APPENDIX – I

A TRAINING PROGRAMME FOR COMPUTER EDUCATION
TEACHERS TO TEACH COMPUTER EDUCATION
AT SECONDARY SCHOOL LEVEL

A Study Material for the Workshop Organized at Shreyas Vidyalaya,
Manjalpur, Baroda, Vadodara, Gujarat

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Guide
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1. IMPORTANCE AND NEED OF TRAINING

Objectives

1. To provide the participating teachers an overall view of the training programme.
2. To enable the participating teachers understand the importance of training programme for teaching computer.

Education prepares future citizens and it decides the future of any country. The future prosperity if any nation depends on the quality of the present system of education as it prepares the work force for tomorrow. Children, who are in the primary and secondary schools, will be the work force of the future society which is going to be highly computer based and industrial. It is a revolution of ICT and computers in the country from which no individual household, business or occupation would have been left untouched. The patterns of employment are changing rapidly and today’s children will need to be trained who can fit into this competitive world of ICT and computers. Looking into this computer education has been implemented as a subject in school.

In order to make the educational system function in this technology based world at its optimum level of efficiency, committed and competent teachers are considered to be of crucial input. It is more applicable to the computer teachers who enter the teaching profession without having a professional qualification/degree. There is no doubt about the content knowledge of these teachers as they possessed diploma or degree in their own computer fields. But knowledge of content alone would not make an effective teacher. In addition, s/he should have a general pedagogical knowledge which is considered as the science and art of teaching. Any computer teacher who aspires to be a teacher of excellence should have knowledge regarding the total range of skills/techniques, methods and medias of teaching so that s/he will be in a position to select the most appropriate ones for his/her instructional purposes. If one has through knowledge pertaining to the theory, merits and demerits of each method, s/he will be in a position to exploit it to its maximum. The observation made on computer teaching of both theory and practical reflects that the
computer education teachers lack in pedagogical aspect of teaching. It was also reflected from the informal discussion with the computer education teachers carried out by the investigator. Based on this brief rationale the investigator has prepared this a training programme which will help computer teachers working in the schools to know about different methods, skills, media and other components related to pedagogy.

2. **AIMS, OBJECTIVE AND INSTRUCTIONAL OBJECTIVE**

Objectives

1. To enable the participating teachers understand aims and objectives of teaching.
2. To enable the participating teachers understand the concept of instructional objectives.
3. To enable the participating teachers understand the components of writing instructional objectives in behavioural terms.

Aims

The term ‘aims’ mean the broad goals, which our educational system embraces. The aims of education are based on philosophical and socio-psychological aspects of our society and culture. For example, the aims of education are to develop patriotism and good citizenship; to develop scientific attitudes towards problem; to develop information technology competency etc.

Aims are broad and stated in general terms. They represent long-term outcomes and provide overall direction. In fact, aims express the expectation of the society that should be achieved by the students through the educational system.

Objectives

Objectives are the milestones to reach the destination i.e. to attain the aim or ultimate goal of education. Objectives are specific, direct and practical in nature.
Objectives are related to the learning outcomes or change in the behaviour of students. The objectives are achieved at the end of every instruction. The achievement of objectives enables the individual to perform certain tasks, develop certain understandings, sustain thinking process, develop attitudes, add to his stock of knowledge etc. In fact objectives do the following functions:

- Provide desired direction to an educational activity;
- Distinguish between various aspects of learning;
- Focus attention on proper attributes of learning activity;
- Determine the nature of an educational activity;
- Provide a basis for systematizing or planning an educational programme;
- Decide emphasis on educational activity;
- Help arrange learning experiences and also evaluation material;
- Guide educational decisions – curricular and co-curricular;
- Guide the selection of relevant content;
- Give meaning and clarify to the curriculum;
- Make learning functional;
- Articulate learning at various levels;
- Help discover proper learning situations/context;
- Fix priorities in an educational programme;
- Help identify weakness and strengths in the learning process;
- Provide basis for measurement of growth and development of the child;
- Guarantee valid evaluation and curriculum;
- Help educational experiences tangible; and
- Define the educational process in totality.

INSTRUCTIONAL OBJECTIVES

Meaning

It refers to the objectives which could be achieved at the end of each unit of instruction. In this context, an objective is a statement of a measurable learning that is
intended to take place as a result of instruction. Instructional objectives are expected
to display in the form of behaviour as a result of receiving instruction.

Instructional objectives are classroom objectives, unique to each course, subject or a teaching point. These instructional objectives are set according to the level of the students in a particular class and adopted to the classroom situation. They are formulated in such a way that they are concrete and tangible. The objectives should involve information, skills, attitudes and interest that could be developed through a particular topic or subject in the classroom. For example, 'to enable the students to name different input/output devices', 'to enable the students to use left button of the mouse' etc. are the instructional objectives.

The statements of objectives in terms of change in the behaviour of the students include certain behavioural or action verbs. Therefore it is necessary to know the action verbs used in writing instructional objectives. Generally a large number of instructional objectives are related to cognitive domain. Here, the action verbs related to cognitive domain has been presented as the objectives achieved in cognitive domains are easily observed as compared to objectives in affective and psychomotor domains although it is also essential to frame certain objectives in affective and psychomotor domain.

**Action Verbs under each Levels of Cognitive Domain (as quoted in Agrawal (1999), p. 111)**

1. **Knowledge**

2. **Comprehension**
3. **Application**

4. **Analysis**

5. **Synthesis**

6. **Evaluation**

**Writing Instructional Objectives in Behavioural Terms**

Robert Mager (1962) as quoted in IGNOU B.Ed. study material, block no. 2 of Curriculum and Instruction (p. 28) has suggested three steps (or components) of writing instructional objectives. They are as follow:

1. Decide what the student will be able to do at the end of the learning.
2. Decide under what conditions the behaviour will be developed i.e. indicate the condition(s) under which the behaviour will be observed.
3. Decide what will be the expected level of performance i.e. indicate how will the student be expected to perform.

**For example:** “At the end of the lesson the students should be able to identify different hardware components after observing the computer system”.

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The above statement fulfills all the three characteristics of a good behavioural objective. Condition one and three of writing acceptable behavioural objectives are fulfilled by the first half of the statement i.e. the student should be able to identify different hardware components. The second half of the condition is fulfilled by the later half of the statement i.e. after observing the computer system.

Passi and Lalita (1976) have mentioned four components of writing instructional objectives. They are:

1. **Well-stated:** It involves communicating clearly, without any ambiguity and misinterpretation, what you want pupils to achieve.
   
   **Example:** The students will be able to name three input devices.

2. **Adequate with respect to Learning Outcomes:** It refers to the coverage of such well-stated objectives in terms of learning outcomes in various domains—cognitive, affective and psychomotor.
   
   **Example:**
   
   (i) The students will be able to identify parts of a computer when given a diagram.
   
   (ii) The students will be able to differentiate between hardware and software.
   
   (iii) The students will be able to distinguish primary and secondary memory.

3. **Relevant to the Content:** It refers to the term related that is every instructional objective stated for a content/unit should be directly related to it.
   
   **Example:**
   
   (i) The student will be able to state at least two secondary memories correctly without any hints or reference material.
   
   (ii) The students will be able to demonstrate 'turn off the computer' without any error.

4. **Adequacy with respect to the Content Outline:** It means, for a content outline, if a list of objectives are written, then the list should cover the whole content i.e. it should be adequate.
Example:

(i) The students will be able to write the steps of 'turn on and turn off the computer'.

(ii) The students will be able to describe in ten sentences about the advantages of computer.

Gronfund (1970), Throndike and Hagen (1997) as quoted in Khirwadkar have provided certain guidelines which would help to write instructional objectives. They are as follows:

1. State objective in terms of student performance (rather than teacher performance).
2. Use an active action verb that indicates something that can be seen and measured i.e. applies, analyzes, demonstrates, recalls, list etc.
3. State each objective in terms of a measurable change or action, an end in result rather than a purpose of learning.
4. State the objective in terms of student performance at the end of the course (also called intended outcomes), rather than about subject matter covered.
5. Include one outcome (action verb) in an objective.
6. State each objective at the appropriate level of generality (for course of unit) not too diffuse or broad to measure.
7. State objective in terms that have uniform meanings (the same to every one) rather than ambiguous words or phrases which may mean different things to different people.
8. Be realistic in terms of time available for teaching, characteristics and prerequisites of students, and other similar conditions pertaining to one's situation.

Thus, the above discussion on writing instructional objective clearly reflects that instructional objectives are the milestones to achieve the ultimate goal or aims of education. In the light of objectives, the teacher tries to modify the students' behaviour with the help of tools (i.e. curriculum and other pedagogic activities) in the desired direction.
Activity for the teachers:

- Write aims and instructional objectives by taking any one chapter of your interest from the Computer Education textbook of Standard VIII.

3. PRINCIPLES AND MAXIMS OF TEACHING

Objectives

1. To enable the participating teachers understand different principles of teaching.
2. To enable the participating teachers understand different maxims of teaching.

There are certain principles and maxims of teaching emphasized by educators and psychologists, which the teachers are expected to bear in mind for making their teaching effective and efficient. The principles and maxims of teaching are discussed below.

General Principles of Teaching

Some of the important and general principles of teaching are as follow:

1. Principles of definite goals or objectives: Destination or goals of teaching-learning must be clear to the teachers and students. Goals and objectives keep the teachers and students on the track. Definiteness of goals helps in planning, executing and evaluating every step, phase or act of the teaching-learning process.

2. Principles of child centeredness: The entire teaching endeavor is for the child. Therefore, it is essential that teaching strategies should cater to the aptitude, interest and abilities of the students. In the drama of education, child should be assigned the role of a ‘hero’.

3. Principles of individual difference: As we know that no two individuals are alike even if the case of identical twins. So, effective teaching needs to cater the individual difference of children.
4. **Principles of linking with life:** Teaching can never be performed in vacuum. It is always in a social context. In the teaching of all the school subjects including computer education, examples from everyday life should be given at proper place.

5. **Principles of active involvement and participation of students:** Teaching-learning is a two-way traffic. Traditional teaching was almost teacher-centered. The contemporary teaching emphasizes that the students must actively participate in teaching-learning process i.e. both in theory and practical of computer.

6. **Principles of cooperation:** Classroom environment becomes lively when the teacher and the taught work in unison, helping each other in carrying out the tasks of teaching and learning. It helps the participants to have the common interest in teaching and learning making the class more homogenous.

7. **Principles of remedial teaching:** All the students do not learn with the same speed and accomplishment. Some lag behind and need extra coaching. The teacher has to find out where the fault lies and think for positive and remedial measures. He may have to arrange for remedial or compensatory or extra teaching for any particular group of students for removing their specific difficulties.

8. **Principles of creating conducive environment:** Physical as well as social environment of the classroom plays a vital role in motivating the learners. Arrangement of computer with needed software should be properly attended to. There should be proper discipline and order. The teacher should be sympathetic but firm.

9. **Principles of planning:** Planning determines the quality or success of any task. Planning in teaching involves the preparation of the lesson notes, provision of teaching aids and working out strategies to be adopted in the delivery of the lesson.

10. **Principles of effective strategies:** Teaching process to be effective must adopt proper means, strategies and tactics. Teaching strategy is a generalized plan for a lesson which includes structure, desired learning behaviour in terms of goals of instruction and an outline of planned tactics necessary to implement the strategy.
11. **Principles of flexibility**: Strategies should serve as guides for effective teaching. Strategies may have to be changed if the classroom situations warrant. Teaching is a complex task and a live phenomenon. The possibilities of alternation in planned strategies cannot be ruled out at the execution side. A teacher must be quite imaginative and resourceful for adapting himself and his teaching to the requirements of the teaching-learning environment.

12. **Principles of variety**: Variety removes the monotony in the classroom. A variety of teaching aids and strategies should be adopted to motivate and sustain the interests of the students. Variety serves as great tonic for creating fresh environment and checking boredom and lethargy.

13. **Principles of activity**: Children are active by nature and any process that is not based upon the student-activity is not accord with recent educational theories. Students should be kept active both in theory and practical classes.

**MAXIMS OF TEACHING**

The maxims of teaching are very helpful in obtaining the active involvement and participation of the learners in the teaching-learning process. They quicken the interest of the learners and motivate them to learn. They make learning effective, inspirational, interesting and meaningful. They keep the students attentive to the teaching-learning process. A good teacher should be quite familiar with them. The different maxims of teaching are discussed below.

1. **Proceed from the known to the unknown**: The most natural and simple way of teaching a lesson is to proceed from something that the students already know to those facts which they do not know. What is already known to the students is of great use to the students in the process of learning. It means that the teacher should arouse interest in a lesson by putting questions on the subject matter already known to the pupils. The teacher is to proceed step by step to connect the new matter to the old one. For example the lesson ‘Introduction to Computer’ may start from the Type writer or Calculator.

2. **Proceed from simple to complex**: The simple task or topic must be taught first and the complex one can follow later on. The word simple and complex are to be seen
from the point of view of the child and not that of an adult. A teacher would curb the interest and initiative of the children by presenting the complex problems with the help of relatively simple problems, for instance, a student will understand and grasp MS Word easily with the help of Word pad.

3. **Proceed from easy to difficult**: A teacher must keep in mind students’ standard/level while teaching. It will help him in sustaining the interest of the students. In determining what is easy and what is difficult we have to take into account the psychological make-up of the child. Logically viewed one skill may be easy but psychologically it may be difficult. There are many things which look easy to us but are in fact difficult for children. The interest of the child has also to be kept in mind while deciding the level of difficult or easiness.

4. **Proceed from concrete to the abstract**: A child’s imagination is greatly aided by a concrete material as ‘Things first and words after’ is the common saying. Children learn first from concrete things which they can see and handle. So, concrete things should be taught first. A lesson on different components of computer can be made interesting in theory class with the help of models or real components or pictures. Similarly, hardware components of computer can be taught first and then software components.

5. **Proceeding from particular to general**: Before giving principles and rules, particular examples should be presented. As a matter of fact, study of particular facts should lead the children themselves to frame general rules. The commands of DOS, rules of flow chart are based on the principle of proceeding from particular instances to general rules.

6. **Proceed from empirical to rational**: Observation and experience are the basis of empirical knowledge. Rational knowledge implies a bit of abstraction and argumentative approach. The general feeling is that the child first of all experiences knowledge in his day to day life and after that he feels the rational bases. For instance, use and advantages of computer and internet makes better sense when taught in the context of everyday life. It is always better to begin with what the children see, feel and experience than arguing and generalizing.
7. Proceed from whole to parts: Whole is more meaningful to the child than the parts of the whole. J.P. Guildford, E.B. Newman and May Seagoe conclude after their research that the 'whole' approach is generally better than 'part' learning because the material to be learnt 'makes sense' and its parts can be seen by the learner as interrelated. The learner sees a relationship between the central ideas of the material to be learned. The 'whole' unit or passage for slow learners should be smaller than the 'whole' unit for the fast learners.

8. From analysis to synthesis: Analysis means breaking a problem into convenient parts and synthesis means grouping of these separated parts into one complete whole. A complex problem of making flow chart can be made simple and easy by dividing it into small units.

9. Proceed inductively: This maxim includes almost all the maxims stated above. In the inductive approach, we start from particular examples and establish general rules through the active participation of the learners. In the deductive approach, we assume a definition, a general rule or formula and apply it to particular examples. The details about inductive and deductive approach are discussed in approaches of teaching section.

In the ultimate analysis it must be observed that the maxims are meant to be our servants and not masters. Moreover, by and large all are interrelated. It is, therefore essential that a judicious use of maxims of teaching can make the class interesting, active and meaningful.

Activity for the teachers:

- Take a chapter from your computer textbook. List down and rationalize in brief the major principles and maxims those can be applied while teaching to the students
4. Skills of Teaching

Objectives

1. To enable the participating teachers understand the concept of skills of teaching.
2. To enable the participating teachers understand the skills of introducing lesson, skills of questioning and skills of probing.
3. To enable the participating teachers understand the skill of explaining, skill of reinforcement and skill of stimulus variation.

Teaching like any profession demands certain specific skills and competencies on the part of teacher which can influence learning in the students and help them achieve their goal of life. In order to implement the principles and maxims of teaching the teacher has to have certain skills and competencies. Skills provide a means for teachers to put theoretical knowledge into practice. Effective teachers should possess skills and competence that set them apart not only from non-teachers but also from ineffective teachers. Effective teachers can not only do things in the classroom that others cannot, but they can also understand the relationship between their actions and the effects of those actions on the students.

It is an acceptable fact that teaching-learning is a complex process. It consists of various activities to be performed by the teacher. These activities may be: introducing the lesson, demonstrating experiments, providing feedback, explaining concepts and principles, questing, drawing figures, writing on the blackboard, using teaching aids and other means of communication. The activities and behaviours that facilitated learning in students are called teaching skills. N.L. Gage (1968) defined teaching skill as “teaching skills are specific instructional activities and procedures that a teacher may use in his classroom. These are related to the various stages of teaching or in the continuous flow of the teacher performance”. Thus, instructional techniques and procedures used by the teacher in classroom are known as teaching.
skills. It is a set of strictly overt behaviours of the teacher (verbal and non-verbal) that can be observed, measured and modified.

A number of research workers have tried to identify several sets of teaching skills. Some of them are common with a little different terminology. Allen of the Stanford University (1969) has identified 14 skills. Borg (1970) has listed 18 teaching skills. Passi has given a list of 19 teaching skills. Jangira and Singh (1982) provide a list of 20 skills. For the present training programme six teaching skills were taken which are important for teaching of any subject and commonly used by teachers. One thing should be kept in mind that all teaching skills are inter-related and have bearing on one another. These six skills are discussed below.

1. Introducing Lesson
2. Skill of Questioning
3. Skill of Probing
4. Skill of Explanation
5. Skill of Reinforcement
6. Skill of Stimulus Variation

(1) Skill of Introducing a Lesson

Introducing a lesson or unit means a brief introduction about the lesson or unit in order to predispose the students mind to it. It includes what a teacher does with or without the help of the students up to the stage of stating the aims of the lesson. It involves establishing cognitive and affective rapport with the students. Its effectiveness can be judged by the verbal and non-verbal behaviours of the students. The skills of introducing a lesson involve maximizing the use of previous knowledge of students, using appropriate device(s) while introducing the lesson, avoiding discontinuity and avoiding statements irrelevant to the aim of the lesson. The detailed description of the above mentioned components are discussed under the heading of components of the skill of introducing a lesson.
Components of the Skill of Introducing a Lesson

The components of the skill of introducing a lesson are: (i) using previous knowledge, (ii) using appropriate devices (s) (desirable behaviours); and (iii) lacking in continuity, and (iv) uttering irrelevant statements (undesirable behaviours). Each of this behaviour is as follows.

Desirable Behaviour: The following desirable behaviours need to be encouraged by the teachers to make the skill of introducing a lesson more effective, interesting and meaningful.

(i) Using Previous Knowledge: It refers to the knowledge already possessed by the students. Students acquire knowledge from various sources like, classroom, friends, books, society, teachers etc. If any new knowledge is added to the previous stuff of knowledge, there should be a logical continuity between them. In other words, mind cannot receive any new knowledge unless there is continuity with the relevant previous knowledge. Then only the new knowledge gets integrated with the previous knowledge and the previous knowledge gets restructured. When a teacher wants to impart new knowledge to the students, it should be relevant to the previous knowledge. Thus, using the previous knowledge of the students while introducing a new lesson, it involves bringing the relevant previous knowledge in them to their conscious level.
The previous knowledge can be tapped out by using any approaches. For this purpose, a teacher may refer to or elicit from what the pupils have learnt in previous classes, current topics which the pupils might be aware of or may create situation in the class.

(ii) Using Appropriate Devices: The term ‘devices’ refers to the technique that the teacher uses while introducing a lesson. Such devices can be (a) use of examples/analogies/similarities; (b) questioning, (c) lecturing/describing/illustrating, (d) audio-visual aids, and (e) demonstration.

Undesirable Behaviour: The following undesirable behaviours need to be discouraged and avoided by the teachers to make the skill of introducing a lesson more effective, interesting and meaningful.

(i) Lack in Continuity: It refers to the sequence of ideas or information being presented. While introducing a lesson, continuity breaks when the statement made or question asked by the teacher is not logically sequenced. Lack in continuity is there when the teacher’s question or statement or demonstration is not related to the immediately preceding question or statement or demonstration.

(ii) Uttering Irrelevant Statements or Questions: A statement or a question which a teacher utters while introducing a lesson is said to be irrelevant when it is not related to the aim of the lesson. Such statements or questions do not contribute to the effectiveness of the skill in terms of establishing cognitive and affective rapport with the students. Sometimes they confuse the students. While introducing a lesson, there can be continuity but the statement uttered may be irrelevant to the statement of aim of the lesson.

Example: (The teacher is introducing a lesson on “Files and Folders”)

Teacher: What is memory of a computer?
Student: It is the part of the computer where programs and data are stored.
Teacher: What are the different types of memory?
Student: There are two types of memory – Primary and Secondary memory.
Teacher: Well students today we will study about “Files and Folders”
Therefore, in order to develop the skill of introducing a lesson, a teacher should use previous knowledge of the students, use appropriate device, avoid lack in continuity, and avoid the use of irrelevant statements and questions.

(2) SKILL OF QUESTIONING

Questioning is a very important technique that a teacher must learn. Successful teaching is highly dependent on questioning. Questioning stimulates thinking. In a lesson different types of questions are used depending upon situation and purpose to be achieved. Questions are used to help students recall certain facts, exercise their reasoning ability, and use their power of recognition and discrimination in enhancing their learning. Effective questioning encourages the students to think/reflect over things and ideas, and leads them to participate in discussion. A teacher equipped with effective questioning skill can:

- Help the students display/test their knowledge,
- Elicit desired responses/information from students,
- Develop subject matter in the class,
- Enable students to analyze the problems related to the topic taught,
- Enable students to apply their knowledge to a specific new situation,
- Help students evaluate for themselves their understanding of the concepts, and
- Motivate students to participate in the teaching learning process.

Generally there are three orders/levels of questions. They are low order questions, middle order questions, and higher order questions.

(i) Lower Order Questions: This level of question is limited to memory level of thinking which forms the basis for higher level of learning.

Example: What is the storage capacity of 3.5 inch floppy disk?

What kind of device a mouse is?
(ii) Middle Order Questions: Middle level questions involve interpretation of facts/concepts being taught or already learnt. Interpretation involves comparison or explanation of relationship between ideas, concepts, generalizations etc.

Example: What is the difference between WordPad and Notepad?

What are the advantages of computer?

(iii) Higher Order Questions: Higher order questions encourage students to think, to reason beyond acquired knowledge, to analyze problematic situations into their elements. These questions enable the students to produce new ideas and to develop creative and reasoning abilities.

Example: How does floppy disk differs from hard disk?

What precautions can be taken to keep the computer safe?

The teacher should bear in mind the following things while asking different levels of questions.

1. The questions should be asked first and then the students asked to answer it. The main advantage in asking the question first is to set the whole class think to find out the answer. On the other hand, if a particular student is asked to stand or sit, as the case may be, and then the question is put to him, other students may not show much interest.

2. Questions should be evenly distributed. No students should be neglected. At the same time questions should not be given in a regular order round the class. Generally there is a tendency to put either too many questions or too less to the students sitting at the back or in the front. Such a tendency should be avoided.

3. Plenty of time should be allowed to the students to think out the answer. However, the time allowed will depend upon the nature of the question.

4. The inability of a student to answer a question should be accepted. The teacher should avoid wasting a lot of time in trying to get an answer out of a child who cannot answer.

5. A volley of questions asked in a rapid-fire manner is upsetting.
Characteristics of Good Questioning

1. The language of the question should be simple.
2. Questions should be graded. They should neither be too easy nor too difficult. If the problem is too easy, the child will not take any interest in it. If it is too difficult, he will get discouraged.
3. Questions should not be ambiguous, lengthy and vague. They should be clear, brief and to the point.
4. They should be suited to the ability of the student to whom the questions are put.
5. Questions should be relevant to the topic.
6. Questions once asked should not be repeated unless the teacher is sure the class has not followed it.
7. The teacher should try to vary the form of his questions.
8. Two questions should not be asked in one.
9. Questions should be interesting as far as possible.
10. Questions should be framed in such a way that they do not encourage guesswork. The teacher should not generally admit answers like ‘yes’ ‘no’, or other single words.
11. Questions should be of developing nature. Every question should grow out of the response of the previous one. Questions should be in a sequence so that the lesson may develop properly.
12. Phrases like “Can anyone answer this question?” should be avoided.
13. Questions should be addressed to the entire class.
14. Questions should be asked in a pleasing manner.
15. Questions should be put in such a way that every student thinks that he will be asked to answer whether he is good or weak.
16. Adequate time should be allowed to answer.

With regard to the skill of questioning, it is very essential to discuss about the skill of probing without which skill of questioning will remain incomplete.
(3) SKILL OF PROBING

The term probing implies going deep in the matter in hand. It is defined as the art of response management, comprising a set of behaviours or techniques for going deep into student’s responses with a view to elicit desired responses. Sometimes it happens that when a question is asked, students give various types of responses. Their responses may be incorrect, partially correct or completely correct. In case of incorrect or partially correct responses, the teacher has to lead students to the correct response. The teacher has to go deep and probe into their responses by asking a number of supplementary questions on what they already know and then lead them to the correct response by removing the defects, if any, in the wording of the questions or Hindrances in understanding the question. Even if the response is correct, a teacher can lead the student towards a better and broader perspective of the response.

The skill of probing questions comprises the following component or behaviour or technique.

Skill of Probing

Promoting  Seeking Further Information  Refocusing  Redirecting

(1) Promoting: It refers to the clues or hints provided by the teacher to arrive at the desired response from the undesired situations. This technique can be used by a teacher when the students give responses like ‘I do not know’, ‘I am not sure’ or very weak or wrong response. Sometimes, it can also be used when the response is partially correct or incomplete. It may be noted that here the teacher himself does not provide the answer to the questions asked in the classroom by him or any student but tries to manage the situation by giving clues.

Example:

Teacher: What are the applications of computers?
Student: I do not know.
Teacher: For what purpose computer is used in your school? (giving hints)
Student: It is used for teaching, getting print etc. (giving hints and prompts)
Teacher: You must have gone to railway station with your parents and purchased tickets from reservation counter. How is the ticket prepared? (giving hints and prompts)

(ii) Seeking Further Information: Sometimes students’ response is partially correct or incomplete. In such cases teacher should elaborate, clarify or explain the response. A teacher can elicit more information or seek further information by asking additional questions. These questions will help the student supply additional information to complete the response, and/or remove short comings. It can be done by asking questions like:

- State your answer in other words.
- Will you please elaborate your answer?
- Add some examples to support your response.

(iii) Refocusing: In refocusing he teacher asks the responding students either to relate his response with something already studied by him. The main aim behind this is to make the student aware of the implications of a give response in more complex and novel situations.
Example:
1. In what way Notepad is similar to WordPad?
2. In what way floppy disk is different from compact disk?
3. How does human brain related to CPU?

(iv) Redirecting: This technique involves putting or directing the same question to several students for response. The main purpose of redirecting is to probe and increase students’ participation. When there is no response, incomplete response or incorrect response, a teacher can probe further by prompting or seeking further information.
Example:
Teacher: How does computer execute instructions?
Student: No response.
Teacher: Akash (redirecting)
(v) Increasing Critical Awareness: This technique is applied in a correct response situation to increase critical awareness in the students. Questions like, ‘How’ and ‘Why’ are helpful in asking the responding student to justify his response for the purpose of increasing critical awareness.

Example:
1. How can you prove it?
2. Why do you use it?

Activity for the teachers:

- Prepare an episode in a dialogue form between teacher and students depicting/emphasizing the skills of introducing a lesson, questioning and probing.

(4) SKILL OF EXPLAINING

Explaining is an activity which is most commonly used by teacher and is the essence of effective instruction. Explaining highlights the relationship among various concepts, events and ideas. Through explanation an attempt is made to relate a set of facts with another set of facts in order to facilitate the understanding of the students. Through explanation an attempt is made to establish casual relationship between causes and consequences of the phenomenon. Questioning begins with why and how etc. generally demand some explanation from both teacher and the students.

During teaching in a classroom, an explanation is a set of interrelated statements elaborating a concept being taught or learnt. In order to increase understanding of students the teacher has to explain the learning activities. While explaining to students, teacher should keep in mind their age and level, their knowledge/experience, their background etc. All these factors significantly influence the effectiveness of explaining. In other words, an explanation should suit the mental
level of the students. It should be relevant to the context under which teaching is taking place.

**Component of Behaviours of Explanation**

In order to make the teaching effective while explaining a concept, a teacher has to keep in mind and practice certain desirable and undesirable behaviour which is known as component behaviour of explanation. The component behaviour is as follows.

<table>
<thead>
<tr>
<th>Component Behaviours of Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desirable Behaviours</td>
</tr>
<tr>
<td>- Introductory statement</td>
</tr>
<tr>
<td>- Concluding statement</td>
</tr>
<tr>
<td>- Use of explaining links</td>
</tr>
<tr>
<td>- Use of visual techniques</td>
</tr>
<tr>
<td>- Interesting to the students</td>
</tr>
<tr>
<td>- Defining technical words</td>
</tr>
<tr>
<td>- Testing students understanding by</td>
</tr>
<tr>
<td>putting few questions</td>
</tr>
</tbody>
</table>

(5) **SKILL OF STIMULUS VARIATION**

Student learning largely depends upon ‘attending’ to the relevant source of environment. Psychologists have found that for any learning to take place, the learner has to attend to information. Attention is essential condition for effective learning. What, when and how much change in behaviour is required for sustaining and securing attention of the student is known as stimulus variation.

The skill of stimulus variation involves deliberate change in attention drawing behaviour of the teacher in order to secure and sustain students’ attention to what is
being taught. This skill implies alternating and focusing students’ attention by changing stimuli in the environment. The variations in the stimuli generate interest among students in their learning and hence help in their academic achievement.

Component Skill of Behaviour

The skill of stimulus variation includes certain component behaviour namely (i) teacher’s movement, (ii) teacher’s gesture, (iii) change in speech pattern, (iv) focusing, (v) change in interaction style, (vi) pausing and (vii) change in sensory focus. All these component behaviour is discussed as follow.

(i) Teacher’s Movement: It is observed that the teacher’s movement in the classroom draws the attention of the students. This behaviour of the teacher makes the students feel that their participation in instructional activities is being supervised by the teacher. It should be remember that teacher’s movement must be meaningful and related to the teaching i.e. the movements should have a pedagogic function. The teacher should avoid the habit of aimless wandering in the classroom.

(ii) Teacher Gesture: The various gestures that a teacher can use in the class to draw students’ attention are head, hand and body movements. Using such gesture a teacher can be more expressive and dynamic in his/her presentation in class.

(iii) Change in speech Pattern: Change in speech of verbal communication is known as change in speech pattern. For example, sudden variation in voice will attract students’ attention. It should be noted that while teaching a teacher should not speak in a monotonous tone. Teacher should be able to change speech pattern at proper points and situations, according to the need of the students and subject matter.

(iv) Focusing: Focusing is used when a teacher wants to direct students’ attention to particular point which they are required to observe. It can be obtained through verbal communication or gesture or both. In verbal focusing a teacher can use statements like ‘Look at this chart’, ‘watch the demonstration’, ‘Now’, ‘This is really very important’ etc. Gesture focusing includes the movement of head and hands (s), pointing out to demonstration, underline the point on blackboard etc. Verbal and gestural focusing
involves both verbal and gestural focusing. For example, pointing to a diagram and saying verbally 'Look at the diagram' and at the same time draw the diagram on the blackboard, or overhead projector transparency or LCD projector.

(v) **Change in Interaction Style:** Interaction takes place when two individual communicate with each other in order to share an idea or feeling. Classroom interaction takes place in three ways:

(a) **Teacher-class interaction:** When the teacher communicates with the whole or part of the class, it is known as teacher-class interaction.

(b) **Teacher-student interaction:** When teacher communicates with one particular student who is supposed to respond to the teacher, it is known as teacher-student interaction.

(c) **Peer group interaction:** When the students interact among themselves, it is known as peer group interaction. It takes place during discussion. Here the teachers' role is to manage and facilitate the interaction among the students so that they get the maximum benefit out of the interaction/discussion.

(vi) **Pausing:** Pausing means introducing silence during talk. In the classroom, if a teacher is continuously talking or asking questions without giving time to students to think and respond, students lose their attention in the lesson. The following tips can make pausing more effective.

- The pause should be introduced at appropriate time and point.
- It should be neither too short nor too long.
- The aim of the pause should be to attract the attention of the students.

(vii) **Change in Sensory Focus:** If a teacher continuously gives information to the students through any one media – oral, visual or oral-visual, there is likelihood for students to lose attention in what the teacher is conveying. In order to draw students' attention a teacher need to change sensory channel – from listening (verbal speech) to
looking (visual display), from speaking to doing, from writing to demonstrating, etc. It helps to maintain the level of attention and motivation of the students.

(6) SKILL OF REINFORCEMENT

Reinforcement is a major condition of learning. It facilitates learning in students. The skill reinforcement involves teachers encouraging students' responses using verbal praise, accepting their responses or using non-verbal clues like smile, nods etc. Reinforcement is a tool in the hands of the teacher to make his teaching more productive.

Reinforcement is not only used to promote learning but also used to secure attention of and to motivate the students for teaching. It is an universal fact that, every student needs social approval of his/her behaviour. When a student answers or responds, he is eager to know whether his responses are correct. When he comes to know that answer is correct and the teacher is happy, he feels encouraged and as a result he takes active part in teaching-learning activities. This behaviour of the student of responding corrects reinforced or one can say that the students' behaviour is reinforced. Reinforcement is thus response modification and is based on the principle of feedback. In other words, we can say that the teachers' reaction to students' response reinforces the student's behaviour. It involves the use of more and more positive reinforces by the teacher and less and less use of negative reinforces so that student participation is maximized.

Component Skills of Behaviours

For effective use of the skill of reinforcement s/he should acquaint himself/herself with behavioural components of the skill. They are as follow.

(i) Positive Verbal Reinforcement: A teacher can motivate the students through various verbal expression (i.e. using words) by saying e.g. 'Good', 'Very good', 'Right', 'Correct', 'Fine', 'Well done', 'Excellent', etc. after h/she responded. A teacher can also provide reinforcement in the middle of the response, saying 'carry
on’, ‘Go-ahead’, ‘Continue’, etc. These expressions are also reinforces. All such kind of verbal expressions are also reinforces. All such kind of verbal expression provides reinforcement to students.

(ii) Positive non-verbal Reinforcement: When a teacher uses gestures, or some other behaviour to reinforce students learning, he uses the skill of non-verbal reinforcement. A teacher can use non-verbal expressions like ‘nodding of head’, ‘smiling’, ‘moving towards the responding student’, ‘writing the students’ answer on the black board’, etc. The non-verbal reinforcement is more effective in bringing about desired behavioural change in students.

(iii) Negative Verbal Reinforcement: Negative verbal reinforcement affects learning negatively and decreases the motivation of the students. Hence, a teacher should avoid giving this type of reinforcement. Therefore, a teacher should try to avoid discouraging expressions such as ‘I do not like what you are doing’, ‘you are not good’, ‘nonsense’, ‘no’, ‘wrong’, ‘incorrect’, ‘not true’, ‘stop’, ‘that is not’, etc. Negative reinforces are generally used to avoid incorrect or inappropriate answers by giving right answers.

(iv) Negative non-verbal reinforcement: This is brought out using such behaviours as ‘frowning’, ‘moving away from the responding student’, ‘giving student discouraging looks’, ‘hard and disapproving stares’, ‘not looking at the responding student’, etc. A teacher should be consider of such behaviours and avoid them as far as possible, if he/she wants to use the skill of reinforcement effectively.

(v) Repeating and Rephrasing Students’ Responses: If the teacher repeats the response of a student it helps the class to understand the concept being taught. This behaviour of the teacher will have a reinforcing effect on the students. However, the teacher should repeat the significant and crucial responses only. Unnecessary repetitions would make the teaching boring.
In addition to these, following points should be kept in mind while using the skill of reinforcement.

1. If you reinforce only those students who respond to your question asked, other students in the class feel neglected. Therefore, involve all the students and ensure their participation in teaching learning activities.
2. Use wide range of reinforcing strategies
4. Over use of reinforcement makes the instructional situation artificial. So, reinforcement should be used judiciously.

Activity for the teachers:

- Prepare an episode depicting the skills of explanation, reinforcement and stimulus variation. Exhibit these skills by one of your group members in a simulated condition.

5. INSTRUCTIONAL MEDIA

Objectives

1. To enable the participating teachers know different instructional media that can be used for teaching computer.
2. To enable the participating teachers understand the component skill of using blackboard.
3. To enable the participating teachers understand the concept and use of instructional media like chalkboard, chart, OHP, computer and LCD projector.

Earlier the term audio-visual aid was used in education. With the advancement of the communication technology, the term ‘Instruction Media’ or ‘Educational Communication Technology or Educational Media’ has been coined. It is primarily due to the dynamic use and expansion of T.V. and Computer in the field of audio-visual education that promise much more for the future.
Audio-visual aids or instructional media are added devices that help the teacher to clarify, establish, co-relate and co-ordinate accurate concepts, interpretations and appreciations. It enables him to make learning more concrete, effective, interesting, inspirational, meaningful and vivid. The aim of teaching with technological media is ‘clearing the channel between the learner and the things that are worth learning’. The instructional media or audio-visual aids can be classified into, (i) audio, (ii) visual, (iii) visual (non-projected, two dimensional), (iv) visual (non-projected, three dimensional), (v) visual (projected-still), (vi) audio-visual (projected-motion) and (vii) new emerging media (multi-sensory). But considering the nature of content of computer education, only few instructional media have been discussed as follow.

(1) CHALKBOARD/BLACKBOARD

The chalkboard/blackboard is a visual non-projected media of teaching. It is unique device which in spite of newer and better devices vogue, is irreplaceable as well as indispensable. It is mirror through which students visualize all about the teacher’s mind, his way of explaining, illustrating and teaching as a whole. It is the cheapest and the most valuable teaching device and universally used aid.

The use of blackboard in class teaching creates an informal atmosphere and motivates learning. It is a help to ‘planning’, ‘to crystallizing’ main points and to ‘summarizing’ and ‘reviewing’ results. Blackboard being a simple means of dealing with the whole class as a unit, it is extensively used during the course of a lesson.

Component Skill of Behaviour:

Using the blackboard is a skill. This skill may be broken down into various sub-skills or components. It has three components:

(i) Legibility of writing
(ii) Neatness in the blackboard work, and
(iii) Appropriateness of written work on the blackboard.
(i) **Legibility of writing**: The handwriting said to be legible when there is maximum ease in reading it. It includes the following points:

- Every letter should be distinct.
- There should be adequate spacing between two letters and two words.
- The slantness of each letter should be closest to the vertical.
- The size of the letter should be large enough to be read from the far end of the room.
- The size of the capital letters should be just bigger than that of the small letters.
- All capital letters and small letters should be of the same size, and
- The thickness of the lines should be of same width.

(ii) **Neatness in Blackboard Work**: The neatness of the blackboard includes following points.

- The words and the sentences should be written in the horizontal lines parallel to the base of the blackboard.
- There should be adequate spacing between lines.
- There should be no overwriting, and
- Relevant matter which is under focus of classroom discussion should be retained on the blackboard.

(iii) ** Appropriateness of Work on the Blackboard**: The content is of two types – letter/words, sentences, and diagrams/illustrations. The appropriateness of the blackboard work includes following points.

- There should be continuity in the points being presented on the blackboard, i.e., it should be logically related to the previous one.
- Blackboard summary at the end of the lesson should be written in a simple and clear language.
- Chalk of different colour should be used to draw, write, and underline important points and keywords. It is done to draw students’ attention to those points.
A chart is a simple flat, generally a combination of pictorial, graphic, numerical or vertical material which represents a clear visual summary. The most commonly used types of charts include outline charts, tabular charts, flow charts and organization charts. Readymade charts are available for use in teaching but charts prepared by a teacher himself incorporating his own ideas and lines of approach of the specific topic are more useful.

**Purpose of using Charts:** Charts serve the following purposes:

1. For showing relationship of facts or figures.
2. For summarizing information.
3. For showing continuity in process.
4. For presenting abstract ideas in visual form.
5. For motivating the students.

**How to use charts effectively:**

1. Teacher made charts should be preferred.
2. Students should be involved in the preparation of charts.
3. Charts should be so large that every details depicted should be visible to every students in the class.
4. Charts should display information about one specific area in a subject.
5. A chart should not contain too much written material.
6. A chart should not contain too many details.
7. A chart should give neat appearances.

In teaching of computer also various kinds of charts can be used. Examples of charts in teaching computer are charts containing picture of floppy, CD, hard disk, modem, server, chart of computer network and chart of working of WWW and flow chart.
(3) OVER HEAD PROJECTOR

Overhead projector is a device that can project a chart, a diagram, a table for that matter, any thing written on transparent sheet, upon a screen or the white wall before the students in a class. It is considered to be the most convenient and effective medium in the hands of the communicator. It makes the teaching illuminative, illustrative and impressive. As it projects messages, it can therefore substitute a picture, graph, chart or even a chalkboard. The advantages of OHP are as follows:

1. An OHP can be used for a large group. As it is a projected medium, the entire class can see the projected transparency at a time. Thus, it also saves great deal of time.
2. It does not require a darkroom. It can be used in the normal classroom light.
3. It facilitates two-way communication or interaction between the teacher and the students. The teacher faces the students while using OHP. S/he can explain the concept while showing the transparency without losing eye contact with the students.
4. It is very easy to handle. There is no complicated mechanism for its operation.
5. The transparencies can also be preserved by the teacher for future display while taking up the same topic.

(4) COMPUTER

The age of information and communication technology has brought revolution in the field of education. The awareness of the key role of information led to the introduction of computer in the education system as a subject. Computer is used as a tool to teach various school subjects. But in teaching computer as a subject in the school, computer is also used as a teaching aid. Without computer it is very difficult on the part of teacher to teach computer content in theory class and demonstrate various operations. The operation of computers like selecting a text, drag and drop, cut, copy and paste, use of different tools of paint programme etc cannot be possible to teach without computer. Visual representation of the task through demonstration helps the students to understand and grasp the task/content clearly, creates interest and...
helps to pay attention longer time. Computer as a teaching aid helps to provide direct and real experience to the students. It helps to explain the difficult task easily and the visual representation helps to provide guidance during practice session by referring the previous task. While demonstrating the task in theory class, place of computer and sitting arrangement need to be made in such a way that all students can observe the demonstration clearly. As the screen of monitor is small students may face difficulties in observation. This difficulty can be overcome by using LCD projector.

(5) LCD PROJECTOR

Liquid Crystal Display (LCD) is a modern electronic projected media. It is a versatile media that is used in teaching different subjects. But it is indispensable for teaching computer as a subject. Students learning style differs from each other. Some are auditory learner, some are visual learner and some are auditory-visual learner. Through sharp projector like LCD, a teacher can present and communicate the topic in an interesting way.

Computer education teachers generally attempt to draw different parts of a computer or computer screen on a chalkboard. It takes lot of time and accuracy/clarity is not maintained. Some parts of the computer can be drawn accurately. But the fundamental operations in computer like 'double-clicking', 'selecting text', 'activating menus' and 'drag & drop' are difficult to explain. There are some software or programs or operations which are difficult to describe but easy to demonstrate or show. It can be done easily through LCD projector. Students can look at the screen of projector and duplicate what they see.

The LCD projector is much more effective than the chalkboard or even computer. While writing on chalkboard the teacher may stay in front which create problem for students. While demonstrating the operations on computer, students may not be able to see it clearly as the screen of the monitor is very small. But LCD projector helps the students to learn more quickly and easily. They don't get confused. Students feel happy to look at what's on the projector screen than what's on the chalkboard. Students learn a wide variety of skills, including Notepad, WordPad, Word processing, paint, media player, triple-click, drag & drop, selecting text etc.
Advantages of LCD Projector: The advantages of using LCD projector during teaching computer are as follows:

1. It can be used for a large group. As it is a projected medium projecting real screen or operations of computer, entire class can see the screen at a time. Thus, it saves great deal of time.

2. LCD projector with excellent display quality and high resolution does not require dark room, even on a bright day or with room lights on.

3. The visual representation of the fundamental operations helps the learner to understand the function clearly.

4. Computer fundamentals like double-clicking, selecting text, activating menu, and drag & drop can be demonstrated easily which helps the students to clear quickly.

5. Through sharp projector a teacher can demonstrate software or operations that are difficult to describe on the chalkboard.

6. Visual representation of the task helps the students to recall/visualize the operations while practicing in the practical class and also helps the teacher at the time of guided practice as the teacher can directly refer to visual representation.

Activity for the teachers:

- Take a topic of your own choice from the computer textbook and
  (i) List down the essential media needed for teaching the topic.
  (ii) Design the media (available or not available) according to your wish and show how that can be used in the specific context.

6. CLASSROOM ENVIRONMENT

Objectives

1. To enable the participating teachers understand the concept of classroom environment and learning process.
2. To enable the participating teachers understand the dimensions of classroom environment e.g teacher-student interaction and student-student interaction.

Piaget (1973), the world famous developmental psychologist hypothesized that children must have opportunities to interact with their environment in order to develop. Such interaction enables them to construct knowledge. Bronfen Brenner (1998) has viewed the environment as a nested system of interrelationships. Almost all of the educationists and psychologists have argued for providing proper classroom environment to the students for better academic development. Classroom as a learning community plays an important role in the process of learning.

**Classroom Environment and Learning Process**

The term classroom environment and classroom climate have been used synonymously as the idea contained in both are almost the same. Classroom environment is visualized as a combination of physical facilities, psychological characteristics and instructional activities of a classroom set-up by teacher and students to contribute to a wholesome learning situation.

A proper classroom environment is necessary for the good functioning of a learning system. The classroom environment not only depends upon physical, social, emotional, educational and economical factors, but also depends upon how the students and teachers perceive the classroom situation for bringing about maximum interpersonal relationships and thereby creating an atmosphere for effective and efficient learning.

Teachers' method of handling the class is one of the most important aspects of classroom environment. Evers (1991) pointed out that knowledgeable teachers model and use guided practices to engage students interest, flexible grouping and balanced strategies and create a non-threatening learning environment. Meece and Mc Colskey (1997) argue that by providing favorable classroom environment teachers can make the students interested and engaged in the classroom activities. A proper classroom environment meets the psychological needs of the students, empowers them to make
choices about learning, eliminates fear of failure, allows students to establish their own standards of achievement and motivates them to participate in the learning process.

**Dimensions of Classroom Environment**

There are several dimensions of classroom environment, but as per the need of the subject two dimensions have been discussed below.

1. **Teacher-student Interaction:** For developing a better classroom environment favorable and democratic relationship between the teacher and student is essential. Patric (1995) has pointed out that effective democratic teachers must foster academic freedom by encouraging and protecting free and open expression of ideas, establish and apply rules fairly and create a respectful atmosphere. The teacher has to be seen as a family member of the student, so that students can freely interact with the teacher.

   In order to create a good learning environment and interaction between the teacher and students both in computer theory and practical class, a teacher can adopt the following technique.

   1. Set the tone for the day by greeting the students.
   2. Keep eye contact with the students.
   3. Move around the room and increase proximity to restless students.
   4. Redirect students’ attention.
   5. Use positive reinforcement.
   6. A teacher should have genuine interest in the student.
   7. Offer praise and encouragement frequently.
   8. Attend the students as individuals not just a group or class as a whole.
   9. Provide freedom to express their ideas.
   10. Enforce the rules fairly and consistently.
   11. Give support, encouragement and protection for free opinion not only for high achievers but also for low achievers.
   12. Avoid gender differences.
2. **Student-student Interaction**: Student-student interaction is the most important dimension of good classroom environment. It is especially applicable for practical classes in computer education as students work in groups or pairs to complete a task or project. Here teacher ensures that students influence their nature of the activities/tasks they undertake, engage seriously in their study, regulate their behaviour, and know of the explicit criteria and high expectations of what they are to achieve. Learning or doing the task through mutual interaction is the best way to fulfill the aims. Learning is not possible without mutual interaction between the students. A homely environment can be created in the classroom by promoting healthy student-student interaction.

Student-student interaction or relationship reflects on the academic engagement of the pupils. The academic engagement is identified by on-task behaviours that signal attentiveness, doing the assigned work and showing enthusiasm for this work by taking initiative to raise questions, contribute to group activities and help peers. To promote student-student interaction, a teacher can adopt the following technique in practical class.

1. Allot computers to the students for practice with 1:2 ratio and not more than that.
2. Instruct the students (pair) to occupy the specific computer so that they (students) do not need to rush.
3. Give the task or project or assignment to carry out.
4. See that the practical class for practice should be according to the theory class.
5. Encourage interaction among students i.e., helping the peer group.
6. Provide guided supervision.
7. Create democratic environment where students will feel free to express their ideas or ask questions related to their problems.

The whole idea of student–student interaction is based on the concept of cooperative learning strategies. These cooperative learning strategies are discussed separately in the section Cooperative learning.
Activity for the teachers:

- List few practical points, which can make your classroom environment conducive.

7. METHODS OF TEACHING

Objectives

1. To enable the participating teachers know different methods of teaching computer.

2. To enable the participating teachers understand various methods of teaching computer e.g. lecture method, discussion method, demonstration method, problem solving method and assignment method.

There are various methods of teaching followed at secondary school level for different subjects. Which method of teaching is suitable/appropriate to a particular subject is entirely based on the nature of the subject in general and content analysis on particular. On the basis of content analysis of Computer Education of Standard VIII, it was found that four methods are appropriate for teaching these contents. These methods are (i) Lecture method, (ii) Demonstration method, (iii) Problem Solving method, and (iv) Assignment method. These methods are discussed as follows.

(1) LECTURE METHOD

The lecture method is commonly used where the strength of the class is very large. It is used where a large content is to be covered during a given period. This method is also found to be appropriate where a new concept or topic is to be introduced or where certain information, facts, principles etc. is to be imparted to the students. Through this method a teacher is able to provide an overview of the course unit or topic along with background knowledge essential for understanding it.

A teacher following lecture method prepares a lesson and presents it in three phases namely introduction, body and conclusion. In the first phase, teacher
introduced the topic by following a suitable introduction. In the second phase the teacher presents the subject matter without any interruption. Here there is no scope for teacher-students interaction and students became a passive listener, takes notes and list difficulties if any. Due to this the students may get bored and may lose interest in the subject. It also does not provide scope for thinking, observation and reasoning as a part of students' activity. In the third phase points covered or taught are summarized, leading to conclusion.

Skills Required for Effective Lecture Method

In lecture method, the teacher talks most of the time. Acquiring mastery of skills and components of the lecture can help the teacher to improve his performance. The skills required are:

(i) Modulation of Voice: It has several dimension viz. speed, pitch, volume, and intonation.
   (i) **Speed** refers to the rate of vibrations of voice cords during speech.
   (ii) **Volume** refers to the degree of loudness of the speech.
   (iii) **Intonation** refers to the rise and fall of voice in speech. The meanings of concepts, terms, ideas, etc., are provided not only by words and grammatical constructions but also by intonation patterns employed by the teacher.

   The teacher should modulate his/her voice according to that s/he wants to communicate to the students. That's why a lecture is more effective when the teacher lays proper stress on various words and phrases.

(ii) **Stimulus Variation**: A major problem of lecture method is to sustain the attention of the students. It can be overcome by acquiring the skill of stimulus variation. Stimulus variation can be achieved through frequent variation in the style of presentation of subject matter, media, interaction pattern etc. This breakdowns the monotony and facilitates learning. The details of stimulus variation have been discussed earlier in skills of teaching.
(iii) **The skill of Explanation:** While following lecture method, the teacher has to make clear the meaning of terms, concepts, situations etc. He has to describe objects, procedures, processes etc. Thus, it is a skill that affects the quality of teacher's communication through verbal medium. This skill has been discussed earlier in skills of teaching.

(iv) **Illustration with Examples:** While lecturing the teacher should describe concepts, principles, theories etc., with the help of examples. Effective illustration with examples can make lectures more communicative and meaningful. Various components of this skill are:

- Formulation of simple interesting and relevant examples.
- Use of appropriate media for presenting examples.
- Use of appropriate approach for presenting examples.

Thus, it can be concluded that there are number of skills that can improve teachers talk and thereby the quality of lecture. However, the most crucial ones are modulation of voice, skill of stimulus variation, skill of explaining and skill of illustration with examples.

**Advantages of Lecture Method:**

The advantages of lecture method are as follows.

1. This method is very economical as large number of students can be taken care of, requires minimum amount of resources and more content can be covered in a given stipulated time.
2. It is useful when the teacher wants to provide large number of facts, concepts, principles etc.
3. A well planned lecture motivates and inspires the students to enhance their knowledge.
4. It helps the teacher in maintaining logical continuity of the topic to be taught.
Disadvantages of Lecture Method: The disadvantages of lecture method are as follow.

1. There is no scope for active participation of students which makes the teaching-learning process dull and ineffective.
2. Because of one way communication, this method makes students mere passive listeners.
3. It does not encourage students to become inquisitive and explorative. It makes the students dependent upon teacher and his notes.
4. There is no scope for meting individual needs. Even no corrective or remedial measures are taken.
5. It does not develop student’s capabilities of leaning to earn.

Ways to Improve Lecture Method: The following measures can be adopted to improve the lecture method.

1. The teacher should plan the lesson properly.
2. The teacher should take into account the entry behaviour of the students i.e. their amount of knowledge and skills, experiences, attitudes, aptitude, competence in language etc.
3. The teacher should structure the lesson properly i.e. arrangement of the key concepts/points to be dealt with.
4. Tell the students at the beginning of the lecture why the lesson is important, point out some key concepts they need to attend for comprehending the lecture.
5. Effectiveness of lecture also depends upon the competence to communicate the intent to the students.
6. Provide ample opportunities to the students to clarify their doubts and to ask question.
7. Special attention needs to be paid to its three parts viz., introduction, the body or message, and closure.
Discussion method of teaching is a form of group based learning. Its value lies chiefly in the fact that it represents a type of intellectual team work. It is based on the principle that the pooled knowledge, ideas, and feelings of several persons have greater merit than those of a single individual. This method of teaching is generally useful in issue based topics or subjects. But it can also be effectively used in teaching computer education. This method can also be used with the lecture method of teaching. In this method ideas are initiated, expressed and exchanged, and the factual basis is traced out. Its strength lies in the maximum participation of the students. Here, the participants are engaged in interaction, interpretation and interpolation of facts. They use to analyze and synthesize the content and in this process systematize the content for the better understanding. In this process, it is the responsibility of the teachers to encourage students to participate by using different skills. For example, situations like giving feedback on the responses of a class test, clarifying the doubts of students at the end of lecture, generating alternative solutions to a classroom problem are the situations in which discussion method could be used.

In Computer Education, discussion method could be used along with lecture method while teaching theoretical chapters like, Introduction to Computers and Introduction to Internet (part-I). These chapters can be taught effectively as it deals with theoretical knowledge about computer and also factual information and data.

For effective utilization of this method, the teachers should give sufficient background information so that the students would possess it and would be ready to use it in the classroom discussion. The teacher needs to have the ability and skills to initiate and handle the classroom discussion. The teacher’s skills and abilities like, giving reinforcement and feedback, listening and canalizing students’ response, giving verbal and non-verbal clues etc can affect the nature and pattern of discussion.

Purpose of Discussion Method
Discussion as a method of teaching may have the following purposes
1. Laying plans for new work/contents.
2. Presenting facts and figures from various angles.
3. Sharing and exchanging information and data with the help of students.
4. Respecting various points of views of students.
5. Clarifying ideas and concepts.
6. Inspiring interests of students
7. Evaluating the progress of students from time to time.

Limitations of Discussion Method

The limitations of demonstration method of teaching are as follows.
1. It is a time consuming method of teaching.
2. It requires active participation of students which is a difficult task in our heterogeneous classes.
3. The teacher needs to be more alert, careful and skillful for making discussion logical and systematic among students.
4. All the topics cannot be taught by using this method.
5. Students coming from various backgrounds and having various levels of interests cannot contribute to discussion adequately.

Merits of Discussion Method

The merits of the discussion method of teaching are as follows.
1. It enables the students to learn together, provide facts, share responsibility and comprehend the topic.
2. It sharpens curiosity for further learning.
3. It crystallizes the thoughts and concepts of the students relating to the topic.
4. It helps the students in discovering unknown facts and information.
5. It helps the teacher to identify the potentiality and talent of students for promotion of creativity and enquiry.

In spite of these limitations of the discussion method, this is one of the most useful method of teaching for some specific contents where the knowledge is not only limited to text books and work books. The discussion method can be used as a best
Demonstration is a talk or explanation by someone who shows you how to do or use something of how something works. Thus, demonstration means:

- The method or process of presenting.
- The procedure of doing something in the presence of others either as a means of showing how to do or in order to illustrate a principle to support the presentation. For example, how to boot (switch on and switch off) computer systematically or how to draw different pictures using the tool of paint program.

If a person demonstrates something to someone, the person shows him by doing it practically and giving explanation along with the performance of the activity.

Demonstration method emphasizes on showing/illustrating something to promote understanding among students. In this method the emphasis is laid on showing model performance that the student is expected to do or perform after demonstration and during practice. Demonstration method is of immense importance in developing variety of skills in the students.

Strategies of Demonstration: While presenting a demonstration on any topic of the computer a teacher can use the strategies like, lecturing or inquiry or both.

Lecturing is the simple strategy that can be used by the teacher. But while using lecturing the teacher have to maintain the interest and attention of the students by telling them what to look for, what is likely to happen and why things happened.

Inquiry is the best strategy of demonstration. Through this a teacher can promote the skill of enquiry among students by asking questions such as: ‘What do you observe?’, ‘What will happen if I double click a file/folder?’, ‘What will happen if you triple click a sentence or a paragraph?’, ‘What will happen if I click on Save As?’ etc.
**Role of the Teacher:** The teacher plays pivotal role in demonstration method. The role of teacher in demonstration method is to plan, organize and execute the demonstration properly so that the students understand the concepts clearly. The quality of demonstration depends on the amount and quality of preparation made by the teacher.

**Role of the Students:** Students also plays an important role in demonstration method. Students' job is to observe (keenly), listen and follow the demonstration step wise. Demonstration requires the sense of hearing and seeing. It leaves vivid and lasting impression on the students’ mind. In addition, the students are required to answer different questions: lower and higher order and replicate the performance. For showing standard performance, the students need practice under feedback and guided supervision conditions. The appropriate outcome of practice, however, is improvement rather than perfection.

**Characteristics:** On analyzing the meaning the following characteristics of demonstration stands out.

- It is a method of teaching by doing.
- It makes easier to learn concepts, principles, complex techniques and skill-intellectual as well as psychomotor.
- It lays foundation for independent practice by the students.

**Uses/advantages of Demonstration Method:** The uses or advantages of demonstration method are as follows:

1. It is used for enhancing understanding of concepts or principles.
2. It is used for development of intellectual skills like observation, questioning, hypothesizing, inferring etc.
3. It can be used for the development of psychomotor skills like typing, drawing different pictures in paint, creating table etc.
4. It is also useful for developing skills of operating mouse, keyboard and computer.

5. In this method students’ participation is encouraged and their involvement ensures effectiveness.

6. This method arouses curiosity and interest in the minds of the students for the subject.

**Disadvantages:** The disadvantages of the demonstration method are as follows:

1. The teacher may not attend to the seating arrangement of the students. As a result, sometimes some students may not be able to see the demonstration.

2. The objectiveness of demonstration may not be stated properly at the beginning. This diminishes the effectiveness of the demonstration.

3. During demonstration, participation of the students may not have been sought. This results in loss of attention of the students which in turn causes poor learning.

4. The teacher may not recapitulate holistically important activities of the demonstration which leads to loss of an opportunity to strengthen cognitive structure of the students.

5. Teacher may not evaluate achievement of the students at the end of demonstration. Due to this the teacher does not get feedback regarding effectiveness of the demonstration.

**Ways to Improve Demonstration Method:** The following measures can be adopted to improve the demonstration method.

1. Arrange the needed material i.e. computer or LCD projector in proper place.

2. Make proper seating arrangements of the class and the location of the demonstration computer or LCD projector in such a manner that every one is able to see demonstration and hear you clearly.

3. It is always better to demonstrate through LCD projector, as the screen is big. As a result students will be able to observe clearly.
4. State the objectives to be achieved in the beginning of the demonstration. This is recommended because it secures interest and attention of the students in the demonstration.

5. Demonstration should be given in such a way that it is neither too fast nor too slow. It should be given at a reasonable pace, considering the capabilities of the students.

6. Utilize short time intervals during demonstration for providing useful information or answering questions.

7. Lastly, the main points of demonstration should be recapitulated or highlighted at the end of demonstration.

(4) PROBLEM SOLVING METHOD

Problem solving is an instructional method or technique. In this method the teacher and students attempt in a conscious, planned and purposeful effort to arrive at solution of the problem. It is a planned attack upon a difficulty or problem for the purpose of finding solution. It is not merely a method of teaching. It is more a method of organization subject matter in such a way that it can be dealt with through the study of problems. Creating or evolving a problem for the students related to the content is the essence of this method. A good problem can help a lot in this method.

Essential Features of the Problem: Following are the essential features of the problem:

1. The problem should be meaningful and interesting to the students.
2. It should have correlation with life.
3. The problem should be clearly defined.
4. The problem should not be too difficult or too easy.
5. The solution of the problem should be found out by the students themselves through the guidance of the teacher.
Process of Problem Solving:

The process of problem solving involves:
1. Sensing, accepting and defining a problem intriguing or meaningful to students of the relevant age. The problem need not always be real.
2. Considering the relationship that exists among the elements of the situation. Identifying data and information, making known and unknown explicit, presenting data etc., are the skills required at this stage.
3. Pursuing the plan of action to a tentative answer.
4. Testing the result.
5. Accepting the result and acting on it.

For the success of problem solving teaching technique the teacher must have the ability to see problems clearly, the power of analyze and synthesize and to draw conclusion. Along with this the teacher must use questioning and brainstorming technique and set an atmosphere of freedom in the class for problem solving.

Advantages of Problem Solving: The advantages of the problem solving method are as follows:

1. It helps in stimulating thinking.
2. It develops reasoning power.
3. It helps to improve knowledge and good study habit.
4. It provides opportunities to the teachers to know in details their students. They learn which students are shy and which are very active and accordingly they assist the students.
5. It helps in the maintenance of discipline. The students remain busy in finding out answers to their own problem.
6. Learning becomes more interesting and satisfies curiosity.
7. It helps to learn how to act in a new problem.
Disadvantages of Problem Solving: The disadvantages of problem solving method are as follows:

1. It involves a lot of time and the teachers find it difficult to cover the prescribed syllabus.
2. Problem solving method needs very capable teachers to provide effective guidance to students.

(5) ASSIGNMENT METHOD

The assignment is the combination of demonstration and laboratory method. This method is very much useful in computer education practical classes. In this method of teaching the teacher can break the content into series of well planned assignments with clear cut instruction for solving the assignment. Generally, in practical class the teacher can provide practice assignment which is the repetitions of activities designed to produce mental or motor skills. The teacher can plan assignment depending upon individual needs of the students.

Essentials of Assignment: The essentials of assignment are as follows:
1. The teacher should write the assignment i.e. what is to be done with clear cut instruction on the blackboard or marker board.
2. The assignment should be in accordance to the age level, abilities and interest of the students.
3. The assignment should be clear and definite.
4. It should not be too lengthy. It should be well planned and balanced so that students can finish it in stipulated time period.
5. The assignment should foster thinking.
6. The assignment should relate the new unit to past experience and also previous unit or assignment.
7. The assignment should be motivated chiefly by the hope of worthwhile achievements, rather than scholastic reward or the fear of punishment.
8. The assignment should arouse an interest in advance.
**Procedure:** Assignment involves self-learning in which the teacher assigned the work as per the requirement of the content and students' abilities and interest. The assignments are categorized into four different types:

(i) **Study Assignment**

(ii) **Revisional/Practice Assignment**

(iii) **Remedial Assignment**

(iv) **Activity Assignment**

(i) **Study Assignment:** This type of assignment can be given before beginning a particular topic which would help students in understanding the concept to be taught or it can even be given after teaching a particular topic. It is given so that the students are able to gain an insight into the subject. It could be given in the form of compare and contrast or studying in detail a particular topic. It is useful in theoretical aspect of computer. Example of assignment: Compare WordPad and MS Word.

(ii) **Revision /Practical Assignment:** This type of assignment is preferred when a particular topic demands drill and practice e.g. in computer education use of Paint Programme, MS Word etc. requires lot of practice from students. Under such cases revision/practice assignment can be given.

(iii) **Remedial Assignment:** Remedial assignments are given to the weak students or slow learners in the class. Here, the teacher has to find out the learning difficulties of the students in a given topic by administering a test. After this students are given remedial measures which could be in the form of self-learning material or guided practice followed by the test to find the learning or students.

(iv) **Activity Assignment:** Activity assignment could be given to the students in the form of preparing charts of hardware components, collecting new information on different hardware gazettes etc.
Thus, depending upon the requirement of the content and needs, abilities of students and objectives of teaching assignments are given.

**Advantages of Assignment:** The advantages of assignment method are as follows:

1. This method provide opportunities to students to work independently and thereby develop in them self-reliance and initiative.
2. Since it is a self-learning approach, students learn at their own pace and time.
3. It provides them an opportunity to do practice what is done in theory classes.
4. As assignments are given depending upon the requirements of the content and abilities of students, it helps in satisfying curiosity of all the students.
5. It helps the child to revise his previous lesson and prepare the next one.
6. It provides remedial measures for slow learner.
7. It provides opportunity to every child to profess at his own speed.

**Disadvantages of Assignment Method:** The disadvantages of assignment method are as follows:

1. This method increases the workload of a teacher in terms of planning different assignments, depending upon needs and requirements of content.
2. In this method the teacher has to keep in mind the abilities and interest of students which is an uphill task for the teacher.
3. In practice assignment, each student needs single computer. Providing one to one computer is not feasible.

**Activity for the teachers:**

- Take all the chapters of your computer textbook and state the best method(s) suitable for each chapter and rationalize it.
8. APPROACHES OF TEACHING

Objective

1. To enable the participating teachers understand various approaches of teaching computer.

The aim of teaching is to bring desirable change in students. It is possible, if a teacher possesses good command over various methods and approaches of teaching. In order to make students learning effective, the teacher has to adopt the right approach or method of teaching. The computer teacher should have command over the knowledge and skill of various teaching approaches and methods. There are many new approaches which can be used for teaching computer at secondary school level. The approaches that can be used for teaching computer are:

(i) Inductive
(ii) Deductive
(iii) Participatory and
(iv) Mastery Learning

(1) INDUCTIVE APPROACH

Inductive approach is an approach of development. In this approach the child is led to discover truth himself. Through inductive approach one is led from concrete to abstract, particular instances to general. Here concrete examples are given and with their help students are helped to arrive at certain conclusion or principles. Through this approach, one tries to prove a universal law by showing that if it is true under one particular case, it is also in other similar cases. This approach has been found to be quite suitable for teaching of science. Looking into the nature of computer education, it can be applied to teaching of commuter at school level. This approach is specially useful in teaching DOS commands and also for teaching the function of ‘cut’, ‘copy’, and ‘paste’ of Windows based programmes.
Advantages of Inductive Approach: The advantages of inductive approach are as follows:

1. It helps in understanding and develop scientific attitude.
2. It is a logical approach and provides ample scope for students' activities.
3. It is based on sound psychological principles. Learning by doing is the basis of this approach.
4. It provides opportunities to the students to be self-confidence.
5. It promotes mental activity on the part of the students, and makes the active participants in the teaching learning process.

Disadvantages of Inductive Approach: The disadvantages of inductive approach are as follows:

1. This approach cannot be used in solving and understanding all the topics of computer.
2. The generalizations obtained from a few observations are not the complete study of the topic. It demands lot of supplementary work and practice.
3. This approach is time consuming and laborious.
4. This approach may be considered complete and perfect only if the generalizations arrived at by induction, can be verified through deductive approach.

(2) DEDUCTIVE APPROACH

Deductive approach is opposite of inductive approach. Deduction is process of moving from the generalization to the particular. Through this approach the learner proceed from general to particular, from abstract to concrete.

In this approach of teaching, the teacher announces the topic of the day and s/he gives the relevant formula/rule/principles etc. The principles or rule is also explained to the students' with the help of examples. From these, students get the idea of use or application of the concerned rule/principle or formula.
Advantages of Deductive Approach: The advantages of deductive approach are as follows:

1. This approach is very economical. It saves time and energy both of the students and teachers.
2. For practice and revision of topic, it is a adequate and advantageous approach.
3. It supplements inductive approach and thus completes the process of induction and deduction.

Disadvantages of Deductive Approach: The disadvantages of deductive approach are as follows:

1. Knowledge is not self-acquired and therefore, not assimilated properly.
2. It encourages memorization of facts which are soon forgotten and, therefore, knowledge is rendered useless.
3. This approach is unnatural and unpsychological for the students who do not possess ability to appreciate abstract ideas in the absence of concrete examples.
4. In this approach memory becomes more important than understanding and intelligence, which is educationally not sound.
5. It not suitable for development of thinking, reasoning and discovery.

Participatory and mastery learning approaches will be discussed separately in the proceeding sections.

Activity for the teachers:

- Take a segment of content or unit, which can be best, taught through deductive approach.
- Prepare a plan/strategy of how to teach the same content using inductive approach.
9. CLASSROOM MANAGEMENT

Objectives

1. To enable the participating teachers understand the concepts of classroom management.
2. To enable the participating teachers understand various principles of classroom management.
3. To enable the participating teachers understand factors influencing classroom management.
4. To enable the participating teachers understand techniques of classroom management.

Classroom instruction includes a number of activities to be performed by the teacher. These activities include motivating the students', explaining the concepts, managing a classroom, assigning and checking the homework, interacting with the students (questioning, probing, commenting, evaluating etc.).

Managing a classroom is an integral part of teaching-learning process. Effective management of a classroom shows the concern of a teacher for the instructional process. It is dependent on his/her efficiency to do the tasks more effectively. Therefore, classroom management, both as a process and as an approach, has a great impact on students learning (Christian, 1991).

Classroom management involves more than one skill of the teacher such as, creating a teaching-learning environment, maintaining students' involvement in teaching-learning activities, establishing effective discipline and ensuring desired learning outcomes by the students. Classroom management and classroom discipline is two different things. Management is a broader concept and is generally directed towards effective teaching and learning. Discipline is a concept used in the context of teacher's response to students; misbehaviour. The ultimate objective is to help students acquire maximum knowledge, attitude and skills.
Classroom management refers to the shaping of learning environment in classroom. Like teaching and learning, classroom management is a complex activity. Classroom management has been defined as "provisions and procedures necessary to establish and maintain an environment in a classroom in which instruction and learning can occur. The primary goal of effective classroom management is not the reduction of misbehaviour or even the creation of a orderly environment. Although they are related issues, effective classroom management and establishment of order are not synonymous (Hofmeister & Lubke, 1990)". "The primary emphasis in effective classroom management is on the creation of a learning environment and hence an increasing appropriate behaviour in students (Hofmeister & Lubke, 1990)". Christian, (1991) defined “Classroom management involves the ability of the teacher to manage various skills so that the quality of teaching learning process is maintained and it ultimately results in maximum output in terms of students’ performance”. Thus, managing a classroom is an act or better still an art of the judicious use of various means to achieve pre-decided objectives. It depends on establishing positive teacher-student peer relationship that helps to meet students’ basic psychological needs.

Principles of Classroom Management

The principles of classroom management are linked with an effective instructional process. The instructional process is based on the teacher’s personal efforts and the objectives that he and his students are supposed to achieve. The principles of classroom management reflect the concern of the teacher for his teaching task. Christian (1991) talks about some major principles of classroom management which can be applied to computer classes also. These are given as follow.

1. Principles of Clarity and Mastery over Content: The first principle of managing classroom instructions the teacher’s command over the subject (s) s/he is dealing with. S/he should have a through knowledge of the school curriculum and his/her subject. Through knowledge implies mastery in one’s subject which helps a teacher teach effectively in a classroom. It helps the teacher in two ways.
• The students are greatly influenced by a well-read knowledgeable and learned teacher
• Through knowledge helps the teacher to conceptualize the content to be covered in the class

2. Principle of Involvement: A teacher can use this principle to make the teaching-learning process more participatory. Active involvement of the students in instructional tasks is a condition of learning. The skill of questioning, perceiving and providing feedback, etc, can make teaching and learning a two-way process. Interactive teaching and learning is possible only when the teacher has thoughtfully planned his teaching activities. If the students are actively engaged in learning tasks in a classroom, they not only achieve mastery learning but also create minimum problems for the teacher.

3. Principle of Democratic Behaviour: Democracy is a way of working together to achieve the common goal. A Democratic teacher provides equal opportunity to every student to participate in teaching-learning activities. This behaviour of the teacher develops a healthy positive attitude among the students for learning. The students learn how to find a solution to classroom problems through understanding one another’s views. Democratic climate in the classroom allows the students to take initiatives about the instructional process and this ensures effective use of class time. No student feels neglected in the classroom.

4. Principles of Teacher Behaviour: While presenting a lesson, the teacher’s behaviour should display various positive attributes: confidence, determination, will-power, etc. This indirectly creates a learning environment in the classroom and thus helps manage a classroom with desired and expected learning behaviour. Positive attributes in the teacher’s behaviour help develop a desirable behaviour in the students as well. A teacher should, therefore, always be conscious that his/her behaviour in the classroom is being minutely observed by the students. Thus, a teacher’s behaviour should not directly or indirectly have any negative impact on your students.
5. **Principle of Self-control:** The teacher has to be firm and consistent in classroom behaviour. If s/he has strong convictions and has a deep commitment to the tasks assigned to him/her, s/he will be able to manage instruction effectively. The self-control of a teacher should enable him/her to control his/her behaviour. This will encourage students to develop self-control in their behaviour. It leads to the development of self-discipline, positive attitude among students.

6. **Principle of Flexibility:** It is not opposed to the principle of self-control. The teacher should display flexibility in his/her behaviour and accommodate the students’ ideas, plans, and observations from time to time. Depending upon the requirements of the prevailing situation, the teacher should be able to make necessary changes in his/her behaviour and in the teaching-learning activities.

7. **Principle of Personal Attributes:** The personal attributes of the teacher such as warmth, sympathy, empathy, etc., have a strong bearing on students’ behaviour in the classroom. The teacher’s caretaking behaviour, harmony and respect for one another, show dignity of work, being peace and self-discipline, and indirect control the undesirable behavior of the students are the necessary personal attributes needed for a teacher. Effective teacher accept the feelings of their students, and are sympathetic to their problems, both academic and personal. The students should not perceive the teacher as an unsympathetic adult who does not treat them as responsible individuals, who would not listen to their opinion, and who does not want to understand them or does not use their suggestions appropriately.

**Factors Influencing Classroom Management**

There are many factors which influence classroom management. Some of the important factors are as follows:

1. **Effective Instruction:** Effective instruction helps a teacher to promote both learning and discipline (order) in the classroom. Doyle (1996) suggested that effective classroom management is facilitated if the students are actively and successfully engaged in instructional activities. Therefore, well-planned instruction with appropriate pacing, guided practice, attention to individual students, effective and...
Immediate feedback etc can help teachers manage a classroom and thereby ensure desired learning.

2. Setting and Implementing Rules: Teachers who set clear-cut goals of instruction and show a degree of commitment to achieve goals can manage their instructional activities more effectively. The teacher, therefore, must demonstrate the willingness and an ability to act when the rules are broken. For example, the students should be told to raise their hands before talking or asking questions. After raising their hands, the students should wait for their turn to come for answering questions or participating in discussions. The process of setting and implementing rules has instructional as well as management value.

3. Managing Intervention: The process of monitoring the students' behaviour and intervening when necessary is one of the most demanding requirements for effective classroom management. The need of intervention is reduced if the rules are classified and instructional activities are appropriately implemented. Typical misbehaviour such as inattentiveness, mild form of verbal aggression, failure to bring books and computer homework, etc., should be effectively intervened.

4. Feedback on Appropriate Behaviour: It is an acceptable fact that the student expects to receive continuous feedback about whether his classroom behaviour is acceptable or not. Success in learning should be praised by the teacher. It should be kept in mind that one should be judicious in his/her praise in the classroom and praise should be linked with performance.

5. Classroom Environment: Classroom environment is also related to management. Many organizational factors such as direction, feedback, communication, interpersonal relations between the teacher and the students etc., create a proper climate for learning. Poorly managed classes do not provide a pleasant supportive environment to teach or learn. A certain degree of calm, quite and comfort is necessary for the teachers' as well as the students' mental health.
Techniques of Classroom Management

It should be kept in mind that there is no ready made formula for managing a classroom. A teacher should be able to design her/her own plans for classroom management that best fit to his/her instructional objectives and suit the students. All resourceful teachers adjust their teaching methods for different kinds of groups and try different systems of classroom management. Still, there are certain general techniques, which can be adopted by the teacher to manage the class.

McNell and Wiles (1990) investigated the secrets of the successful management of classrooms. They made the following suggestions for teachers. They are:

- Show a caring attitude towards your students.
- Listen to the students when they tell you their concerns and viewpoints.
- Use as many as first names as you can.
- Try to be positive in your attitude and approach.
- Cultivate a friendly but respectful relationship with the students.
- Know your students properly.
- Be in time and start the class immediately. Have something for students to do.
- Have a lesson plan and inform the students the way the lesson will progress.
- Apply the rules consistently.
- Vary the types of classroom activities.
- Prepare assignments that are appropriate for your students.

Except the above mentioned points the following points should be kept in mind for successful management of classrooms both in theory and practical.

- Divide the class for theory and practical according to the strength of the class.
- Make arrangement for LCD projector for demonstration class.
- Use other teaching devices as per need.
- Check whether all the computers of laboratory are in working condition or not. If not, arrange computers which are in working condition.
- See that the ratio of computer and students should not exceed 1:2.
- Attend individual student’s query.
- Follow guided supervision.
- Do not solve the problem of students directly. Give them direction to do the task.
- It is better to have two teachers for practical class supervision.
- See that students are practicing the given assignment or not.
- Encourage cooperation among students.
- Identify the learning difficulties of the students at the end of the practical class.
- As per the difficulties, provide remedial measures.

**Activity for the teachers:**

- Apart from the mentioned principles and techniques of classroom management, what else a teacher needs to consider for making his/her classroom effectively managed.

**10. COOPERATIVE LEARNING**

**Objectives:**

1. To enable the participating teachers understand the concept of cooperative learning.
2. To enable the participating teachers acquire the techniques of cooperative learning.

Cooperative learning is a strategy which involves students in established, sustained learning groups or teams. Cooperative learning is not individual learning but group or peer learning. In cooperative learning, students work together to achieve a common goal or task. In this learning there is greater participation and involvement of the students. Cooperative learning generates more intrinsic motivation that individualized learning. The feeling of belongingness produces positive attitudes and team spirit in the students. Cooperative learning is specifically useful for learning various skills and knowledge.
In computer education students have to master various skills of using different devices and also have to demonstrate skill of using various commands, functions etc. Thus, cooperative learning can be used in computer education practical classes. The following paragraphs will clarify what cooperative learning is.

- **Cooperative learning is structured and focused** to make sure that learning is taking place. The teacher chooses the groups to reflect diversity. Letting the students choose their own groups can result in homogeneity in terms of abilities.

- **Cooperative learning creates a classroom community** which involves students in a kind of interdependence whereby all are working towards a common goal or common task. In this group members (pair) are responsible for different aspects of the content/task and teaching or helping the other groups if needed. The group’s work is not complete until all its members have mastered the content.

- **Cooperative learning balances interdependence with individual accountability.** In cooperative learning instructions to the students’ are specific; each group has a task to perform. In other words each student must demonstrate his or her mastery of the subject or given task and receive individual grade or marks. In this group grades are not recommended as some students may score higher mark on the effort of others.

- **Cooperative learning responds to classroom diversity.** It has a positive impact on students who do not participate in classroom discussion or interaction. These students include below average, dull and shy or who has fear to respond. Those students whose learning style preference is cooperative and collaborative rather than competitive are also served well by this classroom technique. Students in the cooperative classroom are responsible for each other’s learning.

In order for cooperative learning activities to be successful in computer education, teachers need to give attention to the following key elements:
1. **Formation of Group/Group Size:** Johnson and Johnson reports that the highest level of success occurs when groups are kept small. So, a teacher should divide the class into small groups. While forming groups, the teacher should keep in mind the heterogeneity among students in respect of intelligence and sex. Each group should consist of boys and girls, above average, average and below average of students’ in terms of intelligence.

2. **Group Functions:** In cooperative learning students work in groups on any of the assignment given by the teacher. Students meet to collaborate on solving a problem or to complete the assignment without direct leading by the teacher. They discuss among themselves to solve the problem. Even one group helps the other to solve the problem.

3. **Group Norms:** In cooperative learning teacher need to proceed slowly and with patience to introduce students to cooperative learning. It is not enough to rearrange the sitting. A “culture” of group work needs to be developed that include expectations regarding noise level, an atmosphere of trust, equal participation and willingness to help one another. It is important that students learn to coach and teach each other. Through this brighter students’ learning is enhanced by their efforts to teach the others; less capable students benefits from one-to-one attention.

4. **Group Skills:** In cooperative leaning students need to be taught procedures and practice opportunities for sitting arrangement, moving quietly into groups, responding to teacher’s signals for attention etc. It is important for students to receive explicit instruction and regular practice in the interpersonal skill that this method requires. These include:
   1. Team work.
   2. Active and reflective listening.
   3. Positive feedback.
   4. Coaching and tutoring others.
5. **Group Goals:** Clear instructions in the beginning of the class, goals, and time duration for group activities or given assignments are essential to successful cooperative learning.

6. **Conducting the cooperative Learning Session:** The teacher should allot time for cooperative learning sessions and distribute the cooperative learning sheets which must contain objectives and activities to be done by the groups. If it is not possible to distribute cooperative learning sheets then write it on the marker board or blackboard. All groups should carryout learning activities according to guide line given/written in the sheets or on the blackboard. If a member commits mistakes, he may be helped by others. At this state, the teacher should observe how cooperatively the groups are working. Here, the teacher should give feedback to each group about whether they are proceeding in the right direction and gaining from the practice or activity. During the activity teacher should follow guided supervision. Finally, the group should report about what they have done and how they have performed.

**Advantages of Cooperative Learning:** The advantages of cooperative learning are as follows:

1. It creates an informal situation based on mutual dependence, feeling of being-accepted, liked and supported by fellow students.

2. In cooperative learning students have the freedom to explore their ideas, discuss with their friends and sharpens their thinking and actions.

3. Students can provide individual assistance from one another. As they can freely seek assistance from fellow students in cooperative learning, their achievement will be much higher.

4. As students are contributing to the group and participating in class, students become more active learner.

**Activity for the teachers:**

- Take a topic/unit of your choice where cooperative learning can be used.
- Design a strategy of your own to deal the same topic with the help of cooperative learning.
11. MODELS OF TEACHING

Objectives:

1. To enable the participating teachers understand the concepts of models of teaching.
2. To enable the participating teachers understand the concept of Advance Organizer Model.
3. To enable the participating teachers understand the use of Advance Organizer in teaching computer.
1. To enable the participating teachers understand the concept of Mastery Learning Approach.
2. To enable the participating teachers understand the steps of mastery learning approach model in teaching computer.
3. To enable the participating teachers use of mastery learning approach model in teaching computer.

The core of teaching is the arrangement of environments within which the students can interact; so that the objectives could be achieved. In this regard, the model of teaching provides a scope for a teacher to achieve objectives in a best possible way.

The dictionary meaning of ‘model’ is that, it is a pattern of something to be made or reproduced and means of transferring a relationship or process from its actual setting to one in which it can be more conveniently studied. In the point of view of teaching, a model of teaching is a plan or pattern that can be used to shape curricula, to design instructional materials and to guide instruction in the classroom and other settings. The most important aim of any model of teaching is to improve the instructional effectiveness in an interactive atmosphere and to improve or shape the curriculum. There are many models of teaching. But keeping in mind the nature of the computer education content of standard VIII, only two models were found appropriate viz., Advance Organizer Model by David P. Asubel and Mastery Learning Model by Benzamin S. Bloom. The two models are discussed as follow.
David P. Ausubel propounded a theory of meaningful verbal learning called Advance Organizer Model (AOM). His primary concern was to help teachers organize and convey large amounts of information meaningfully and efficiently as possible. This model was designed to strengthen students' cognitive structures. Cognitive structure means a person's own knowledge of a particular subject matter at any given time and how well it is organized, clear, and stable. This model is taken from verbal learning principles, in which the main aim is to provide the learning inputs to the students in a most effective way. According to Ausubel, any subject is a chain of concepts. In the same way, our mind also accepts the concept if the subject matter is presented in a chain-like sequence where the new concept is presented relating it with the old one.

In this model, teachers first recall the previous knowledge of the students, and then give the new knowledge on the basis of previous knowledge. It systematizes the subject in an order, and helps to present the topic in such a way that the students grasp it easily. It is also called expository model as the teacher exposes the whole concepts to the students. Teachers give verbal instruction related to the whole concept and the students grasp it as a whole putting different concepts in a chain of components and a similar chain is made in students' minds which makes the learning effective.

Principles of Advance Organizer Model:

The Advance organizer Model of teaching is based on the following principles.

1. **Principle of Progressive Differentiation**: In it, the most general idea of the subject or discipline is presented first and they are progressively differentiated in terms of details and specifically.

2. **Principles of Integrated Reconciliation**: It means the new ideas/concepts should be consciously reconciled and integrated with previously learnt concepts.
or previous knowledge. For this the teacher can (i) remind students of the ideas, (ii) ask for a summary of the major attributes of the new materials, (iii) repeat precise definitions, (iv) ask for differences between aspects of the material and (v) ask students to describe how the learning material supports the concept.

Aims of Ausubel's Model

Following are the aims of Ausubel's Advance Organizer Model of teaching.

(i) To give the knowledge of concepts and facts of subject to the students in a meaningful way.

(ii) To develop cognitive structure among students.

(iii) To enable the students to arrange the knowledge in a logical sequence.

(iv) To present the pre-knowledge, explain facts and then present new knowledge so that the new concepts are correlated to pre-knowledge.

Phases of Advance Organizer Model

The AOM has three phases of activities. They are (i) presentation of the advance organizer, (ii) presentation of the learning task and (iii) strengthening of the cognitive structure. Details about these phases of AOM are given as follow.

Phase – I: The main purpose of this phase is to present the advance organizer. This phase consists of three activities like, clarifying the aims of the lesson to be taught, presenting the advance organizer, and prompting awareness of relevant knowledge about the lesson.

Clarifying the aim of lesson is one of the ways to obtain students’ attention and to orient them to their learning goals. Both of these activities are necessary to facilitate meaningful learning among students.

The organizer is not just a brief, simple statement but it is an idea in itself. It is built around the major concepts and propositions of a discipline or area of study. The chief features of an organizer is that it is at higher level of abstraction and generality
than the students' learning material. The essential features of the concept must be pointed out and carefully explained by citing essential features, explaining them, and providing examples. The presentation of the organizer need not be lengthy, but it must be precise and clear. It should be continually related to the material it is organizing. The teacher should repeat the organizer several times, particularly when new or special terminologies are associated with the organizer.

Finally, it is important to prompt to recall learner's previous knowledge and experiences that might be relevant to his/her learning task and advance organizer.

**Phase – II:** In this phase the learning material is presented before students. It can be presented in the form of lectures, discussions, experiments or reading. During the presentation the organization of the learning material needs to be made explicit to the students so that they have an overall sense of direction and can see the logical order of the material. The organization of the learning material needs to be done in the context of relating it to the presented advance organizer.

**Phase – III:** The main purpose of this phase is to anchor the new learning material in the students' existing cognitive structure that is to strengthen the student's cognitive structure. In this phase the teacher can use the activities for prompting integrative reconciliation. The integrative reconciliation can be done by several ways like the teacher can (i) remind students of the ideas, (ii) ask for a summary of the major attributes of the new learning material, (iii) repeat precise definitions, (iv) ask for differences between the aspects of material, and (v) ask students to describe the ways the learning material supports the concept or proposition that is being used as organizer.

Ideally, the initiation of phase III is shared by teachers and students. At first, however, the teacher will have to respond to the student's need for clarification of some area of the topic and for integration of the new material with existing knowledge.

Essentially, Ausubel has provided us with a method for improving not only presentations but also students' abilities to learn from them. For this the teacher
should teach the students how to become active and to look for organizing ideas, reconcile information with them, and generate organizers of their own

Application of Advance Organizer Model

1. Cognitive aims can be achieved by this model. Selection, organization, presentation and expression can be achieved.
2. It increases learner's grasp of factual information which could be linked to and explained by the key ideas, the concept of ideas.
3. When the subject is presented in organized way, students get all matters in systematic order in less time, more knowledge can be given.
4. The instructional effect of this model is that the ability to learn from reading, lectures and other media is used.

Example of an Advance Organizer

“A computer is an electronic device which receives data, processes it and gives output”.

The above mentioned statement is an example of an advance organizer prepared for chapter one ‘Introduction to Computers’ of Standard VIII Computer Education Textbook. The teacher has to present the advance organizer and should lead the discussion in such a way that it should develop the below given cognitive structure related to computer
An individual's Cognitive Structure with respect to Computer System
Activity for the Teachers:

"Take a chapter from your computer textbook which is suitable to be taught with the help of Advance Organizer Model. Prepare the Advance Organizer for the topic and write the process of teaching using Advance Organizer Model".

(2) MASTERY LEARNING MODEL

John B. Carol inaugurated a fundamental change in thinking about the characteristics of instruction in 1963. He argued for the idea that student’s aptitudes are reflective of an individual’s learning rate. In this new paradigm, Caroll suggested that instruction should focus more on the time required for different students to learn the same material.

He called the learning rate, LR, the degree of learning, which is demonstrated in the formula:

$$LR = f(\text{time spent for learning}/\text{time needed to learn})$$

This describes that the learning rate is the function of the time a learner has to learn to the time he actually needs to learn a given situation of instruction. In simplest form; his model proposed that if each student was allowed the time he needed to learn to some level and he spent the required time, then he could be expected to attain certain level. However, it was Benjamin Bloom (1968) who transformed this conceptual model into an effective working model now known as "Mastery Learning".

Meaning: ‘Mastery Learning’ is an instructional philosophy based on the belief that all students can learn if given the appropriate amount of time and the appropriate instructional opportunities. It is believed that students can achieve mastery when curricular standards are clearly articulated and defined, when assessment accurately measures the students’ progress toward performance of the objective(s), and when instructional lessons are tightly aligned to the curriculum.
Mastery learning is based on the following premises:

1. All individuals can learn.
2. People learn in different ways and at different rates.
3. Under favourable learning conditions, the effects of individual difference approach a vanishing point.
4. Uncorrected learning errors are responsible for most learning difficulties.

What defines mastery learning is the organization of time and resources to ensure that students are able to master instructional objectives. There are many different instructional strategies (small group instruction, cooperative learning, use of differentiation activities, discovery learning, discussion groups etc.) that teachers use in the classroom that support mastery learning. For teaching computer education to the students through mastery learning approach, the teacher can follow the following steps. The steps are discussed as follow.

1. In the first step, the teacher determines what the students will know/learn and what they will be able to do after the lesson. In this step the teacher does the following acts:
   (i) The teacher provides the objectives of the lesson and the level of performance.
   (ii) The teacher reviews the previous knowledge of the students.
   (iii) The teacher provides clear directions about work to be done.
   (iv) Provides an overview of the lesson.

2. In the second step the content is divided into relatively small teaching units, each with their own objectives and assessment. After doing this, the teacher presents the new concepts or skills. The presentation of the skill or concept includes:
   (i) The teacher presents the material in small steps so that one point can be mastered at a time.
   (ii) The teacher provides varied examples of the new skills or concepts.
iii) The teacher provides a visual representation of the concepts or skill along with the verbal explanation. It assists students in following the representation and later on serves as a cue or prompts.

(iv) The teacher should avoid staying on topic.

3. In the third step that is after presenting the material from the unit, an assessment is administered to determine each student’s progress and to identify areas in which more instruction may be needed (FORMATIVE EVALUATION).

4. In the fourth step, the teacher gives the information to the students about their learning process (FEEDBACK). This “feedback” in other words called “reinforcement” (discussed in the skills of teaching) reinforces precisely what was more important for the students to learn in each unit of instruction, recognizes what students learned well, identifies the specific concepts or skills on which students need to spend more time and is appropriate for students’ levels of learning.

5. A student scoring at high level of performance based on specific criteria on an assessment will move directly into activities that provide opportunities for them to broaden, expand or deepen their learning (ENRICHMENT) or may be moved on to the next unit of study or group of objectives to be mastered (ACCELERATION).

6. In this step, the students who have not mastered the material are engaged in activities that offer guidance and direction on how they can correct their learning errors and remedy their learning problems (CORRECTIVES). Students are provided with alternative learning method and then given another formative assessment to check for mastery.

7. As the computer education needs more practice, the teacher should follow GUIDED PRACTICE/SUPERVISION in practice class to ensure mastery over skills. It enables the teacher to make an assessment of students’ abilities to perform the learning task/skill by assessing the amount and type of error.
The teacher’s role in this step is to monitor students’ practice work, providing corrective feedback when necessary. A better way to monitor students’ practice is to use a specific corrective feedback technique called “praise, prompt, and leave”. In this technique the teacher moves around the computer laboratory systematically and efficiently, checking students’ work. The teacher tells each student whether he or she has done the item or part of a practice correctly. If there are errors, the teacher instructs to that particular students and also refer to the visual representation task. The corrective feedback lasts for one minute or less per each student.

8. In this step that is at the end of the unit (s) the teacher evaluates the final competence of students by giving a SUMMATIVE ASSESSMENT covering the objectives of the unit. After the assessment is given, teachers evaluate the results and plan next unit. Here it is to be kept in mind that NO STUDENTS IS TO PROCEED TO NEW MATERIAL UNTIL BASIC PREREQUISITE MATERIAL IS MASTERED.

“Mastery learning is usually implemented through careful process of organization and planning, followed by specific procedures for classroom application and students’ assessment and evaluation. Mastery learning does not challenge teachers’ professionalism or academic freedom but instead offers a useful instructional tool that can flexibly applied in a variety of teaching situations. Although it is not an educational cure-all, mastery learning significantly increases the positive influence teachers can have on students learning” (Guskey, 1997).

Activity for the teachers:

Activity:

- Take all the topic of computer textbook and decide the mastery level needed for those topics and rationalize it.
- Design the strategy for any taken topic to achieve the targeted/decided mastery level.
12. EVALUATION AND LESSON PLANNING

Objectives

1. To enable the participating teachers understand the concept and process of evaluation.
2. To enable the participating teachers understand different types of evaluation and their use.
3. To enable the participating teachers understand the importance of planning in teaching.
4. To enable the participating teachers understand the different steps of lesson planning.
5. To enable the participating teachers prepare lesson plan.

EVALUATION

The main purpose of classroom teaching is to influence students' behaviour in the desired direction. The desired direction is guided by the educational objectives formulated by the teacher. To realize the objectives teacher provides various learning experiences. The extent to which the objectives are being achieved or not are determined through evaluation. Very often the terms 'Test', 'Measurement', and 'Evaluation' are assumed to be the same and are used as though they are synonymous and mutually interchangeable. But the fact is that they carry different functional meaning.

Test: A test usually represents a uniform set of tasks to all members of a given group at a scheduled time with a due prior notice. A test consists of a standard set of questions to be answered or tasks to be performed. The test result is a measure of the characteristic or the trait to be measured. Test is a device to obtain measurement in education. It is one among the several devices like, holding interviews, competitions and group discussions or assigning projects, giving assignments etc. that can be used to measure a given characteristics of an individual.
**Measurement**: When a test is given, a measure is obtained. In other word, when we assign a score on a given task performed by a learner, we are doing an act of measurement. Measurement quantifies the data obtained through tests. It ascertains the extent and quantity of something. The result of measurement is simply a number or quantitative value, which expresses the amount of characteristics possessed by an individual. For example a student scored 35 marks in a test of 50 marks.

**Evaluation**: When we compare the score of a learner with those of other learners and judge whether it is good/bad/average or satisfactory/unsatisfactory, we are doing the act of evaluation. Thus evaluation is a wider and more inclusive term than measurement. It is an act or process that assigns value to a measure. Evaluation means 'to find the value of or 'to judge the worth of’ Measurement refers to quantitative aspect, whereas evaluation refers to both quantitative and qualitative aspects. Test, measurement and evaluation can be represented as:

![Diagram of Test, Measurement, and Evaluation]

Evaluation plays an important role in teaching-learning process. In learning it contributes to formulation of objectives, designing learning experiences and assessment of learning performance. Besides this, it is very useful to bring improvement in teaching and curriculum. It also helps teacher to make better
Formative evaluation is used to monitor the learning progress of students during a period of instruction. Its main objectives are to provide continuous feedback to both teachers and students relating to the success and failures in learning. Through feedback, it provides reinforcement to students for successful learning and identifies their learning errors that need correction. Through feedback to teachers, it helps them in modifying their instruction and method of teaching, and help to prescribe group work and individual remedial work for students. Formative evaluation is done through tests, homework, class work, and practice work, oral questions prepared for each segment of instruction. These are usually mastery tests that measure all the intended learning outcomes of the taught segment. Observational techniques are very much useful in monitoring students’ progress and identifying learning errors, especially in practical classes or practical based activities.

(ii) Summative Evaluation: Summative evaluation is done at the end of a course of instruction. It is designed to find out the extent to which the instructional objectives have been achieved. It is used primarily for assigning course grades or for certifying student’s mastery of the intended learning outcomes at the end of a particular course programme. It is not concerned with improvement of method, content, or instructional objectives; rather concerned to point out the levels of attainment in a programme or instruction. Usually, teacher-made achievement tests, rating scales, standardized achievement test are used for the purpose of summative evaluation.

(iii) Norm-Referenced Evaluation: Norm-referenced measurement is the traditional class-based assignment of numerals to the attribute being measured. Here the measurement act relates to some norm, group. It attempts to interpret the test results in terms of the performance of a certain group. This group is called norm group because
it serves as a referent of norm for making judgments. The measurement is made in
terms of a class or any other norm group as the function is to relate individual
measurement to some norm group (class). The purpose is to discriminate between the
high-achievers and low-achievers. Its focus is not on what one has learnt or how much
one has learnt of a given chunk of learning, rather its focus is on where one stands in
relation to the others of his level. It means, norm-referenced evaluation describes an
individual’s performance in terms of his relative position or standing in some known
group.

(iv) Criterion-Referenced Evaluation: When a student’s performance is referred to
a predetermined criterion, which is well defined, such type of measurement is termed
as criterion-referenced measurement. It determines an individual status with refer to
well defined criterion behaviour. There is no reference to the performance of other
individual in the group. For example, (i) Kavita got 90 marks in a computer test
(practical). (ii) Himansu passed the computer on line test. In these statements there is
no reference to the performance of other members of their group, only their individual
performance is stated.

The purpose of criterion-referenced test/evaluation is to assess the objectives
It is the objective based test. The objectives are assessed in terms of behavioural
changes among the students. It assesses the ability of a student against the criterion-
behaviour of the learners. Success of criterion-reference test lies in the delineation of
all defined levels of achievement, which are specified in terms of behaviourally,
stated instructional objectives. Use of criterion-referenced measurement at the
beginning stage where learning of basic skills and fundamental concept is essential, is
a must to lay a proper foundation for learning at later stage. It does away with the
unfair comparison of an individual with other children.

Thus, at the end a question arises which evaluation is well fitted to computer
education? It depends upon the subject and nature of its content. As the nature of
computer education content is skill based, it needs formative and criterion-referenced
evaluation.
Activity for the teachers:

Activity 1:

“Take any chapter from computer textbook. Prepare one long question or two to three short answer type of question and justify the type of evaluation you are doing for the student”.

Activity 2:

“Take any one chapter computer textbook which would continue for a minimum 5 to 7 classes. Design an evaluation which you could call that as continuous and comprehensive evaluation”.

LESSON PLANNING

Planning: Planning is one of the most essential aspects of human activity. Planning is essential not only in all spheres of life but also it is very essential in the field of teaching learning. So for teaching the content to the students a teacher needs to plan his or her lesson. Lesson planning helps a teacher to precede his/her lesson in right direction and indicates the aims and objectives to be realize by teaching a lesson, the methods to be employed and the activities to be undertaken in the class. Thus, lesson planning is a plan of action in teaching-learning process.

Types of Lesson Planning: There are four types of lesson planning. They are:

(i) Annual planning.
(ii) Monthly planning.
(iii) Unit planning.
(iv) Lesson planning.

Components of Lesson Planning: A lesson planning consists of various components. They areas follow:

(i) Entry behaviour of the students.
(ii) General and specific objectives of the lesson.
The general lesson planning that is followed in the B. Ed. teacher-training programme is not feasible to be followed by the teachers because it is too lengthy and detailed. From the practical experience of the researcher during observation of the lesson of computer education teachers and looking at the workload of the teacher, general lesson based lesson plan is not feasible. Looking to this a cognitive lesson plan has been prescribed for computer education teachers to follow during the process of teaching learning. Cognitive lesson planning is a type of planning not on the paper but at the cognition level of the teachers, which is going to be very short and sweet which every teacher can make and follow during teaching. This lesson plan can help to improve the aptitude of space relation of every teacher. A brief step of the cognitive lesson plan is given as follow.

**FORMAT OF COGNITIVE LESSON PLAN**

1. Specific Objectives:
2. Method, approach and media
3. Introduction
4. Teaching Flow Chart
5. Teacher's Behaviour
6. Students' Behaviour
7. Blackboard Summary
8. Evaluation
Specimen of a Lesson Plan

Topic: Introduction to Computer

Specific Objectives:

The students will be able to:

1. Understand the concept of computer.
2. Define computer.
3. Name different types of computer.
4. Name the components of computer.
5. Explain the function of computer.
6. Differentiate between primary memory and secondary memory.

Methods: Lecture method.

Approach: Inductive.

Media: Blackboard and real object (computer system and RAM).

Introduction: The teacher will ask students to tell the name of few electronic devices/machines commonly used by people. From the response the teacher will ask to name the device used by students. On the basis of this the teacher will introduce the topic by stating that like calculator there is an electronic device/machine, which does more function than calculator -- called computer.

Teaching Flowchart:
Teacher’s Behaviour: The teacher will explain the concept of computer and its parts by showing computer system and real object (RAM). Also, the teacher will ask questions in between while explaining.

Students’ Behaviour:

The students will respond to teacher’s questions, note down the blackboard work and observe the real object.

Blackboard Summary:

Computer: its definition
Types
Components
Memory structure

Evaluation:

Q1. Define computer?
Q2. What are the different types of computer?
Q3. Name different components of computer.
Q4. What are the functions of computer?
Q5. Differentiate between primary and secondary memory?
Q6. What is binary digit?

Activity for the teachers:

- Take a chapter of your own interest and prepare a model cognitive lesson plan.