of Micro Teaching :

“Teaching skills are a set of related teaching acts or behaviours performed with the intention to facilitate pupil's learning.” - B.K. Passi

Teaching is a complex phenomenon that comprises of various specific teaching skills. Through micro teaching, complexities of class room teaching are reduced. The different skills are identified and then mastery of each skill is acquired. Here two important questions crop up which need consideration, the first one is to know what is a skill. The second one is how many skills are involved in the teaching process.

1.5.6.1 Introducing a Lesson :

The introduction to a lesson must be interesting so as to motivate

the students in what follows. Training in introducing a lesson helps the teacher prepare students for the lesson, in order to induce maximum pay-off in learning. Its main purpose is to clarify the goals of instruction, using students' present knowledge and skills to involve them in the lesson. Appropriate devices used for an introduction are narration, illustration, questions, similarities and analogies. This part of the lesson should not take more than 4 to 5 minutes. The components in skill of introducing a lesson involves utilization of previous knowledge of pupils, using appropriate devices, maintenance of continuity, relevance of verbal and non-verbal behaviour, overall environment of the class should be included.

1.5.6.2 Questioning :

A good teacher must be a good questioner. Ability to ask questions is regarded as one of the chief qualifications of a better teacher. Questioning helps the teacher to understand how far the teaching has been helpful to his students. At the same time, questioning also helps the students to know how far they have been able to grasp the idea.

Questioning may be asked throughout classroom teaching. There may be introductory questions, teaching or developing questions and testing or recapitulatory questions. Questions are generally of three types, viz., lower order, middle order, and higher order. Lower order questions are those questions which merely test the ability to recall. Middle order questions test the comprehension of the subject and the ability to apply it. Higher order questions can develop higher mental abilities like analysis, synthesis, evaluation and creativity and increase critical awareness.

A good question should have clarity, simplicity, brevity, challenging, relevancy etc. as characteristics. Good questions are educative and they have a very prominent place in all kinds of learning. If used in the right way, at the proper time, they lead to new realms of understanding.

Questioning is an art and it requires all the skill of an expert to handle it properly. The student teacher must address his question to the whole class in order to seek students' participation. Do not repeat or change your questions, it will disturb the minds of

students. After a question is addressed, give sufficient time to the class to think and formulate the answer. Questioning should proceed in a logical sequence. To make learning delightful, co-operative and profitable, it is better to put questions in pleasant and sympathetic manner.

1.5.6.3 Illustrating with Examples :

The use of good examples and clear teaching are basic skills to teaching. Use of examples during teaching is another core ability which a teacher should develop. Examples should be related and relevant to the topic, and they should be simple and interesting. There could be verbal examples or could be shown through pictures. From the above description we can conclude that examples are the observation or situations of occurrence of a concept or generalisation. The skill of illustration can be defined as the selection of the examples relevant to the concept or the generalisation to be taught to pupils, so that the content under study may be clear and understandable to the pupils. It will be much better if these examples are taken from pupils' daily life. Skill of Illustration with example involves describing an idea, concept principle by using various examples. The components is skill of illustration should be simple, relevant to the topic, interesting, approach should be appropriate and pupil involvement should be adequate.

1.5.6.4 Stimulus Variation :

Training in stimulus variation strengthens the teacher's ability to attract and hold the attention of the students. During teaching teachers remain immobile at a place or speak in a monotonous voice throughout. So they are trained in purposeful movements (like moving towards the chalk-board to write a new word, or going near a child to supervise his work or moving towards the table to demonstrate an experiment), meaningful gestures (like making use of hand patterns of communication), change in posture (like changing it from standing to sitting, bending or leaning forward to emphasize an important idea), speech pattern, focusing, interactional styles, and stuffing sensory channels (like making aural-visual switching).

The skill of stimulus variation involves deliberate changing of various attention producing behaviours by the teacher in order to keep

pupils attentive in the class at high level. Such behaviours include teacher's (1) Movements, (2) Gestures, (3) Change in speech patterns, (4) Focussing, (5) Change in interaction styles, (6) Pausing, (7) Shifting sensory channels, and such others.

Sneha Joshi writes, "What to change, when to change, and how to change requires a skill on the part of the teacher for securing and sustaining attention at high level. Such a skill is named as skill of Stimulus Variation."

1.5.6.5 Reinforcement :

The student-teacher must practise using positive reinforcers accepting their responses or non-verbal cues like a smile and avoid the use of negative reinforcers so that students' participation is maximum. Reinforcement skill is sometimes known as 'Feedback Skill'. Reinforcement is a type of conditioning in which reward or punishment reinforces the behaviour. The reinforcement must come after the response has been made and not before it. If reinforcement is not made it results in the extinction of the response. Thus reinforcement is correlated with response rather than the stimuli. It is based on feedback principle which means that the reduction or satisfaction of an organic need or drive stimulus increases the probability of future responses. In the words of *Skinner*, "If the occurrence of an operant (response) is followed by the presentation of a reinforcing stimulus, the strength is increased." What gets strengthened is the response or operant. If the response is not reinforced, it results in the extinction of the response. Extinction of a response means becoming less and less frequent.

1.5.6.5.1 Types of Reinforcement :

There are two types of reinforcement :

(i) Positive reinforcement : Positive reinforcement is any stimulus whose presentation strengthens the probability of the response. It means strengthening of a desirable behaviour. It increases pupil's participation in the class. It generates a pleasant effect on the pupils. Food is a positive reinforcer for a hungry man. In case of human beings food, water, money, praise, prestige and social approval work as positive reinforcers.

(ii) Negative reinforcement : A negative reinforcer is any stimulus whose withdrawal strengthens that behaviour (the probability of a response). Removing something like electric shock, a loud noise, teacher's frown etc. from the situation are negative reinforcers.

Schedules or procedures of reinforcement are basically of two types :

(a) Continuous reinforcement schedule : In this schedule every response is reinforced. For example when all the answers given by pupils are reinforced by the teacher, he is using continuous schedule.

(b) Intermittent reinforcement schedule : In intermittent schedule reinforcement is given after a number of responses or after some lapse of time. Some but not all the responses are reinforced. When the teacher reinforces some responses, it is known as intermittent schedule of reinforcement. Intermittent schedules generate more resistance to the extinction of learned response than continuous schedule.

Reinforcement is not only used to promote learning but also to secure attention and to motivate pupils. Some of the uses of reinforcement in the class-room are :

1. To increase pupils' participation.
2. To facilitate learning.
3. To motivate the learner and to maintain the level of motivation.
4. To modify undesirable behaviour.
5. To develop self-management of learning experience through self-reinforcement.

Research studies show that teachers using the skill of reinforcement are generally rated high on warmth, friendliness and enthusiasm. Training in the use of reinforcement skill may help him to become a more successful teacher.

1.5.6.5.2 Definition of Skill of Reinforcement in Behavioural Terms :

The skill of reinforcement involves the appropriate use of the positive reinforcers and decrease or avoid the use of negative reinforcers so that the pupil participate to the maximum. Thus the skill of reinforcement refers to the effective use of reinforcers.

According to *Joshi, S.M.*, the skill of reinforcement can be defined as “the art of learning the judicious and effective use of reinforcers by a teacher for influencing the pupils' behaviour in the desired direction directed towards pupils' maximum participation for realising the better results in the teaching-learning process.”

The skill of reinforcement consists of various components such as use of (1) Positive verbal reinforcers, (2) Positive non-verbal reinforcers, (3) Extra verbal reinforcers, (4) Negative verbal reinforcers, (5) Negative non-verbal reinforcers.

1.5.6.6 Using blackboard :

Chalk/white board is one of the most widely used visual aids in a classroom. It is very essential skill for a successful teacher. The effectiveness of presentation depends upon the proper use of chalk/white board. This skill requires the following activities :

- * Writing legibly, using different letters which are large enough to be seen by backbenchers, adequate space in between the letters;
- * Neatness in the chalk/whiteboard work by writing in straight lines, retaining only the relevant material and by seeing that the representation is correct and realistic;
- * Appropriateness of written work in respect of simplicity, continuity in the points being presented, using coloured chalks or markers, underlining important words, avoiding lengthy and laboured drawings, using pointer to focus attention, providing favourable lighting conditions so that there is no glare.

1.5.7 Summary :

Teacher behaviour can be modified through many devices and techniques. Microteaching has been found to be an effective strategy for modification of classroom behaviour of teachers. It is a scaled down teaching in which size of class, period duration and size of the topic are reduced. It is real teaching. It provides immediate feedback to teacher-trainees.

Microteaching assumes that teaching is a complex skill which can be analyzed into simple skills. Teacher educators can improve pupil performance through feedback. There are three phases of micro

teaching i.e. knowledge acquisition phase, skill acquisition phase and transfer phase.

1.5.8 Questions for Practice :

- Q.1. “Microteaching is a scaled down teaching encounter in class size and class time”. Elaborate the statement and discuss the phases of microteaching.
- Q.2. Define microteaching. Discuss the stimulus variation and reinforcement Skills of micro teaching.
- Q.3. Write short notes on :
- (i) Questioning
 - (ii) Introducing a lesson
 - (iii) Using blackboard
 - (iv) Illustrating with examples.

1.5.9 Suggested Books :

- Aggarwal, J.C. (1996), Principles, Methods and Techniques of Teaching.
- Aggarwal, Rashmi (2009), Educational Technology.
- Bhushan, A. and Ahuja, M. (1992), Educational Technology.
- Mohanty, J. (1992), Educational Technology.
- Sachdwa, M.S. (2008), Essentials of Educational Technology.
- Singh, L.C. (2005), Microteaching.
- Sharma, R.A. (1980), Technology of Teaching.