Study Material
for the Course
RESEARCH AND TEACHING METHODOLOGY
for
M.Phil Programmes of All Disciplines in the University Departments and Affiliated Colleges
(Since 2018-19)
Unit 5 – Methodology of Teaching
CONTENTS

M.Phil – RESEARCH AND TEACHING METHODOLOGY

(Common for all the M. Phil Programmes in the University Departments and Affiliated Colleges since 2018-19)

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Unit 5 – Methodology of Teaching

A teaching method comprises of principles and methods used by teachers to enable student learning. The methods of teaching can be broadly classified into teacher-centred and student-centred. The choice of teaching method depends on the interest of the teacher. Following are some teaching methods. From which a teacher has to choose a method or combination of two or more methods, according to the requirement - nature of the course and the level of learners.

5.1 Objectives of Teaching

The objective of teaching must always be directed towards achieving the aims of education in general. Whatever subject is taught to the learners, the ultimate aim is to educate the student via teaching that particular subject. It is necessary to formulate suitable and relevant objectives, thus acting as roads towards attainment of the destination. It is, however, too general and broad to be meaningful in a classroom. There are broad aims and specific aims in teaching field. Broad aims are considered as a frame of reference and are regarded as directions of growth. Later, to draft the specific objectives, psychology of learning, and stage of the learner and principles of teaching ought to be taken into account besides the demands of the society.

The primary aim of teaching is to impart the basic knowledge and the information about the world. The other objectives are:

1. *Cultivating the greatness of students* - Teachers are educators who have an impact on students always creating some positive changes within them in part of envision either short-term or long-term goals. Vision requires tenacity, work, time and drive, where the teachers may have to find innovative ways to accomplish such attitude with students, staff, administrators and schools community.

2. *Creating the teaching manifesto* - Educators do create their own teaching manifestos that outline their beliefs about learning and teaching. Teachers spare more time on preparation tasks following the strict curriculum and the available instructions.

3. *Open education to all* - Teachers must stand by the UN's list of global universal sustainable development goals. They have to know the barriers of the children's

education and how to break them in ensuring the inclusive and quality education for all and promote lifelong learning.

4. *Encouraging blended learning* - There is now an overwhelming amount of teaching methodology via technology as it has now transformed many spheres of life. Using this innovative strategy in the classroom provides a teacher and students to grow professionally. There are more benefits in utilising the advanced technology of these days.

5. *Modifying the students' behaviour and maintaining the classroom management* - Classroom is a field not only for study but also for many aspects of life. Maintaining discipline along with interactive classes does modify the behaviour of wards.

6. *Teaching must be fun* - A professional teacher keeps the students constantly engaged. This is possible only by opting some warm-up activities according to the situation to kindle the students' eagerness for the proceeding classes.

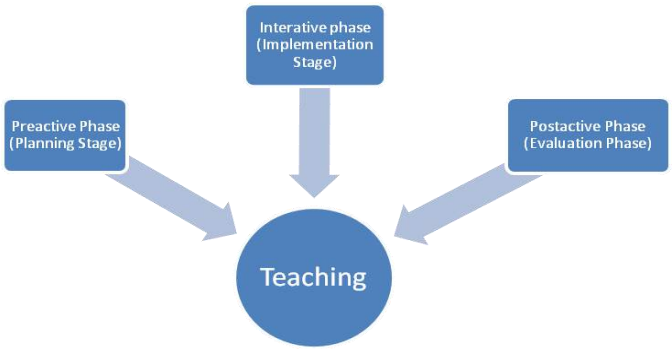
7. *Articulating the values* - The main goal of teaching is to assist the students in figuring out whom they are and how they are responsible for the society. Effective communication boosts their confidence to express their ideas.

8. *Motivating the students* - Great teachers inspire the students without fail. The style, gesture, subject proficiency of a teacher directly influences the pupils' commitment in their life. Proper motivation and channelizing the students pave the way for their future betterment.

9. *Having an online presence* - Internet is a place where the whole world can be united and be in line with each other. Sharing the ideas and passion with successful teaching professionals foster an enthusiastic connection.

5.2 Phases of Teaching

Teaching being a complex task, a systematic planning is needed to do this task. There are various steps in this process which are called as phases of teaching. The mutual understanding between the teacher and the students play the solitary role in this instruction, a part in the education process.



The different phases of teaching are*:*

Pre-active phase

This is the first phase and also the most important criterion for a successful outcome of learning. Planning phase involves the instructions to be done by a teacher before the classes like lesson plan write-up, method of teaching, the teaching aids to be used and the associated classroom activities. Planning is done for taking decision about the following aspects:

a) Selection of the content to be taught

b) Organization of the content

c) Justification of the principles and maxims of teaching to be used

d) Selection of the appropriate of methods of teaching

e) Decision about the preparation and usage of evaluation tools

First the main objectives and the specific objectives being fixed, the tutor will plan the content material depending on the level of students. Here the expected behavioural change will be taken into account. Then the initial level is known and the terminal level expected is destined. By the extent of students' psychology and within the societal needs and ethics, the content materials are organised in order fulfilling the goals of this phase. This organisation stage is a requisite for the transfer of learning. Motivation points and the teaching techniques are finalised by decision making of the teacher beforehand. All these steps are passive and hence this stage is also called as the pre-active phase of teaching.

Interactive phase

This second phase means the plan execution stage, where all the activities of a teacher are clubbed up with the learning experiences cultivated through the curriculum. Generally, these are concerned about the explanation of the content, student's response and affording guidance. It includes -

- *Sizing up of the class* – As soon as the teacher enters the class, an efficient tutor will have a look at the number of students in the class. She can adjust her tone and teaching strategy accordingly. Also, she can judge the students about their attitude towards the session.

- *Diagnosis of the learners* - Asking questions at the starting point makes a teacher to know their previous knowledge and can analyse the capacity of the learners. In between questions help the staff to diagnose the understanding nature of them and further makes the way for altering the teaching methods, if needed.

Thereby a good rapport is expected to exist between the teacher and the students at this juncture. Both verbal and non verbal interactions are encouraged. Flanders' interaction analysis must be followed by a proficient teacher to proceed with the correct footsteps in the direction of the output.

Feedback or reinforcement is a condition increasing the possibility for accepting a particular response or occurrence of a particular response in future. Reinforcement is used for three purposes such as

- strengthening the response.
- changing the response, and
- modifying or correcting the response.

The two types of such conditions are positive reinforcement and negative reinforcement.

Positive reinforcement - These are the conditions which increase the possibility of recurrence of desired behaviour or response.

Negative response - These are the conditions in which the possibility of recurrence of the undesired behaviour or response is decreased, such as punishment or reprimanding etc.

Post-active phase

The last phase of teaching without which the teaching process is incomplete is the evaluation process. The evaluation process is related to both the teaching and learning attributes and their result. This stage is to determine the attainment of objectives, students' learning, and the usefulness of teaching methods adopted. The post-active phase includes the evaluation activities like quizzes, written or verbal tests, etc. The achievements of the learners may be measured correctly. The following activities are done under this stage with utmost care and concern like:

a) Defining the exact dimensions of the changes caused by teaching.
b) Selecting appropriate testing devices and techniques.
c) Changing the strategies in terms of evidences gathered.

Teaching is a process in which students are endowed with a conducive environment for interaction with the purpose to promote a definite learning within

specified time and regulating their behaviours. Teaching is viewed as a comprehensive process, with tremendous changes according to the impetus of time in understanding the features of teaching and teachers.

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5.3 Methods of Teaching

5.3.1 Lecture method

Lecture method is an educational presentation delivered by an instructor to a group of students with the help of instructional aids and training devices. In lecture method, the teacher orally presents the course material in an organized way to the students. Lectures may contain varying level of student participation, and the students take notes generally.

Lecturing is one of the oldest methods of teaching used by the teachers of higher education. Lecture method gives more importance to content presentation, where the teacher is active and the students are passive, but the monotony of teaching will be overcome by the questions posed by the teacher while lecturing. Lecturing helps to motivate, clarify, expand and review the information. Lecture, as a method of instruction has an enormous importance and attention on the part of the teacher. The spotlight and the centre of attention is the teacher himself/ herself. For many students lecturer is the centre of attention than the lecture content. The teacher must be aware that lecturing requires hard work, great attention, creativity, and good personality traits. Formal lecturing helps to develop the basic theoretical knowledge. Lecturing is an alternative when the teaching resources are scarce, availability of limited number of periods in time-table and when the students' strength is more.

Lecture method – Meaning

According to Carter Good's dictionary, lecture method is defined as: "an instructional procedure by which the lecturer seeks to create interest, to influence, stimulate, or mould

opinion, to promote activity, to impart information, or to develop critical thinking, largely by the use of the verbal message, with a minimum of class participation, illustrations, maps, charts, or other visual aids may be employed to supplement the oral technique".

How to plan a lecture?

Before starting to prepare a lecture, the teacher must be able to answer the following four basic questions.

- Who is the audience?
- What is the purpose of lecture?
- How much is the time available?
- What is the subject matter?

Components in a lecture

The components involved in a lecture are as follows.

The Audience: The lecturer should know who the audiences are? their background, their likes and dislikes – level of knowledge, their level of understanding on the subject, etc. It will be more effective, if the teacher starts with a general discussion on the topic.

Purpose: The general purposes of a lecture are:

a) To give general information on the subject
b) To change the basic attitude of the audience
c) To give detailed information
d) To nourish with new knowledge

Time Schedule: The lecture may be planned in a way that the audience must not lose their interest on the subject. Hence within the given time, the teacher must impress the students with interesting examples, questions, discussion and so on.

Subject Matter: The lecture should contain a brief introduction, which carries the objectives and theme of the subject, the body of the lecture in which the important points to be highlighted in a sequential order, illustrative examples with real life incidents can be added along with the usage of audio-visual aids will help the students to understand better. There should be time for discussion and a brief conclusion should be given. The brief conclusion will help to recapitulate the learned subject.

Characteristics of a good lecture

While giving a lecture, the teacher should be cautious of the following:

Posture: It is very important to have a very good posture while giving a lecture. The person needs to stand erect and the teacher should be visible to all the audience too.

Appearance: The teacher should wear clean and neat clothes. One should possess a very friendly and confident look which will create a good impression.

Manner: The teacher should have a poised and courteous behaviour to make the students attentive in the class.

Gesture: Actions and gestures of the teacher should be natural and purposeful. Mannerisms like playing with chalks should be avoided.

Voice: The voice of the teacher should be audible and should convey the confidence, emotion and emphasis of the teacher.

Vocabulary: The teacher should use simple language avoiding the misinterpreted words and jargons.
Time: The class should be interactive and the teacher should systematically manage the time.

Merits of lecture method

The merits of lecture method are as follows:

1. The lecture method is the most economical way of getting a large amount of information across to a large class. A teacher can convey the information in minimum time, thus enabling the syllabus to be covered within the stipulated time. It is economical in terms of both money and time.
2. The lecture is useful in imparting in an efficient manner factual information to convey facts to students who have difficulty reading their texts.
3. The lecture helps to channelize the thinking of students in a given direction.

Demerits of lecture method

The demerits of lecture method are as follows:

1. Science is best learnt by doing. There is no provision for activities in this method as the students are passive (listeners).

2. The rate of imparting information by the teacher may seem too fast for the students who are restless by nature, preoccupied with their own immediate problems and often handicapped by limitations of vocabulary and background experience.

3. A poorly planned, poorly delivered lecture fails to motivate the students.

4. As student interaction is minimum, social attitudes and values may not be fostered.

Many research studies have compared the effectiveness of the lecture method with other methods of teaching. McKeachie et al. (1990) concluded that the lecture method is only as efficient as other methods of teaching as a means of transmitting knowledge.

5.3.2 Discussion method

Planning a discussion is basically the same as planning a lecture. The teacher will find the following suggestions helpful in planning a discussion lesson.

1. *Select a topic that the students are able to discuss* - Unless the students have some knowledge to exchange with each other, they cannot reach the desired learning outcomes using discussion method. If necessary, provide assignments that will give the students an adequate background for discussing the lesson topic.

2. *Establish a specific lesson objective with desired learning outcomes* - Through discussion the students develop an understanding of the subject by sharing knowledge, experiences and backgrounds. Consequently, the objectives are normally stated at the understanding level of learning.
3. *Conduct adequate research to become familiar with the topic* - While researching, the teacher should always be alert for ideas on the best way to tailor a lesson for a particular group of students. The teacher should also earmark reading materials that appears to be appropriate as background material for students. Such materials should be well organized and based on fundamentals.

4. *Organize the main and subordinate points of the lesson in a logical sequence* - The guided discussion has three main parts - introduction, discussion and conclusion. The introduction consists of three elements: *attention, motivation* and *overview.* In the discussion, the teacher should be certain that the main points discussed build logically with the objective. The conclusion consists of the summary, reactivation and closure. By organizing in this manner, the teacher phrases the questions to help the students to obtain a firm grasp of the subject matter and to minimize the possibility of a rambling discussion.

5. *Plan at least one lead-off question for each desired learning outcome* - In preparing questions, the teacher should remember that the purpose is to stimulate discussion, and not to get answers alone. The teacher should avoid questions that require only short categorical answers, such as yes/no. Lead off questions should usually begin with how or why.

Uses of questions in discussion

In the guided discussion, learning is achieved through the skillful use of questions. Questions can be categorized by *function* and by *characteristics*. Understanding these distinctions helps the teacher to become a more skilled user of questions.

The teacher uses open ended questions for discussion. This is the *lead-off question* and its function is indicated by its name. The purpose is to get the discussion started. After the discussion develops, the teacher may ask a *follow-up* question to guide the discussion. The reasons for using a follow-up question may vary. The teacher may want a

student to explain something more thoroughly, or may need to bring the discussion back to a point from which it has strayed.

In terms of *characteristics,* questions can be identified as *overhead, rhetorical, direct, reverse* and *relay.* The overhead question is directed to the entire group to stimulate the thought and response from each group member. The teacher may use an overhead question to pose the lead-off question. The rhetorical question is similar in nature, because it also spurs the thought of the group. However, the teacher provides the answer for the rhetorical question. Consequently, it is more commonly used in lecturing than in a guided discussion.

Structure of discussion method

The teacher must have a set of goals and/or ideas that she wants to convey to the student.

a. *Introduction:* This should be something that poses a question or narrates a current event to help getting the discussion started.

b. *Discussion:* The teacher should keep the discussion confined to the topic. He/ She should listen attentively and try to continually evaluate the knowledge of the students.

c. *Summary:* The teacher should summarize each section before concluding.

d. *Conclusion:* The teacher should take a couple of minutes to review and recapitulate what was covered in the discussion. This will help the students to grasp the "larger picture". The teacher should also clarify the questions posed by the students.

Objectives of discussion method

The objectives of using discussion as a method of teaching are to: Share information; Clarify ideas; Inspire Interest; Evaluate Progress; Develop self-confidence in expressing view; and Develop tolerance to views different from one's own.

Procedure of discussion method

The teacher opens the discussion by asking one of the prepared lead-off questions. After asking a question, the teacher should be patient. The students should be given a chance to react. The teacher should have the answer in mind before asking the question, but the students have to think about the question before answering.

The more difficult the question, the more time the students will need to produce an answer. Sometimes, students do not understand the question. Whenever the teacher sees puzzled expressions, the question should be rephrased in a slightly different form. The nature of the questions should be determined by the lesson objective and desired learning outcomes.

Once the discussion is underway the teacher should listen attentively to the ideas, experiences and examples contributed by the students during the discussion. As the discussion proceeds, the teacher may find it necessary to guide the direction, to stimulate the students to explore the subject in greater depth, or to encourage them to discuss the topic in more detail. By using how and why follow-up questions, the teacher should be able to guide the discussion towards the objective of helping students to understand the subject.

When it appears the students have discussed the ideas that support this particular part of the lesson, the teacher should summarize what the students have accomplished. This will summarize the ideas developed by the group and show how they relate to, and support, the idea discussed. An interim summary reinforce learning in relation to a specific learning outcome. In addition to its uses as a summary may also be used to keep the group on the subject or to divert the discussion to another member.

Advantages of discussion method

Guided discussion is a non-hierarchical verbal interaction among a group of persons on a specified topic with a purpose. There are several benefits to the discussion method as a technique in this course.

a. Provides an active learning role. Research shows that students learn more and retain learned information longer when their role in the learning process is active.

b. Encourages students to listen to and learn from each other. Discussion encourages cooperative learning rather than competitive learning.

c. Involves high level thinking and critical thinking skills.

d. Exposes students to viewpoints other than their own.

e. Helps develop oral advocacy and other skills.

f. Provides an opportunity for students to bring their opinions and feelings to the study of the topic in science.

5.3.3 Inquiry method

Inquiry-based learning experiences can take place in a single lesson or over the course of several lessons or even several weeks. An entire unit can be organized around a number of related questions. Most of the curriculums require that students use the scientific method independently to carry out experiments and eventually to design their own. To meet these content standards, students must demonstrate competence in using the stages of this scientific method in the following prescribed order.

Developing a question: All inquiry-based learning, whether the content is science, social studies or math, begins with a question. Questions in these content areas may be

contained in the curriculum. Inquiry-based learning experiences will be successful only when questions have been phrased clearly and when students can discover answers through hands-on experiences, traditional library research, or electronic research. Curriculum documents often include “real world contexts” as part of the math, science and social studies curricula. This feature helps to make each inquiry experience relevant to students’ daily lives.

Generating a hypothesis: In the scientific method, students bring their prior knowledge and understanding to bear on the question by predicting answers at the beginning of the inquiry. This is called generating a hypothesis. *F*or the very youngest children, guess is frequently used instead of hypothesis, but by second grade, children can usually handle the formal term. One can simply ask them how they would answer the question, given what they know about the topic.

Developing an experimental design: A viable experimental design is one that can test hypotheses and helps students construct knowledge. The results of a clearly defined procedure in an experiment should help students answer the original question. Many districts use science kits in which each experiment has already been designed, the procedures are written in teacher’s manuals and student workbooks and all required materials are provided.

Collecting and recording data: Collecting and recording data are integral to the success of all inquiry-based learning. Students must be responsible for collecting relevant data that will help them answer their questions. Data can be collected through hands-on experimentation; observation; working with primary sources, such as face-to-face interviews, surveys, or questionnaire; or traditional library or electronic research. Data collection may happen during one class period or over the course of several days or weeks. If you want data to be recorded in a specific way, you must make that way clear to students through explanation and modeling.

Analyzing data: As an intellectual activity, the process of data analysis also moves the students into higher levels of Bloom’s cognitive taxonomy. Once all the data have been collected, it is time for students, either in small groups or alone, to begin thinking about what the information means. Data analysis might begin with the questions, what did you find out? and what were your discoveries during the investigation? Then students can address a series of specific questions that relate to the particular experiment.

In the next important part of data analysis, students look for relationships or discernible patterns in the data. Teachers can model the data analysis process using the ‘think aloud’ method.

Reaching conclusions, forming and extending generalizations: Once students have analysed the data, they have to answer their inquiry question and the teacher needs to move them to deeper levels of understanding. At this final stage of the investigation, students must compare their results to the hypothesis they made at the beginning. If their hypothesis turned out to be correct, why do they think it did so? If their hypothesis was

incorrect, what misconceptions were proven wrong by the experiment? Students must also be provided with multiple opportunities to move beyond answering the original question by explaining why their results are important. Sometimes this is called the *so what? - question.*

Communicating results: The final step in any inquiry is for students to communicate what they have learned to others**.** This communication can be accomplished in any combination of written formats, such as reports, power point presentation, tables or charts, depending on the nature of the inquiry and the form of the data that students have collected. A number of computer software programmes create these products. Students can give oral presentations that describe their process and their findings, as well. Depending on the teacher's objective, it may be appropriate for students to decide how to communicate what they have learned to others. Whether students' investigations or experiments were in science, math or social studies, this stage of the scientific process can be concerned to both oral and written language arts standard.

5.3.4 Discovery method

Discovery learning is a technique of inquiry-based learning and is considered a constructivist based approach to education. It is also referred to as problem-based learning, experiential learning and 21st century learning. It is supported by the work of learning theorists and psychologists Jean Piaget, Jerome Bruner, and Seymour Papert.

Jerome Bruner is often credited with originating discovery learning in the 1960s, but his ideas are very similar to those of earlier writers such as John Dewey. Bruner argues that "Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving". This philosophy later became the discovery learning movement of the 1960s. The mantra of this philosophical movement suggests that we should 'learn by doing'.

Discovery learning can occur whenever the student is not provided with an exact answer but rather the materials in order to find the answer themselves. Discovery learning takes place in problem solving situations where the learner draws on his own experience and prior knowledge and is a method of instruction through which students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments.

Discovery method - Characteristics

Discovery-based learning is typically characterized by having minimal teacher guidance, fewer teacher explanations, solving problems with multiple solutions, use of hand-on materials, minimal repetition and memorization. There are multiple essential components that are required for successful discovery-based learning which include the following:

- Teacher guidance where the emphasis is on building upon students' reasoning and connecting to their experiences.
- Classroom culture where there is a shared sense of purpose between teacher and students, where open-mindedness and dialogue are encouraged.
- Students are encouraged to ask questions, inquire through exploration and collaborate with teacher and peers.

Teacher's Role in Discovery method

It has been suggested that effective teaching using discovery techniques requires teachers to do one or more of the following:

1) Provide guided tasks leveraging a variety of instructional techniques

2) Students should explain their own ideas and teachers should assess the accuracy of the idea and provide feedback

3) Teachers should provide examples of how to complete the tasks.

A critical success factor to discovery learning is that it must be teacher assisted. Discovery learning can also result in students becoming confused and frustrated. Mayer (2004) argued that pure unassisted discovery should be eliminated due to the lack of evidence that it improves learning outcomes. Even Bruner (1961) who was one of the early pioneers of discovery learning cautioned that discovery could not happen without some basic knowledge.

In summary, the teachers' role in discovery learning is critical to the success of learning outcomes. Students must build foundational knowledge through examples, practice and feedback. This can provide a foundation for students to integrate additional information and build upon problem solving and critical thinking skills.

Advantages of Discovery method

- Early research demonstrated that directed discovery had positive effects on retention of information at six weeks after instruction versus that of traditional direct instruction.
- It is believed that the outcome of discovery based learning is the development of inquiring minds and the potential for life-long learning.
- Discovery learning promotes student exploration and collaboration with teachers and peers to solve problems. Children are also able to direct their own inquiry and be actively involved in the learning process which helps with student motivation.

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5.3.5 Problem solving method

Human beings face a multiple dimensional problems in their lives and they try to solve these problems in a particular way in the light of their previously gained knowledge and experiences. In this regard, it is essential for the students to be prepared for future or near future challenges by facing real life, or real like, problems in their learning environment, and finding appropriate solution of these problems. In present era, problem based learning is extensively used nearly in all areas and was first implemented in medical education in 1950s.

The need to teach problem solving

Problem solving is an important basic skill needed for today's 21st century learners. Guided by recent research in problem solving, changing professional standards, new workplace demands, and recent changes in learning theory, educators and trainers are revising curricula to include integrated learning environments which encourage learners to use higher order thinking skills, and in particular, problem solving skills. As education has come under criticism from many sectors, educators have looked for ways to reform teaching, learning, and the curriculum. Learners often learn facts and rote procedures with few connections to the context and application of knowledge. Problem solving has become the means to re-join content and application in a learning environment for basic skills as well as their application in various contexts. Today, there is a strong movement in education to incorporate problem solving as a key component of the curriculum.

The need for learners to become successful problem solvers has become a dominant theme in many national standards. Learning experiences that allow independent thinking and multiple ways of approaching the problem, encourage independence and creativity in learners. The problem solving method is based on the idea of involvement of students in real life problems. It gives students opportunity to actively construct their learning by thinking, questioning, visualising the situation, searching for solution, doing activities and experiments and arriving at conclusion on their own. Teacher facilitates them in identifying the problem. For this, the teacher may create a situation, pose a question, perform activity or experiment, elicit inquiry from students to make students realise that a problem exists and helps them to identify the problem. The teacher sets up the stage for solving the problem. The students are helped to pose questions to initiate thinking, listen to their thinking, facilitate them to recall their existing knowledge and reconstruct them as and when it is required, and to use that knowledge to solve problems.

Problem solving - Definition

The roots of problem solving learning are found in Dewey's thoughts "that learning by experimentation or doing is more lasting" (Dewey, 1938). Actually, the problem solving is how to learn independently. It is the most convenient approach to achieve the aims of teaching - learning process. Problem solving was viewed as a mechanical, systematic, and often abstract (decontextualized) set of skills, such as those used to solve riddles or mathematical equations. These problems often have correct answers that are based on logical solutions with a single correct answer (convergent reasoning). Under the influence

of cognitive learning theories, problem solving shifted to represent a complex mental activity consisting of a variety of cognitive skills and actions. Problem solving included higher order thinking skills such as visualization, association, abstraction, comprehension, manipulation, reasoning, analysis, synthesis, generalization - each needing to be 'managed' and 'coordinated'.

Gagne's (1985) defined problem solving as the "synthesis of other rules and concepts into higher order rules which can be applied to a constrained situation." When teaching problem solving, authentic problems in realistic contexts are essential. Learners learn to solve these problems, and only after having done so will they be able to see the similarities of strategy across different contexts—and then, only with the right kind of support and structure for their thinking.

Principles of problem solving method

The useful principles lying behind problem solving method are:

i) Students *visualise* the situation of the problem, process of the problem solving and expected solution of the problem. For this they may draw diagrams/graphs/flowcharts/concept maps.
ii) Students *attempt* to solve the problem. They make observation and collect data to explore the solution. In this process they apply their understanding to construct their knowledge.
iii) Students *draw* conclusion.
iv) Students *present* the record.
v) Students *generalise* the conclusion. Different problems may require different sequence of steps. If same problem is presented to different groups of students in the class, they tackle the problem in different ways connecting their prior understanding.

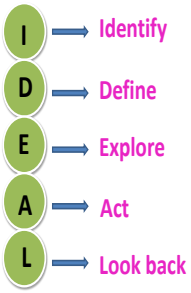
Types of knowledge

Instruction in problem solving needs to focus on two distinct types of knowledge: declarative and procedural (Gagne, 1985).

Declarative knowledge: Declarative knowledge includes facts, concepts, and principles. It is the content-specific or factual knowledge within a discipline or skill domain.

The three types of declarative knowledge:

i) Facts ("know what"—simple associations),
ii) Concepts ("know that"—ability to identify and cluster examples), and
iii) Principles ("know why"—ability to predict and explain the behaviour of a system).



Procedural Knowledge: It is the knowledge about the

continuum of problem types. The kinds of problems we encounter vary in the amount of structure they provide. Problems are often represented on a continuum from well-structured, through moderately structured, to ill-structured. The position of a problem on this continuum determines the way it is taught and learned.

Problem solving models

There are several problem solving models and one of the general problem-solving models is Bransford's IDEAL model:

Identify the problem

Define the problem through thinking about it and sorting out the relevant information

Explore solutions through looking at alternatives, brainstorming, and checking out different points of view

Act on the strategies

Look back and evaluate the effects of the activity.

This model is similar to many of the general problem solving models that were common and that are still used with many general problem solving courses found in academic and corporate training settings. These teach problem solving as a "content-free" thinking skill, not integrated with the rest of the curriculum or work environment.

Another frequently-used model of the problem solving process is given by Gick, 1986. This model identifies a basic sequence of three cognitive activities in problem solving:

i. Representing the problem includes calling up the appropriate context knowledge, and identifying the goal and the relevant starting conditions for the problem.
ii. Solution search includes refining the goal and developing a plan of action to reach the goal.
iii. Implementing the Solution includes executing the plan of action and evaluating the results.

Teachers' role in problem solving

In this method, the students are made to realize the existence of problem. They are taught how to conceive the situation as problem and provide rationale of the problem. They are made to identify various issues related with problem and separate known and unknown things. In this method, students are made to think, make decision—how, when and where, find the unknown issue by applying their existing knowledge and understanding who else can facilitate them in this process; what experiment/activity/ calculation needs to be done; what learning resources to be utilised.

Moreover, the teacher also –

i. facilitates students to define the problem;

ii. encourages students to plan their method of problem solving. Students learn by thinking themselves while working on problem and struggling to find the solution;
iii. ensures participation of all if problem is being solved in groups. Keep moving around the class and observing students' group work. Observe that all students are working on the task;
iv. encourages the group which has completed the task earliest to extend help to the group struggling with the problem, so that they can do it within the given time frame;
v. calls a few students to share their ideas on the problem when all the students have completed the work. They may use the blackboard or perform the critical part of the activity again to explain the phenomenon being studied;
vi. reflects and discusses explicitly on the problem, acknowledging contribution of students; and
vii. collects the work of students.

The teacher may assess on the following parameters:

- Reasoning and justification
- Completion of work
- Correctness of solution
- Group participation
- Novelty in approaching the problem
- Multiple approaches of solving problem.

If a problem revolves around performance of an activity or experiment, then questions based on the activity may be designed as:

i. What do you think would happen?
ii. Why will it happen?
iii. What did actually happen?
iv. Why did it happen?
v. Do you find any difference from your prediction?
vi. How will you further explain your reasoning?

Advantages of problem solving method

The chief advantages of the method are enumerated as follows.

- The learners are capable of recognising and identifying the problem.

- The learners are able to recall how it was solved last time, and do it again. The learner breaks the problem down into intermediate goals and solves each one in turn, using this process.

- This develops the higher order thinking skills like reflective thinking, logical reasoning, critical thinking analyzing and decision making.

- The learners explore and use other techniques such as brainstorming, team work, collaborative and cooperative learning.

- It develops the motivation and attitudinal aspects such as effort, confidence, anxiety, persistence and knowledge about self which are important to the problem solving process.

5.3.6 Project method of teaching

The term ‘project method’ was first used by Richards in 1900 according to educational literature. The project method (also known as project work, project approach, and project-based learning) is the method of learning through experiences and it gives importance to purposeful activities carried out in a life-like situation. It is evolved from the philosophy of pragmatism. It is experience-centered strategy related to life-situation. This teaching strategy is focused on socialization of students by achieving cognitive, affective and psychomotor objectives.

It is one of the standard teaching methods. It is a sub-form of action-centered and student-directed learning and an enterprise in which students are engaged in practical problem solving for a certain period of time.

Project method - Definition

Charles E. Allen, 1916, gives the following definition and description of the project - “A project is a problem involving the discharge of a responsibility on the part of a given individual or group of individuals. It requires an intelligent application of knowledge or an exercise of skill, or both, in order that something may be accomplished.”

According to Kilpatrick, “a project is a wholehearted purposeful activity proceeding in social environment.” Ballard says, “a project is a bit of real life that has been imported into the school.” A modified definition of project given by Thomas and Long is that “a voluntary undertaking which involves constructive effort or thought and eventuates into subjective results."

Project method - Characteristics

The special characteristics of this method are:

- It is the embodiment of a new way of looking at the student and a new way of teaching to live.
- It aims at teaching the students to get the best out of life not in the future, but here and now.
- It is an attempt to use experience, which makes the lessons unforgettable.
- It gives an opportunity for self-expression by bringing out what is in the students.
- The activity which is chosen becomes the core and all knowledge, that is acquired, becomes incidental.

- It proposes merely not the abstract solving of a problem but the whole sequence of activities involved in a complete undertaking.
- It lends itself naturally to group work.
- It is a large unit plan of teaching. A project is a learning unit of appreciable length, difficulty and learning value. Many large units will combine to make a project.
- The students learn better from their own activity than from constant instruction.
- It seeks to offer complete freedom of choice of the problem to be solved.
- It seeks in making individuals see and understand life in its unity.

Project method - Importance

In the project method, the importance of the problem in developing reason is indicated by E. N. Henderson. He declared that the use of the problem as the form of developing the reason is the characteristic feature of education in modern times. The largest outcome of educational reform of this method is to develop the capacity of the students to readjust that springs from reasoning. Contrary to traditional methods, project method focus on applying, not imparting, specific knowledge or skills, more rigorously than lecture, demonstration, or recitation. It aims at the enhancement of intrinsic motivation, independent thinking, self-esteem, and social responsibility. In project teaching method, students can develop their self-study activities, they would get used to educate beyond the programme, to use the knowledge, to solve communicative, informative problems and to have an opportunity to study cultural- informative competencies. So it is considered to be very effective and important.

The four steps in the project method areas are: purposing, planning, executing, and judging. There are four basic elements of this teaching strategy which makes it purposeful. They are spontaneity, purpose, significance, and interest or motivation.

Project method - Objectives

Project teaching activities require the following objectives:

i) In order to defend each problem project or to explain the statements, the teacher should offer the plan of the project in this way: the theme; the considered task; the main theme; personal opinion; conclusions and reviews.
ii) It should have some impassioned questions and more attention is paid to discussion if it is necessary.
iii) Involving the class to the discussion for example putting the rhetorical questions.
iv) Using the right language combinations by the performer.

Principles of project method

The project teaching method is based on the following principles:

i. *Principle of utility:* Choosing the project which is closer to the social life.

ii. *Principle of purpose:* Knowledge of purpose is a great stimulus which motivates the students to realize the goal. Purpose motivates learning. Interest cannot be aroused by aimless and meaningless activities.
iii. *Principle of experience:* Experience is the best teacher and what is learnt should be experienced.
iv. *Principle of activity:* Physical and mental opportunities should be provided to students and they are allowed to do and to live through doing.
v. *Principle of readiness:* Involving the learners in finding the solution of the problem with their active participation.
vi. *Principle of reality:* Real life situations should be presented in the life of the school.
vii. *Principle of learning by doing:* Learner performing certain tasks and experiences new things. This adds to his knowledge and results in learning.
viii. *Principle of socialisation:* Developing the feeling of cooperation and group work.
ix. *Principle of inter-disciplinary approach:* Involving the knowledge of different subjects in solving the social problems.
x. *Principle of freedom:* The students should be free to choose an activity according to his/her interest, needs and capacities.

Types of project method of teaching

Projects may be of several types depending upon the nature of work undertaken. Dr Kilpatrick has suggested the following types of project.

Procedure type: Projects in which students are asked to do something like building, planning to execute a model or model any devices or even a toy are called producer type projects.

Consumer type: Projects in which pupil are getting the experience and are enjoying, they are engaged in consumer type projects.

Problem type: Project in which a solution to problem is to be found out. These projects are given to solve the problems related to any life-situation or related to any subject. These general problems if solved would make the student efficient to find suitable suggestions for social-life.

Drill type: No new activity is undertaken but an activity once performed, is repeated to acquire greater skill. It may be taken up to give drill in singing and swimming.

Thus the project involves all types of activities - mental and manipulative. Projects may be easy or complex depending on the activities involved and the student's development and levels of intelligence. It may also vary from imparting of information to imparting of skill.

Essentials of a good project

The teacher should consider the following essentials before selecting a project for doing.

- The project should have evident worth for the individual or the group that undertakes them.
- It should be timely selected with due regards from several points of view.
- It should have a bearing on a great number of subjects and the knowledge acquired through it may be applicable in a variety of ways.
- It should be challenging which requires reasonable amount of effort.
- It should be feasible taking into considerations the pros and cons, the availability of resources and practicability.

Role of a teacher in project method of teaching

The project method of teaching is successful when it is based on a suitable definite procedure. The foremost responsibility of the teacher is to provide those situations to the students wherein they should be spontaneous to solve some practical problems. The teacher should be on the viewpoint of discovering their interests, tastes, aptitudes and needs of the students. When the problems provided by the teachers are social problems, then this method provides better social training and gives more satisfaction.

The teacher may discuss with different topics of interest with students. Pictures of different scenes, models should be shown to them. Surveys on local condition may be undertaken. The teacher has to tap all the available resources to provide worthwhile situations. When the students are allowed to select the projects themselves, it would stimulate student purposing and they would be more interesting in what they are to make. The teacher should assist them in selecting the projects and guide them in the most appropriate way.

The teacher may divide the applied or practical projects into role-play, applied, and mono project. All these projects are directed to develop the students' activity and they should be discussed completely beforehand. It must have elements linking to the social life of the students. In order to do this type of project, its structure and logic should be discussed and regulated. Later, teacher should give new suggestions and instructions, but the direction should not be changed. After the discussion, it is very important to put it into practice. It is very effective to do role-play and game projects in the group. This group work and pair work interests the students very much. Here each student chooses the part of the project with freedom. Students do the tasks with interest, because it is chosen according to their own interests. The teacher may include social or business conflicts as projects. The results of these projects are determined beforehand, but sometimes it can be determined at the end. These types of the project are based on creativeness. Informative projects give information or data on a phenomenon or something else.

The structure of the informative project is:

Determine the objectives of the project → show the actuality of the project → find out the resources → have a "brain storm" training → data

processing: analyzing, collecting, comparing with the facts, giving a report, making a video film, making a photo album → project presentation. This project may sometimes be a module of a big research project.

The main idea of project teaching method is to provide opportunity for the students to self-study, to expose their knowledge, and their scientific practical abilities. The philosophical, human, psychological peculiarities of project teaching method are really directed to develop the student's personality. The student doing all kinds of project individually creates "his own way of searching knowledge" and this way will start the long life learning of the student. The methodological and scientific-theoretical basis of project teaching method guarantees of increasing the quality of knowledge. On the basis of project teaching technology, the teaching process becomes the complete system of pedagogical process, which is based on educational, informative, and upbringing development of the students. According to project teaching method system, students' interests are increased along with their responsibility, activities, reaching their goals and objectives, problem solving skills, thinking creatively and dream.

Advantages of project method

The various advantages of project method are summarized as follows.

- It follows the psychological laws of learning – the law of readiness, the law of exercise and the law of effect.
- It gives freedom to the students.
- It suits the psychological concept of maturation.
- It saves students from insincerity and superficiality.
- It trains for a democratic way of life.
- It helps learning through practical problem solving. It helps in developing social norms and social values among the learners.
- It provides invaluable opportunities for correlation of various elements of the subject matter and for transfer of training or learning.
- It helps in growing knowledge very effectively as a result of their close cooperation on social participation
- It upholds the dignity of labour
- It gives satisfaction to the students by completing the whole task.

Disadvantages of project method

The demerits of project method are given below.

- Knowledge is acquired by coincidence of its being valuable to the project. It makes learning haphazard and incidental.
- It leaves gap in the students' knowledge
- It underestimates man's power of imagination, which enables them to savour the full experience of another, without the necessity of undergoing the experience of oneself.

- The students may be too ambitious and may be beyond their capacity.
- The project cannot be planned for all subjects and whole subject matter cannot be taught by this strategy.
- It is not economical from the point of view of time and cost.

Suggestions for bettering the Project Method

- This teaching strategy should not be used as an independent teaching strategy but as a supplementary teaching technique.
- Teacher should try to utilize the inexpensive/waste products to prepare models etc.
- To avoid the problem of supervision, teacher may appoint a leader to each group of students.
- Teacher should fix a time limit for each project.

5.3.7 Seminar method

A seminar, as a teaching method, involves generating a situation for group to have guided interaction among themselves on a theme. It is generally presented to the group by one or more members. The person who presents the theme should have studied the theme thoroughly before hand. The relevant material is selected and organised. The collected material is put in the form of paper. This is circulated among the participants in advance or before the presentation of the theme. It provides the structure of the theme, to facilitate its communication. Thus seminar method of teaching is an higher learning method which involves paper reading on a theme and followed by the learning which involves paper reading on a theme and followed by the group discussion to clarify the complex aspects of the theme.

Objectives of seminar method

The main objective of this method of teaching is to realize the higher objectives (Knowledge) of cognitive and affective (emotion) domains.

Cognitive objectives: The objectives of the cognitive domain realized to create the teaching learning situations are to develop:

i) the higher cognitive abilities – analysis, synthesis, and evaluation;
ii) the higher cognitive actions – valuing, organizing and characterization of quick comprehension and construction of reaction to a particular situation; and
iii) the ability to seek clarification and defend the ideas of others effectively.

Affective objectives: The objectives of the affective domain realized to create the teaching learning situations are to develop:

i) the feeling of tolerance against the opposite ideas of others;
ii) the feeling of co-operation with other colleagues and respect the ideas and feelings of others;
iii) the emotional stability among the participants of the seminar; and
iv) the good manners of putting questions and answering the questions effectively.

Assigning roles in seminar method

In this method of teaching, the students may be assigned different roles as Organiser or Instructor, President or Chairman or Convener of the seminar, Speakers of the day, Participants and Observer.

Role of the Organiser: The teacher may select a student to be the organizer to conduct seminar on a particular theme or topic. It is the responsibility of an organizer to plan and prepare the whole programme of the seminar. The different aspects of the topic or theme of the seminar may be assigned to different persons who play their part as speakers. The date, time, place and schedule and all other arrangements are decided by the organizer. Generally the orgainser suggests the convener of the seminar.

Role of the President: While selecting the president or convener, it should be taken in consideration that the person should be well acquainted with the theme of seminar. He must know his rights and duties as the convener. Virtually the seminar's activities are conducted by them. He/she encourages the participants to take part in discussion relevant to the theme. In so some situations he/she may also take part in the discussion. The participants can be given opportunities, to take part in the discussion and at the end he/she summarises the discussion and presents his/her view point on the theme. He/she has to welcome and thank the speakers and participants, guest speakers and observers.

Role of Speakers: The organizer assigns the topic to the speakers. They prepare thoroughly and printed copies of the papers are presented and distributed among the participants before the beginning of the seminar, so that the participants also prepare themselves on the topic. It encourages discussions at the end of the presentation. They should be ready for active interaction with the participants and answer their queries. They should have the tolerance while the participants criticize their ideas.

Role of the Participants: The participants of the seminar should be well acquainted with the theme. They should appreciate the performance of the speakers. They should be able to seek clarification of the theme through their questions or their experiences. The number of participants may be 25 to 40 foe effective interactions.

Role of the Observers: Some guests may be invited as observers, to observe the activies of the seminar. They should be allowed to discuss at the end of present their observations with the permission of the convener.

Procedure of seminar

The procedure or steps in organizing the seminar method of teaching are as follows:

- Selection of the topic or theme for the group
- Assigning different roles to the students

- Selection and organization of the relevant material
- Circulating the organized material as printed copies among the participants
- Presenting the theme or different aspects of the themes
- Observing in the light of their knowledge and experience regarding the theme
- Clarifying doubts, queries or related to the theme through discussions
- Further analysis and evaluation of the view points

Proceedings of the seminar may be prepared as guided by the convener. The convener should see the discussion in track, stimulate maximum participation and consolidate at appropriate stages and express his/her view points. It is necessary to give time for discussion which is the main purpose of the seminar. The different viewpoints and contrary ideas of the participants will induce for further thinking which is helped in validating and strengthening them.

Types of seminar

The above method can be conducted by organizing at different levels. On the basis of this level of organisation, the seminars are classified into various types.

Mini seminar: A seminar organized to discuss a topic in class is known as mini seminar. The purpose of the mini seminar is to make the students to organize and play different roles. It is a stimulated situation for the students. In an institution different seminars should be organized before the main seminar.

Major seminar: Such seminars are organized at departmental or institutional on a major theme. All the students and staff members should take part in the seminars. These seminars may be conducted weekly or monthly in departments. Specific themes have to be selected for the seminar.

National seminar: A national seminar is organized by an association or organization at national level. The experts are invited on the theme of the seminar. The secretary of the seminar prepares the place, date, time, venue and schedule. Generally funding agencies and other national bodies like NCERT, UGC, NCTE, ICSSR at national levels.

International seminar: Generally such seminars are organized by international organisations. These may take place in collaboration with the national or state level associations also. The topic or theme of the seminar is very broad.

Essentials of seminar

For organizing effective seminars, the following essential things should be there in a seminar.

- Abstract theme should be presented and discussed
- Learners should react in the light of their own experiences
- Active interaction on the ideas though abstract or concrete should be aimed

- Creating suitable environment and opportunities for vibrant questioning, making observations, evaluating the theme by comparing the learners' own experiences.

Advantages of seminar

Seminar as a teaching method has the potential to develop different abilities in students. The merits of this method of instruction are listed below.

i) This method stimulates thinking because of interaction. Different higher order cognitive abilities like analytical thinking, critical thinking, synthesizing and evaluating the ideas will tend to be developed.
ii) Some important attributes such as tolerance, co-operation, valuing the ideas of others, emotional stability, respecting other's ideas, openness and spirit of team work will be inculcated among the students.
iii) The effects of these attributes represent the norms of behaviour in group situations. This adherence to the group norms would gradually inculcated the effect attributes in the participants.
iv) The related effect of seminar will develop better learning environment as well as learning habits. While preparing for presentation and participation in the discussion, learners will get induced to pursue independent study, engage in post-seminar discussions and develop critical outlook to ideas leading for permanent self-initiated learning.
v) This method has great instructional value as it makes the instruction learner-centred and provides for learning through enquiry which is based on a very natural inquisitiveness of humans.
vi) It plays an important place in higher education at all levels of instruction.

Limitations of seminar method

The seminar method has the following limitations:

i) A seminar cannot be organized on all the content of a subject matter. Some topics are highly structured. A theme of a seminar should be such on which discussion may be held.

ii) When a seminar is organized, the persons who speak too much dominate the discussion of the seminar and do not provide opportunities to take part in the discussion. As a result discussion will be confined to certain members in the group rather than whole groups.

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5.4 Integrating ICT in Teaching: Individualised Instruction

The innovations in Information and Communications Technology (ICT) have transformed our society, the thought process of people and their life style and have tuned towards a dynamic world. Preparation of students to survive in this current digital era and 'knowledge society' by integrating ICT in the curriculum is an essential component of the schools and educational institutions. The inculcation of ICT in the teaching learning process provides a proactive and teaching and learning environment. Educational technology is conceived as a science of techniques, methods and media by which educational goals could be realised. It may be defined as the systematic application of the knowledge of sciences to practical tasks in education. The endorsement of scientific method in the communication process translates the behavioural science of teaching/learning. It serves as a mean and process for productive learning systems. Its contribution in the field of education is pervasive which pervades the whole teaching learning process meaningful for both the teacher and the learner and modifies their behaviour for the betterment of themselves and of mankind. The National Policy of Education (1986) has observed "Education Technology will be employed in the spread of useful information; the training and re-training of teachers, to improve the quality, sharpen awareness of art and culture, inculcate abiding values etc., both the formal and informal sections". Thus when we apply the science of learning and communication to teaching we evolve ICT integrated education.

5.4.1 Instruction system

Instruction is an important component in teaching-learning process. The inclusion of systematic actions which induces learning situations is known as instruction. It implies the application of psychological and scientific principles and knowledge to instruction for achieving the specific objectives of learning. The organised combination of subject matter content with procedures and rules for presenting the content in order to reach the learning outcomes is referred as instructional systems. An instruction can be characterized by the tasks viz., setting objectives, teaching content based on these objectives, and evaluating performance. The goal to bring in improvement and development in the instructional systems by educators traces back to Greek philosopher Socrates. The massive communication developments have brought in a revolution in instruction technology. To be in line with the current digital era, teachers are required to integrate ICT in their daily

teaching and replace their traditional instructional methods with modern tools and facilities.

5.4.2 Individualised instruction

Individuals differ in their level of intelligence, aptitude, interest, abilities, growth and development and it is not justified to cater same kind of education to all. In order to provide effective education and aid optimum development among the individuals mounted the need for individualised self-learning technique or individualised instruction. Instruction is individualised in order to get adjusted with differences that exist among learners. Individualized learning, or individualized instruction, is a method of teaching in which content, instructional technology and pace of learning are based upon the abilities and interest of each learner. The manner in which different learners perceive, acquire, retain, and retrieve information may differ. Trait of the individual learner is the given prior consideration in the individualised approach to instruction. Instructional system to adjust with different cognitive style of individuals provides individualised style in the instruction called the individualised instruction. Though variety of individualised instructions are developed they all form base with three fundamental components:

- *Pace:* the amount of time given to a student to learn the content
- *Method:* the way that the instruction is structured and managed
- *Content:* the material to be learned

Pace: Individualisation of pace, controls the rate at which individual learners progress through the content of the instruction. This duration of the instruction is controlled and designed sometimes by the teacher and sometimes by the learner. When the pace is decided by the teacher or the instructor, specific due dates are specified before the instruction begins. The learner exercises his/her control over the pace of the instruction, it remains not to be time bound. Between these two extremes are situations where control of the pace of instruction is shared or negotiated, not necessarily equally, by the teacher and learner. Different number of items may also be provided for different learners.

Method: The preparation and delivery of instruction is planned and constructed based on the theories of learning. The method of instruction is influenced upon whether the instruction is designed for one homogenous group, or is flexible, in anticipation of individual differences among learners. Commonly any instruction is designed to satisfy the needs of an average learner, and is customized ad-hoc by the teacher or instructor as needed once instruction begins. For instruction to be considered individualized, the instruction is usually designed to account for specific learner characteristics with inclusion of alternative instructional methods for students with different backgrounds and learning styles. The instructional method is tailored to reach all types of learners.

Content: Individualisation of content is predominantly implemented in diagnostic and prescriptive fashion. The learner-centric principles adopted in education system have paved the opportunity to define the content by the learner himself/herself pursues learning

based on his/her own interest. The customization of the content may be either tracking or enrichment. The least modified among the three components is 'Content'. Based on the assessment of the knowledge and skill of the learner, the content is adjusted and remedial material is provided. The range of activities available to the learner is an indicator of how individualized the content is in an instructional setting. Thus the content is based on the observed performance and estimated knowledge of the learner.

Principles of Individualised Instruction

According to Edger Dale, "*Teaching* is a broad, vague, ill-defined term and *Instruction* is a purposeful, orderly, controlled sequencing of experiences to reach a specified goal".

The main principles that lie behind the preparation of individualised instruction are as follows:

- Individual differences existing among the learner is taken into consideration.
- In Learner-centric, a learner is solely responsible for what to learn, when to learn and how to learn.
- Application of psychological learning theories and principles
- Ensures in-depth or mastery in learning into the content structure
- Immediate feedback and reinforcements enable the learner to proceed the content
- Facilitation for interactive and active participation of each individual learner

Instructional approaches with a goal to improve the instructional experience of individual learner have been modified in some of these or all of the above mentioned components. Some of such instructions where the students learn without the help of a teacher but by operating the instructional materials themselves is called self-learning devices. Some of such self-learning devices employed for educational purposes are:

a) Programmed Instruction
b) Keller Plan or Personalised System of Instruction
c) Computer Assisted Instruction (CAI)

a) Programmed instruction (or) Programmed learning

Programmed Instruction (PI) is one of the effective innovative and highly individualised and systematic instructional strategies in the teaching-learning process. As classroom instruction and self-learning material, it has brought excellent learning outcomes among the learners. It represents a more rigorous attempt to develop mastery over specified goals to secure 'insured' learning. Programmed learning comprises of a orderly, controlled, carefully specified and logically sequenced learning experiences. Edward L. Throndike lays down the fundamental ideal of programmed learning in 1912. Programmed learning is application of technology in instruction or 'educational explosion' to meet out the dire need to educate people in this knowledge explosion and population explosion era. Significant contributions to this theory of programming have been made by Sidney L. Pressey, Robert M. Gagne, Robert Mager and B.F. Skinner. In this new path towards automation of learning, individual plan to self-learn the whole content using Stimulus–

Response–Reinforcement cycles. The instructional loads are carried by teaching machines or programmed tests.

PI - Definition:

Smith and Moore (1962) defined "Programmed instruction as the process of arranging the material to be learned into a series of sequential steps, usually it moves the students from a familiar background into a complex and new set of concepts, principles and understanding".

Leith (1966), defines "Programmed instruction as a sequence of small steps of instructional material (called frames, most of which require a response to be made by completing a blank space in a sentence. To ensure that expected response is verified by the provision of immediate knowledge of results. Such sequence is intended to be worked at the learner's own pace as individualised self-instruction".

Characteristics of PI:

- The instructional material is split into several fragments called frames and logically sequenced.
- Every frame succeeds with questions as stimulus, based on the response elicited, initial entry behaviour of the learner is considered
- Gradual movement from one frame to next is enabled, which allows the terminal or competence which the learner is expected to achieve
- Frequent response and immediate feedback is provided to motivate the individual.
- Instantaneous reinforcement for correct responses.
- Facilitates to correct the wrong answers by providing right answers by the learner himself, hence self-corrective.
- An individual is exposed to proceed at his/her own pace without any humiliation in a heterogeneous class.

Principles of Programmed Instruction:

- *Principle of small steps* - meaningful small steps of the subject matter (called frame) is presented one at a time to enable progressive learning.
- *Principle of active responding* - the active participation of the learner is focused and many attractive components and activities are planned to engage the learner and acquire knowledge by step by step.
- *Principle of immediate reinforcement* - the correctness of the response is reinforced based on the psychological principles to motivate the learner.
- *Principle of self-pacing* - the speed of learning of the individual is appropriately considered to help him/her learn the subject in his/her own pace.
- *Principle of student-testing* - to meet out the continuous evaluation of the learning process, the learner is tested and his/her response for each frame is recorded for the revising and improving the learning.

Styles of programming

The modes of preparing the programmes are called the styles of programming.

i. *Linear Programming*

In 1950, B.F.Skinner developed a style which is known as linear programming. It is single track programme, the learner gradually proceeds from one frame to another and progresses towards the end of the programme in a straight line. The student is rewarded with reinforcements and immediate feedback. Cues are given to prompt correct responses. The path of the programme is extrinsically designed by the programmer, hence the learner has no choice of his/her own in the path instead follow the specified and directed path of learning. Linear programming moves slowly in progressive manner towards its goals.

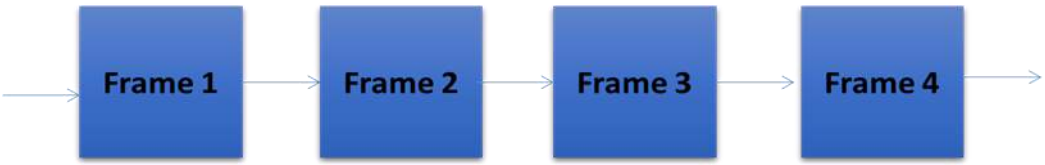

Fig 1 - Arrangement of Linear Programming

i. Branched Programming

The model named 'Branching' was developed by Normal A. Crowder. It is an improvement over the linear programming. He is of the opinion that branching programme is like human tutor and talk-back to the student. In contrast to the linear programming, it provides an intrinsic arrangement in learning and avoids the medium of extrinsic device, ie., it is not extrinsically controlled by the programmer. The learner is liberal to make decisions and adapts the instructions suitable to his/her needs. The frames are relatively bigger in size, and may be a combination of two or three ideas in the form of meaningful components.

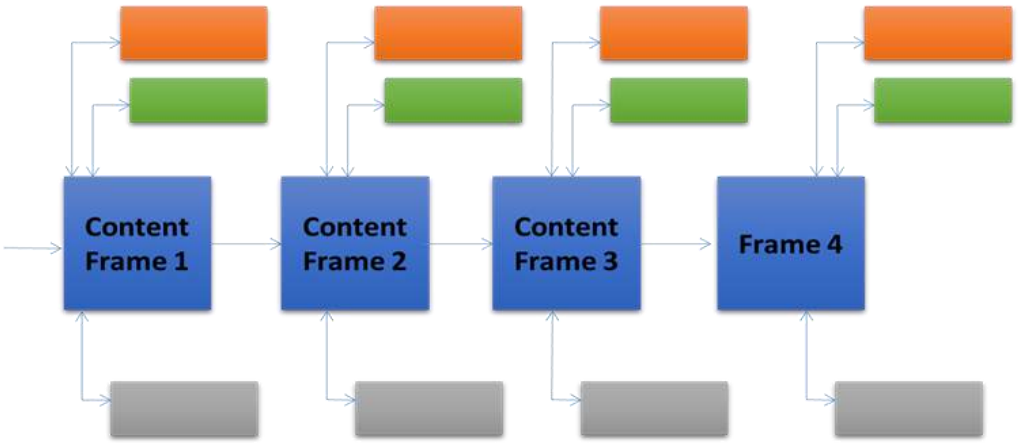

Fig 2 - Arrangement of frames in branching programme

Branching programme anticipates the errors of learners; the incorrect responses are diagnosed and remedial instruction is provided and enables the learner to move again to the original frame to make an attempt to choose the right answer. Thus the errors occurred are detected and corrected before proceeding further on the learning path. Individual learning path is branched based on the responses they selected. Freedom in choosing the path of action based on the subject matter prompts the learner to be active, alert and focused. A student proceeds through the programme independently along different routes or branches.

ii. Mathetics Programming

Mathetics is an innovative and controversial approach towards programmed instruction. In 1962, T.F. Gilbert developed a new system of programmed instruction called Mathetics and described systematic procedure for its functioning. Mathetics comes from the Greek word 'Mathein' meaning 'to learn'. Mathetics is defined as, "the systematic application of reinforcement theory to the analysis and construction of complex representories which represents the mastery of subject matter". It is eclectic in nature. It analyses the deficiencies and rectifies it. It is a most applicable teaching technique to teach skills than subjects. The teaching method used in this style is backward chaining. Pupils learn the last step first, and then go to the next one before it and thus moves to the introductory step. The tasks of this system are connected from last to the first, this process of binding task or frames from last to first is called as chaining. Retrogressing chaining technique is the characteristics of the mathetical style of programming.

b) Personalised system of instruction

Fred Keller, devised the Personalized System of Instruction (PSI), or the Keller Plan in the year 1968. It is perhaps one of the first comprehensive systems of individualized instruction. Keller developed his system on ten accepted educational principles of active responding, positive conditions and consequences, specification of objectives, organization of material, mastery before advancement, evaluation/objectives congruence, frequent evaluation, immediate feedback, self-pacing and personalization.

Keller Plan is somewhat different from other self- learning instruction by means of –

- *Self-pacing* – every student is allowed to proceed at his own speed
- *Unit mastery* – learner outcome is not peer referred but criterion referenced. When the learner achieves 80% to 90% of the determined objectives only, he/she is allowed to proceed at his/her own speed.
- *Student tutors; or peer proctors* – peer protocor are employed to help the students during theory course of learning. It also enables them to understand their level of mastery by periodical evaluation.

- *Optional motivational lectures* – lectures of expert teachers are given in the beginning. These are also supplemented by films, T.V, radio programmes, demonstrations etc.
- *Learning from written material* - printed study materials are provided which contains objectives of the content, method of learning, model questions and reference books.

The last three components indicate that the method of instruction vary slightly from individual to individual based on their level and needs. Although all students learn from written material and student tutors, the motivational lectures are optional.

c) Computer assisted instruction (CAI)

Individualized instruction proponents saw computers as powerful way and to further improvise the design and delivery of individualized instruction as suitable to the electronic environment. John E. Coulson wrote in 1970: "A modern computer has characteristics that closely parallel those needed in any educational system that wishes to provide highly individualized instruction". CAI is an instructional technique, which enables two way interactions between the learner and the computer. In this, the lesson or subject matter to be learnt are recorded in the software of the computer. In this stored instructional programme, computer instructs the student, informs, guides and tests until prescribed level of proficiency is reached.

The computer can perform complex analyses of student responses and make decisions based on the assessments of student performance and match resources to individual student needs. Thus, if the student answers according to the material booted, it will be acknowledged and permits to proceed further or else the student is provided with alternate explanations or move back to the same frame again to respond the question correctly.

Objectives of CAI

The objectives of CAI are:

i. To control the presentation of stimulation to a student
ii. To accept and evaluate the students response
iii. To present further stimuli based on the interaction calculated, and to shape the student's response in the desired manner

Role of CAI

Drill and Practice – The computer reviews and provides regular practice on basic concepts to achieve master over the content learned. Further these drills could be individualised based on the level of the students. Harder exercises for bright students and average exercises and easier problems for the slow learners could be planned.

Tutorial - The students interact with the computer through text form. The computer responds to the learners questions based on the stored answers in its memory. Some computers respond even to spoken words and then reply. The learner gets immediate feedback about his/her response.

Simulation and Gaming – Effective learning is made possible by providing exercises which specifically designed to present vital real life activities with the essence of real situations without hazards, costs or tie constraints. It provides simulation learning situation which is not possible via direct experience. For example, eruption of volcano, germination of seeds could be better understood by simulation. Organised social simulations are called gaming. To train in psychomotor skills such as aircraft flying, driving car, weapon operation simulation games are utilized.
Browsing – The computers store a lot of information and it could be retrieved by the student whenever he/she is in need of it. Thus it acts as a knowledge box to draw, search and retrieve information anytime and anywhere.

Merits of CAI:

- The study material could be retrieved sequentially and rapidly without error.
- The utilisation of multimedia like animation, graphics, sound and music the learner is interested and motivated to learn.
- The learner learns and operates in his own interest and pace.
- The computer manages to analyse the responses and respond correctly and enable further progress towards the learning material.
- The presentation of content could take any desired forms like text, diagrams or animations.
- The computer copes with the speed of the learner and his/her needs.
- Quality upgradation could be made in short span of time
- The cost and labour involved in developing a CAI is economical.
- The instruction once developed could be used for any number of students.

Demerits of CAI:

- It is a machine controlled process
- The holistic development of an individual through participation in competitions, peer group, co-curricular activities remains impossible
- CAI concentrates and develops cognitive objectives only.
- There is no scope for the development of virtues like kindness, sympathy, helping others etc.,

In summary, individualized instruction has the potential to improve instruction by varying the pace of instruction, the instructional method, and the content. Most approaches allow for self-pacing, yet variation in method and content is rare, and when it does occur, is usually very limited.

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5.4.3 Ways for the effective presentation with PowerPoint

Robert Faskins and Dennis Austin created Microsoft PowerPoint (simply PowerPoint). It is a presentaion program at a software company named Forethought Inc. that was released on April 20, 1987 initially for Macintosh computers only which offers users many ways to display information from simple presentations to complex multimedia presentations.

PowerPoint became a component of the Microsoft Office suite, offered in 1989 for Macintosh and in 1990 for Windows, which bundled several Microsoft apps. Beginning with PowerPoint 4.0 (1994), PowerPoint was integrated into Microsoft Office development, and adopted shared common components and a converged user interface. PowerPoint's market share was very small at first, prior to introducing a version for Microsoft Windows, but grew rapidly with the growth of Windows and of Office. Since the late 1990s, PowerPoint's worldwide market share of presentation software has been estimated at 95 percent.

PowerPoint is a computer program that allows to create slides for presentation that either contains all points on each slide, or the points can be imported by clicking the mouse. Slides can be made into a slide show that runs automatically of can be advanced using the mouse as points are made in the presentation. It is actually quite user friendly if the individuals is already familiar with the Microsoft Office environment. To create a slide show, simply open the program, and follow the prompts to start creating the presentation. It consists of a number of individual pages or “slides”. The “slide” analogy

is a reference to the slide projector. Slides may contain text, graphics, sound, movies and other objects, which may be arranged freely. PowerPoint, however, facilitates the use of a consistent style in a presentation using a template or "Slide Master".

The ease of use of presentation software can save a lot time for people who otherwise would have used other types of visual aid like hand-drawn or mechanically typeset slides, blackboard or whiteboards, or overhead projection. As PowerPoint's style, animation and multimedia abilities have become more sophisticated, and as the application has generally made it easier to produce presentations. The difference in needs and desires of presenter and audiences has become more noticeable.

The presentation can be printed, displayed live on a computer, or navigated through at the command of the presenter. For larger audiences, the computer display is often projected using a video projector. Slides can also form the basis of webcasts.

PowerPoint provides three types of movements –

i. Entrance, emphasis, and exit of elements on a slide itself are controlled by what PowerPoint calls Custom and Animations.

ii. Transitions, on the other hand, are movements between slides. These can be animated in a variety of ways.

iii. Custom animation can be used to create small story boards by animating pictures to enter, exit or move.

Characteristics of PowerPoint presentation

- PowerPoint communicate ideas, messages, and information to a class.
- With the help of Readymade layouts one can design the slide.
- Transition and custom animation of titles and text can also be set to make it more viewable.
- The age and maturity of the class can be set according to the Timer of times.
- Can add graphics, videos and sound in the slide.
- A clip art gallery includes images, pictures, video which can be inserted into a slide.
- The attractive and appealing of each slide can be set through transition and custom animation.

Advantages of PowerPoint presentation to a teacher

- In recent times, PowerPoint is the most effective medium of instruction in the classroom teaching learning.
- PowerPoint allows the teacher to arrange the pictures and charts systematically according to the topics.

- Creates interest and arouses curiosity in the students
- Used alternative to every teaching-aid or audio-visual aid that is used in a normal classroom.
- The fatigue experienced by the students can be avoided by colorfulness, animation and transition of slides.
- The seating arrangement of the students in the class cannot be disturbed.
- It is very useful for the students of higher classes where difficult scientific concepts have to be studied.
- It is possible to retain eye contact with the students during the presentation.
- It is possible to reproduce very complex drawings, sound, pictures and even clips in presentation.
- It is quicker to add information on slides/transparencies than to write it all on a whiteboard.
- It is possible to 'build up' an argument by showing one sentence after another.

Making effective PowerPoint presentations

- Use the slide master feature to create a consistent and simple design template. It is fine to vary the content presentation (i.e., bulleted list, 2-column text, text & image), but be consistent with other elements such as font, colours, and background.
- Avoid the use of flashy transitions such as text fly-ins. These features may seem impressive at first, but are distracting and get old quickly.
- Overuse of special effects such as animation and sounds may make your presentation "cutesy" and could negatively impact your credibility.
- Good quality images that reinforce and complement your message. Ensure that your image maintains its impact and resolution when projected on a larger screen.
- Limit the number of slides. Presenters who constantly "flip" to the next slide are likely to lose their audience. A good rule of thumb is one slide per minute.
- Learn to navigate your presentation in a non-linear fashion. PowerPoint allows the presenter to jump ahead or back without having to page through all the interim slides. Know how to and practice moving forward AND backward within your presentation. Audiences often ask to see the previous screen again.
- Have a Plan B in the event of technical difficulties. Remember that transparencies and handouts will not show animation or other special effects.
- Practice with someone who has never seen your presentation. Ask them for honest feedback about colours, content, and any effects or graphical images you've included.

- Not to read from your slides. The content of your slides is for the audience, not for the presenter. Not to speak to your slides. Many presenters face the direction of their presentation rather than their audience.
- Not to apologize for anything in your presentation. If you believe something will be hard to read or understand, don't use it.
- When possible, run your presentation from the hard disk rather than an external memory device.

The seven Don'ts of PowerPoint presentations

It's not surprising, PowerPoint slideshows have become the norm for visuals in most business presentations. Slideshows are quick to produce, easy to update and effective to inject visual interest into the presentation. However, slideshows can also spell disaster even for experienced presenters. The key to success is to make certain your slide show is a visual aid and not a visual distraction.

For the best results, avoid these common "seven deadly sins" of PowerPoint presentations.

1. *Slide Transitions and Sound Effects:* Transitions and sound effects can become the focus of attention, which is distracted by the audience. Worse yet, when a presentation containing several effects and transitions runs on a computer much slower than the one on which it was created, the results are sluggish, almost comical when viewed. Such gimmicks rarely enhance the message trying to communicate.

2. *Standard Clipart*: PowerPoint is now so widely used the clipart included with it. It shows a lack of creativity and a tired adherence to a standard form. First, make certain that need graphical images to enhance the message. If do, use own scanned photographs or better-quality graphics from companies such as Photo Disc (www.photodisc.com) or Hemera's Photo Objects (www.hemera.com). Screen captures can add realism when presenting information about a Website or computer program. Two popular screen capture programs are Snagit (www.techsmith.com) for Windows and Snapz Pro (www.ambrosiasw.com) for Macintosh. Both are available as shareware.

3. *Presentation Templates:* Templates force to fit the original ideas into someone else's pre-packaged mold. The templates often contain distracting backgrounds and poor colour combinations. Select the good book on Web graphics and apply the same principles to the slides. Create the own distinctive look or use the company logo in a corner of the screen.

4. *Text-Heavy Slides:* Projected slides are a good medium for depicting an idea graphically or providing an overview. Slides are a poor medium for detail and reading. Avoid paragraphs, quotations and even complete sentences. Limit the slides to five lines of text and use words and phrases to make the points. The audience will be able to digest and retain key points more easily.

5. *The "Me" Paradigm*: Presenters often scan a table or graphical image directly from their existing print corporate material and include it in their slide show presentations. The results are almost always sub-optimal. Print visuals are usually meant to be seen from 8-12 inches rather than viewed from several feet. Typically, these images are too small, too detailed and too textual for an effective visual presentation. The same is true for font size; 12 point font is adequate when the text is in front of you. In a slideshow, aim for a minimum of 40 point font.

6. *Reading:* A verbal presentation should focus on interactive speaking and listening, not reading by the speaker or the audience. The demands of spoken and written language differ significantly. Spoken language is shorter, less formal and more direct. Reading text ruins a presentation. A related point has to do with handouts for the audience. One of the goals as a presenter is to capture and hold the audience's attention. If distribute materials before the presentation, audience will be reading the handouts rather than listening. Often, parts of an effective presentation depend on creating suspense to engage the audience. If the audience can read everything going to say, that element is lost.

7. *Faith in Technology:* Never know when an equipment malfunction or incompatible interfaces will force. Be prepared by having a back-up of the presentation on a CD-ROM. Better yet is a compact-flash memory card with an adapter for the PCMCIA slot in the notebook. With it, can still make last-minute changes. It's also a good idea to prepare a few colour transparencies of key slides. In the worst-case scenario, none of the technology works and have no visuals to present, should still be able to give an excellent presentation if focus on the message. Always familiarize with the presentation, practice it and be ready to engage the audience regardless of the technology that is available.

Tips for effective PowerPoint presentations

- Use single sans-serif fonts such as Arial or Helvetica. Avoid serif fonts such as Times New Roman or Palatino because these fonts are sometimes more difficult to read.
- Not to use the font size smaller than 24 point.
- Use the same font for all the headlines.
- Select the font for body copy and another for headlines.
- Bold and different sizes of those fonts for captions and subheadings may be used.
- Add a fourth font for page numbers or as a secondary body font for sidebars.
- Not to use more than four fonts in any one publication.

- Clearly label each screen. Use a larger font (35-45 points) or different colour for the title.
- Use larger fonts to indicate importance.
- Use different colours, sizes and styles (e.g., bold) for impact.
- Avoid italicized fonts as these are difficult to read quickly.
- Avoid long sentences.
- Avoid abbreviations and acronyms.
- Limit punctuation marks.
- No more than 6-8 words per line
- For bullet points, use the 6 x 6 Rule. One thought per line with no more than 6 words per line and no more than 6 lines per slide
- Use dark text on light background or light text on dark background. However, dark backgrounds sometimes make it difficult for some people to read the text.
- Do not use all caps except for titles.
- Put repeating elements (like page numbers) in the same location on each page of a multi-page document.
- To test the font, stand six feet from the monitor and see if one can read the slide.

Design and graphical images

- Use design templates.
- Use single style of dingbat for bullets throughout the page.
- Make images all the same size.
- Use the same border.
- Arrange images vertically or horizontally.
- Use only enough text when using charts or graphical images to explain the chart or graph and clearly label the image.
- Leave empty space around the text and graphical images.
- A graphical image should relate to and enhance the topic of the slide.
- Try to use the same style graphical image throughout the presentation (e.g., cartoon, photographs)
- Repetition of an image reinforces the message.
- Use duplicates of varying sizes, colors, and orientations to multiply the usefulness of a single clip art image.
- Check all images on a projection screen before the actual presentation.
- Avoid noisy animation effects unless it relates directly to the slide.

Colour

- Limit the number of colours on a single screen.
- Bright colours make small objects and thin lines stand out. However, some vibrant colours are difficult to read when projected.
- Not to more than four colours on one chart.
- Check all colours on a projection screen before the actual presentation. Colours may project differently than what appears on the monitor.

General presentation

- Check the spelling and grammar.
- Give a brief overview at the start. Then present the information. Finally review important points.
- It is often more effective to have bulleted points appear one at a time so the audience listens to the presenter rather than reading the screen.
- Use a wireless mouse or pick up the wired mouse so you can move around as you speak.
- If sound effects are used, wait until the sound has finished to speak.
- Do not turn the back on the audience. Try to position the monitor so you can speak from it.

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5.5 Evaluation - Need, Importance and Characteristics

Evaluation is a major component of the educational process, which helps teachers to improve teaching and learning. Educational institutions usually require evaluation data to demonstrate effectiveness to funders and other stakeholders, and to provide a measure of performance for marketing purposes. Educational evaluation is also a professional activity that individual educators need to undertake if they intend to continuously review and enhance the learning they are endeavouring to facilitate.

Educational evaluation is inherently a process of professional judgement. The first principle is that professional judgement is the foundation for evaluation and, as such, is needed to properly understand and use all aspects of evaluation. The measurement of student machine scoring and multiple-choice test items, but even these approaches are based on professional assumptions and values. Whether that judgement occurs in constructing test questions, scoring essays, creating rubrics, grading participation, combining scores, or interpreting standardized test scores, the essence of the process is making professional interpretations and decisions. Understanding this principle helps teachers and administrators realize the importance of their own judgements and those of other in evaluating the quality of evaluation and the meaning of the results.

It is quite important to understand the difference between measurement evidence (differentiating degrees of a trait by description or by assigning scores) and evaluation (interpretation of the description or scores). Essential measurement evidence skills would include the ability to understand and interpret the meaning of descriptive statistical procedures, including variability, correlation, percentiles, standard scores, growth-scale scores, norming and principles of combining scores for grading.

The evaluation influences student motivation and learning. The nature of evaluation influences what is learned and the degree of meaningful engagement by students in the learning process. Evaluation tools should be authentic, with feedback and opportunities for revision to improve rather than simply audit learning; the more general principle understands how different evaluations affect students.

Teachers and administrators need to not only know that there is error in all classroom and standardized evaluation, but also more specifically how reliability is determined and how much error is likely. With so much emphasis today on high-stakes testing for promotion, graduation, teacher and administrator accountability, and school accreditation, it is critical that all educators understand concepts like standard error of measurement reliability coefficients, confidence intervals and standard setting.

Educational evaluation is a continuous process not a periodic exercise. It helps in forming the values of judgement, educational status, or achievement of students. Evaluation in one form or the other is inevitable in teaching-learning, as in all fields of activity of education judgements need to be made. Hence it is education judgements need to be made. Hence, it is desirable that teachers must acquire knowledge and understanding about the various aspects of evaluation and its application in classrooms.

Evaluation is systematic determination of merit, worth, and significance of something or someone using criteria against set of standards. Evaluation often is used to characterize and apprise subjects of interest in a wide range of human enterprises. Different authors have different notions of educational evaluation. These sometimes dissimilar views are due to the varied training and background of the writers in terms of their profession concerned with different aspect of the education process.

5.5.1 Principles of evaluation

1. Evaluation device is selected or developed only after the purposes of evaluation have been carefully defined. The underlying educational objectives have to be first of all identified and defined.
2. Evaluation techniques are selected in terms of the purpose to be served
3. Evaluation is comprehensive; therefor it requires a variety of evaluation techniques.
4. Proper use of evaluation techniques requires an awareness of their strengths and weaknesses.
5. Evaluation is only a means to an end and should not be considered as an end in itself. To gather data blindly about the pupils and then to file the information in the hope that it will someday prove useful is a waste of time and effort.
6. Evaluation is a forward-looking process providing to us guidelines for the future, for improvement, for improvement, for reform and for progress.
7. Evaluation demands an expertise in selecting or constructing tools of data collection, in administering and tests, and in analyzing and interpreting the data.
8. Evaluation goes side by side with planning of education programme, teacher's instruction, student's learning, out coming of behaviour and the overall educational progress.

5.5.2 Approaches to evaluation

Evaluation is a methodological area that is closely related to, but distinguishable form more traditional social research. Evaluation utilizes many of the same methodologies used in traditional social research, but because evaluation takes place within a political and organizational context, it requires group skills, management ability, political dexterity, sensitivity to multiple stakeholders and other skills that social research in general does not rely on as much. Here we introduce the idea of evaluation and some of the major terms and issues in the field.

There are many types of evaluations that do not necessarily result in an assessment of worth or merit-descriptive studies, implementation analyses, and formative evaluations, to name a few. "Better perhaps is a definition that emphasizes the information-processing and feedback functions of evaluation.

Evaluation is a systematic endeavour and both use the deliberately ambiguous term 'object' which could refer to a program, policy, technology, person, need, activity and so on. The latter definition emphasizes acquiring and assessing information rather than assessing worth or merit because all evaluation work involves collecting and sifting through data, making judgement about the validity of the information and of inferences we derive form it, whether or not a assessment of worth or merit results.

The generic goal of most evaluations is to provide "useful feedback" to a variety of audiences including sponsors, donors, client-groups, administrators, staff and other relevant constituencies. Most often, feedback we perceived as "useful" if it aids in

decision- making. but the relationship between an evaluation and its impact is not a simple one – studies that seem critical sometimes fail to influence short-term decisions, and studies that initially seem to have no influence can have a delayed impact when more congenial conditions arise. Despite this, there is board consensus that the major goal of evaluation should be to influence decision-making or policy formulation through the provision of empirically-driven feedback.

There are many different types of evaluations depending on the object being evaluated and the purpose of the evaluation. Perhaps the most important basic distinction in evaluation types is that between formative and summative evaluation. Formative evaluations strengthen or improve the object being evaluated- they help form it by examining the delivery of the programme or technology, the quality of its implementation, and the assessment of the organizational context personnel procedures, inputs, and so on.

Summative evaluations, contrast examine the effects or outcomes of some object - they summaries it by describing what happens subsequent to delivery of the program or technology; assessing whether the object can be said to have caused the outcome; determining the overall impact of the causal factor beyond only the immediate target outcomes; and estimating the relative costs associated with the object.

a) Formative evaluation

Formative evaluation is a type of evaluation which has the purpose of improving programmes. It goes under other names such as developmental evaluation and implementation evaluation. It can be contrasted with other types of evaluation which have other purposes, in particular process evaluation and outcome evaluation. An example of this is its use I instructional design to assess ongoing projects during their construction to implement improvements. Formative evaluation can use any of the techniques which are used in other types of evaluation; surveys, interviews, data collection and experiments.

Formative evaluation developed relatively late in the course of evaluation's emergence as a discipline as a result of growing frustration with an exclusive emphasis on outcome evaluation as they only purpose for evaluation activity. Outcome evaluation looks at the intended or unintended positive or negative consequences of a program policy or organization. While outcome evaluation is useful where it can be done, it is not always the best type of evaluation to undertake. For instance, in many cases it is difficult or even impossible to undertake a outcome evaluation because of either feasibility or cost. In other cases, even where outcome evaluation is feasible and affordable, it may be a number of years before the results of an outcome evaluation become available. As a consequence, attention has turned to using evaluation techniques to maximize the chances that a program will be successful instead of waiting till the final results of a program are available to assess its usefulness. Formative evaluation therefore complements outcome evaluation rather than being an alternative to it.

Formative evaluation has also recently become the recommended method of evaluation in education. In this context, an educator would analyses the performance of a student during the teaching/intervention process and compares this data to the baseline data. There are four visual criteria that can be applied.

i. Change in mean
ii. Change in level or discontinuity of performance
iii. Change in trend or rate of change
iv. Latency of change

Another method of monitoring progress in formative evaluation is use of the number-point rule. In this method, if a certain pre-specified number of data points collected during the intervention are above the goal, then the educators need to consider raising the goal or discontinuing the intervention. If data points vary highly, educators can discuss how to motivate a student to achieve more consistently.

Formative evaluation is used to monitor the learning progress of students during the period of instruction. Its main objective is to provide continuous feedback to both teacher student concerning learning successes and failures while instruction is in process. Feedback to students provides reinforcement of successful learning and identifies the specific learning errors that need correction. Feedback to teacher provides information for modifying instruction and for prescribing group and individual remedial work.

Formative evaluation depends on tests quizzes, homework, classwork, oral questions prepared for each segment of instruction. These are usually mastery tests that provide direct measures of all intended learning out comes of the segment. The tests used for formative evaluation are mostly teacher made. Observational techniques are also useful in monitoring students' progress and identifying learning errors.Since formative evaluation is used for assessing student learning progress during instruction, the result is not used for assigning course grades.

b) Summative evaluation

Summative evaluation refers to the evaluation of the learning and summaries and the development of learners at particular time. After the period of work e.g. a unit for two weeks, the learners sits for the test and assigns a score. The test aims to summarise learning up to that point. The test may also be used for diagnostic assessment to identify any weakness and then build on that using formative assessment.

Summative evaluation is characterized as evaluation of learning and is contrasted with formative evaluation, which is evaluation for learning. It provides information on the product's efficacy (its ability to do what it was designed to do). For example, did the learners learn what they were supposed to learn after using the instructional module? In a sense, it does not bother to evaluate "how they did", but more importantly, by looking at how the leaners performed, it provides information as to whether the product teachers what it is supposed to teach.

Summative evaluation is designed to find out the extent to which the instructional objectives have been achieved usually at the end of a terminal period. It is used primarily for assigning course grade or for certifying student mastery of the intended learning outcomes at the end of particular course programme. The techniques used for summative evaluation are determined; there are external examinations as well as teacher-made tests, training etc. Although the main purpose of summative evaluation is assigning grades, it also provides information for judging the appropriateness of the course objectives and the effectiveness of instruction.

5.5.3 Continuous and Comprehensive Evaluation (CCE)

Education aims at making children capable of becoming responsible, productive and useful members of society. Knowledge skills and attitudes are built through learning experiences and opportunities created for learners in school. It is in the classroom that learners can analyse and evaluate their experiences, learn to doubt, to question to investigate and to think independently.

Continuous and Comprehensive Evaluation (CCE) refers to a system of college-based evaluation of students that covers all aspects of student's development. It is a developmental process of assessment which emphasizes on two fold objectives. These objectives are continuity in evaluation and assessment of broad based learning and behaviourial outcomes on the other. In this scheme, the term `continuous' is meant to emphasise that evaluation of identified aspects of students `growth and development' is a continuous process rather than an event, built into the total teaching-learning process and spread over the entire span of academic session. It means regularity of assessment, frequency of unit testing, diagnosis of learning gaps, use of corrective measures, retesting and for their self-evaluation.

The second term `comprehensive' means that the scheme attempts to cover both the scholastic and the co scholastic aspects of students' growth and development. Since abilities, attitudes and aptitudes can manifest themselves in forms other than the written word, the term refers to application of variety of tools and techniques (both testing and non-testing) and aims at assessing a learner's development in areas of learning like : Knowledge Understanding/Comprehension/Apply/Analyze/Evaluate Creating feedback of evidence to teachers and students. The scheme is thus a curricular initiative, attempting to shift emphasis from testing to holistic learning. It aims at creating good citizens possessing sound health, appropriate skills and desirable qualities besides academic excellence.

Objectives of CCE

1. To help develop cognitive, psychomotor and affective skills
2. To lay emphasis on thought process and de-emphasise memorization
3. To make evaluation an integral part of teaching-learning process
4. To use evaluation for improvement of students achievement and teaching – learning strategies on the basis of regular diagnosis followed by remedial instruction
5. To use evaluation as a quality control devise to maintain desired standard of performance
6. To determine social utility, desirability or effectiveness of a programme and take appropriate decisions about the learner, the process of learning and the learning environment
7. To make the process of teaching and learning a learner-centred activity. Equip the learners to meet the challenges of life with confidence and success
8. To use a variety of ways to collect information about the learner's learning and progress in subjects and cross curricular boundaries
9. To collect information continuously and record the same
10. To give importance to each learner's way of responding and learning and time it takes to do so
11. To report on an ongoing continuous basis and be sensitive to every learner's responses
12. To provide feedback that will lead to positive action and help the learner to do better.

Important functions of CCE

1. It helps the teacher to organize effective teaching strategies.
2. Continuous evaluation helps in regular assessment to the extent and degree of learner's progress (ability and achievement with reference to specific scholastic and co-scholastic areas). Continuous evaluation serves to diagnose weaknesses and permits the teacher to ascertain an individual learner's strengths and weaknesses and her needs.
3. It provides immediate feedback to the teacher, who can then decide whether a particular unit or concept needs re-teaching in the whole class or whether a few individuals are in need of remedial instruction.
4. By continuous evaluation, students can know their strengths and weaknesses. It provides the students a realistic self-assessment of how she studies. It helps a learner to determine the areas of instruction in which more emphasis is required.
5. CCE identifies areas of aptitude and interest. It helps in identifying changes in attitudes, and value systems.
6. It helps in making decisions for the future, regarding choice of subjects, courses and careers.
7. It provides information/reports on the progress of students in scholastic and co-scholastic areas and thus helps in predicting the future successes of the learner.

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5.6 Later Adolescent Psychology

The transition from child to adult takes place more gradually during a period known as adolescence. Adolescences has traditionally been viewed as beginning with the onset of puberty, a rapid spurt in physical growth accompanied by sexual maturation, and as ending when individuals assume the responsibilities associated with adult life marriage, entry into the workforce and so on (Rice, 1992).

5.6.1 Physical development during adolescence

The beginning of adolescence is signalled by a sudden increase in the rate of physical growth. While this growth spurt occurs for both sexes, it starts earlier for girls (at about age 10 or 11) than for boys (about age 12 or 13). Before this spurt, boys and girls are similar in height; in its early phases, girls are often taller than boys; after it is over, males are several inches taller, on average, than females.

This growth spurt is just one aspect of puberty, the period of rapid change during which individuals of both genders reach sexual maturity. During puberty the gonads, or primary sex glands, produce increased levels of sex hormones, and the external sex organs assume their adult form. Girls begin to menstruate and boys start to produce sperm. In addition, both sexes undergo many others shifts relating to sexual maturity. Boys develop facial and chest hair and their voices deepen. Girls' breasts develop, and their hips widen; both sexes develop public hair. There is great individual variability in all these respects. Most girls begin to menstruate by the time they are thirteen variability in all these respects. Most girls begin to menstruate by the time they are thirteen, but for some this process doesn't start until considerably later, and for others it may begin as early as age seven or eight. Most boys begin to produce sperm by the time they are fourteen or fifteen; but again, for some the process may start either earlier or later.

Facial features, too, often change during puberty. Characteristics associated with childhood, such as large eyes, a high forehead, round cheeks, and a small chin, give way to a more adult appearance. Some members of both genders retain relatively childlike facial feature; for females such "baby –faced" appearance can be a plus, because many males find it attractive. Being baby-faced does not confer such advantages on males, however. In fact, recent findings indicate that adolescent males who are baby-faced may attempt to compensate for this by behaving in antisocial ways (e.g., committing crimes).

Gender differences also exist with respect to the effects of early sexual maturation. Early-maturing boys seem to have a definite edge over those who mature later. They are stronger and more athletic and often excel in competitive sports. Partly as a result of these advantages, they tend to be more self-assured and popular and are often chosen for leadership roles. It contrast, early sexual maturation can have negative implications for females. Early-maturing girls are taller than their classmates-frequently taller than boys their own age-and their increased sexual attractiveness may invite unwanted sexual advances from older persons. In short, the timing of puberty can play an important role in adolescents' developing self-identities and so in their later social development.

5.6.2 Cognitive development during Adolescence

Adolescents become capable of logical thought. However, this does not mean that they necessarily demonstrate such thinking. In fact, only about 40 percent of adolescents can solve the kind of problems used by Piaget to test for formal operational thinking. Moreover, if they do show such logical thought, it may be restricted to topics or types of problems with which they have had direct experience.

In addition, adolescents' theory of mind – their understanding of how they and been described as a realist approach to knowledge; they believe that knowledge is a property of the real world and that there are definite facts or truths that can be acquired. In contrast, older children and preadolescents become aware of the fact that experts often disagree; this leads them to develop a relativist approach, which recognizes that different people may interpret the same information in contrasting ways.

Preadolescents go bit farther, adopting a defended realism approach, which recognizes the different between facts and opinions. Yet they continue to believe that there is a set of facts about the world that are completely true, and that differences in opinion stem from differences in available information. Still later, adolescents come to realize that there is no secure basis for knowledge or for making decisions; at this point, they adopt an approach described as dogmatism-skepticism, in which they alternate between blind faith in some authority and doubting everything. Finally, some adolescents, at least, realize that while there are no absolute truths, there are better or worse reasons for holding certain views-an approach described as post skeptical rationalism. This of course, is the kind of thinking democratic societies wish to encourage among their citizens, because only people capable of thinking in this way can make the kind of informed judgments necessary for elections.

In sum, cognitive development does not stop in childhood; on the contrary it continues throughout adolescence and results, ultimately, in more mature modes of thought.

5.6.3 Emotional development during adolescence (The ups and downs of everyday life)

It would be surprising, if the major physical and cognitive changes occurring during adolescence were not accompanied by corresponding changes in social and emotional development.

It is widely believed that adolescents are widely emotional – that they experience huge swings in mood and turbulent outbursts of emotion. Is this belief correct? To a degree, it is. In several studies on this issue, large numbers of teenagers wore beepers and were signalled at random times throughout and entire week. When signalled, they entered their thoughts and feelings in a diary. Results indicated that they showed more frequent and larger swings in mood than those shown by older personal. Moreover, these swings occurred very quickly. Older people also show shifts in mood, but these tend to be less frequent, slower, and smaller in magnitude.

Other widely accepted views about adolescent emotionality, however, do not appear to be correct. For instance, it is often assumed that adolescence is a period of great stress and unhappiness. In fact, most adolescents report feeling quite happy and self-confident, not unhappy or distressed. Moreover, and again contrary to prevailing views, most teenagers report that they enjoy relatively good relations with their parents. They agree with them on basic values, on future plans, and on many others matters. There are some points of friction, of course. Teenagers often disagree with their parents about how they should spend their leisure time and how much money they should have or spend; and to some extent parents and teenagers disagree about sexual behaviour, although the gap is not nearly as large as you might believe. In general, though, teenagers are happier and get along better with their parents than is widely assumed.

Parenting styles and their effects on adolescents

The fact that most adolescents get along well with their parents is, in one sense, surprising; after all, there are growing sources of conflict between parents and children during these years. In particular, parents must come to terms with the fact that their children are turning rapidly into adults, and this means giving them the increasing freedom they seek-at least up to a point. How should parents react to these changes? Growing evidence suggests that while there is no single "best" parenting style, some broad patterns or styles of parenting have more beneficial effects than others.

Two key dimensions seem to underlie differences parenting styles. One has to do with *parental demandingness* - the extent to which parents are strict or controlling. Parents high on this dimension seek to control their children through status and power, and confront them (often angrily) when they do not meet the parents' expectations. A second dimension is that of *parental responsiveness* – the extent to which parents are involved in and supportive of their children's activities. Parents high on this dimension listen actively to their children, respond to their requests, show warmth, and focus on their children's concerns and interests during conversations with them. *Authoritarian*

parents are high in demandingness (Controlling) and low in responsiveness. They establish strict rules for their children show great interest in, and responsiveness to, them. *Permissive parents* are high in responsiveness but low in demandingness. They are warm and responsive, but they set no rules or standards for their children and don't hold them accountable for their actions. Finally, rejecting/neglecting parents are low in both responsiveness and demandingness-they just don't seem to care what children do or what they become.

Not surprisingly, these contrasting styles have strong and lasting effects. Growing evidence suggests that an authoritative style may yield the most beneficial effects: Adolescents whose parents adopt this approach are generally competent both socially and cognitively. That is, they are confident yet friendly and cooperative, and they tend to do well in school. In contrast, adolescents whose parents show a rejecting /neglecting style tend to be lower on both dimensions. Moreover, they often show unsettled patterns of behaviour that can get them into serious trouble. Children whose parents adopt an authoritarian or permissive style tend to fall in between.

5.6.4 Social development (Friendships and the quest for identity)

Important as they are, parents are only part of the total picture in the social development of adolescents. Friendships, primarily with members of their own gender, but also with members of the other gender, become increasingly important. In fact, most adolescents are part of extensive social networks consisting of many friends and acquaintances. Girls tend to have somewhat larger networks tend to become smaller and more inclusive as adolescents grow older.

One motive for forming friendships during adolescence seems to be the developing need to belong – the need to have frequent positive interactions within ongoing relationships. This need strengthens during early adolescence and leads many preteens and teenagers to reject parental influence and to identify with their peers. Thus, they adopt the dress, style of speech, and overall style of their chosen peer group sometimes to the point where parents worry that their offspring have entirely surrendered their unique identity within a few years, however, this tendency subsides, and teenagers begin to conform less and less to their peer group.

Friendships and social success also play an important role in another key aspect of social development during adolescence-the quest for a personal identity. This process is a key element in a famous theory of psychological development proposed by Erikson, a theory well worthy of a closer look.

5.7 Teaching Late Adolescents

Adolescence means 'to emerge' or to achieve 'identity'. The term "adolescence" comes from the Latin word 'adolescere' that means "to grow" or "to grow to maturity". Adolescence is the age when the individual becomes integrated into the society of adults,

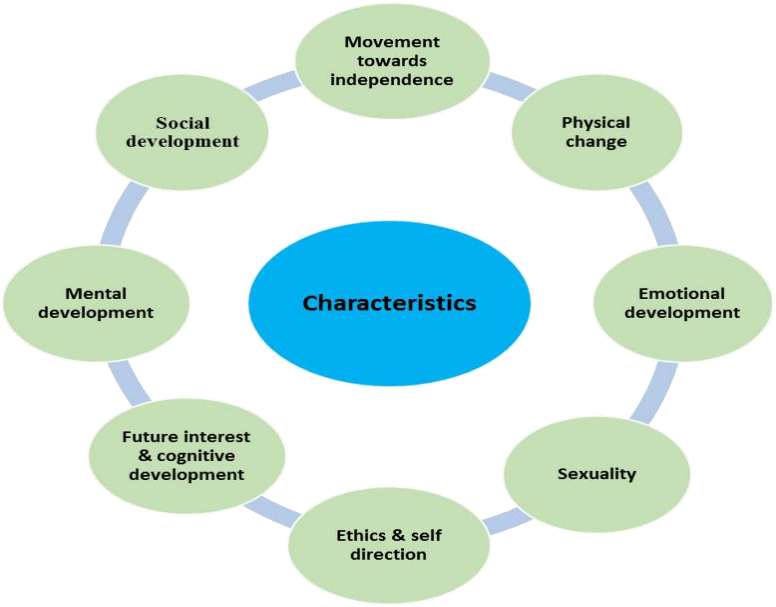
the age when the child no longer feels that he/she is below the level of his/her elders but equal, at least in rights". Adolescence is the period of transition from childhood to adulthood, a stage of major growth and development in which significant physiological, cognitive, psychological and behavioural changes take place and important developmental tasks, such as developing an identity and becoming independent, need to be accomplished. Late adolescence is a period from 16 - 21 years. Adolescence is an exciting and rewarding time of each human life. Adolescence is something dynamic, something that changes from moment to moment. Adolescence is a period of anxiety, a time to adjust with the changes occurring in them during that period, a time to find out the reason for their existence.

Adolescent students vary greatly in their development and readiness for learning. It is a period of stress and storm. Adolescence can be a time of creative energy and vitality, of great zest for living. It can also be a time for self-expression, curiosity, and exploration, a time of discovery and adventure. In late adolescence, career decisions are finally traced. Personality development gets stronger at this period and continues to be in the same for a long time.

Every teacher plays, directly or indirectly an important role for the students' moral and affective development. They play a critical role in judging the developmental stage of each student and help them in developing responsibility, accountability, work, and self-help. Establishing a positive relationship is the basis of practice in all aspects of teaching adolescents. Teacher should not only concentrate on teaching the lesson contents but also see the social, emotional, physical, intellectual, spiritual and moral development of the late adolescents. As a teacher begins his/her teaching career, they bring the strengths of their known subject matter knowledge and enthusiasm for wanting to share that knowledge with students.

5.7.1 Characteristics of late adolescents

The major characteristics of late adolescents are depicted in the following figure.



a) Movement towards independence

- Firmer identity
- Ability to delay gratification
- Ability to think ideas through
- Ability to express ideas in words
- More developed sense of humour
- Stable interests
- Ability to make independent decisions
- Ability to compromise
- Self-reliance
- Greater concern for others

b) Future interests and cognitive development

- More defined work habits
- Higher level of concern for the future
- Thoughts about one's role in life

c) Sexuality

- Concerned with serious relationships
- Clear sexual identity
- Capacities for tender and sensual love

d) Ethics and self-direction

- Capable of useful insight
- Stress on personal dignity and self-esteem
- Ability to set goals and follow through
- Acceptance of social institutions and cultural traditions
- Self-regulation of self esteem

e) Physical changes

- Personality development gets stronger at this period and continues to be in the same for a long time
- Most girls fully developed
- Boys continue to gain height, weight, muscle mass, body hair

f) Emotional development

- Better sense of self
- Becomes gradually more emotionally stable
- Greater concern for others
- Thoughts about their purpose in life
- Pride in one's work
- Greater emotional stability

g) Social development

- Become self-reliant and able to make own decisions
- Feel more comfortable around parents
- Experience interested in and concerned about serious relationships
- Can combine both emotional and physical intimacy in a relationship
- Developed a clear sexual identity

h) Mental development

- Has ability to think new ideas and set goals.
- Has ability to express ideas.
- Has developed a deeper view of life and may become involved in community issues

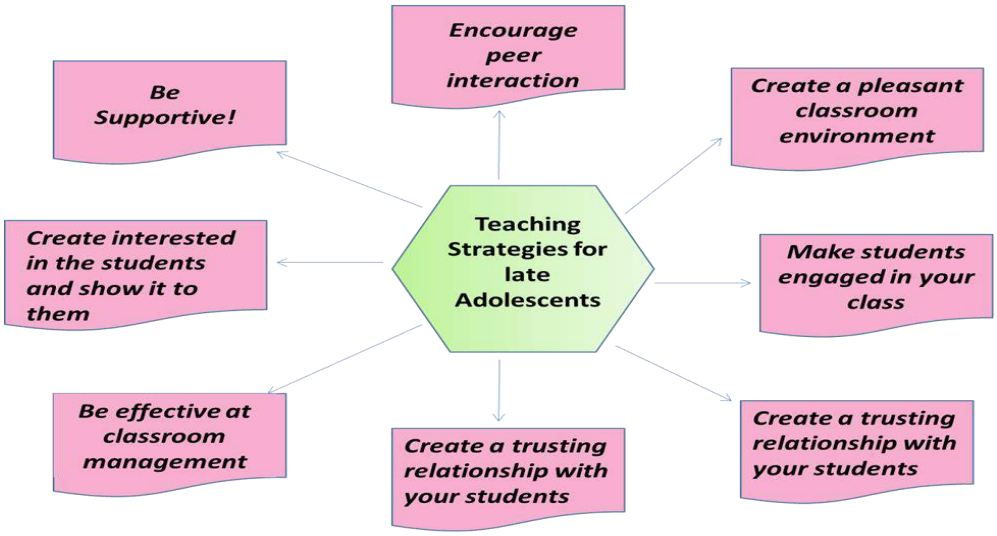
5.7.2 Problems of adolescents

The family problems and foolish activities of theirs make them land up in pain or depression. When they do not find any way to solve their problems, they become stressed and anxious. Apart from that they have many more problems like

- Career decisions and college choices
- Healthy living choices
- Idealistic views versus reality
- Developing personal views and intolerance for opposite opinions
- Weighing parental input
- Increased thoughts about more global concepts such as justice, history, politics, and patriotism
- Develops idealistic views on specific topics or concerns
- Focus thinking on emerging role in adult society
- Being convinced of something with little to no evidence to support it
- Focusing solely on the negative and ignoring the entire positive
- Black and white thinking not seeing the gray
- Expecting others to change to suit his/her needs or desire

5.7.3 Teaching strategies for late adolescents

Effective *teachers* are always on lurk for new and stimulating *teaching strategies* that will keep their students motivated and engaged. Their teaching methods are dominated by learner centred methods. There are a number of teaching strategies existing but the teacher has to use appropriate strategies according to the need of the learners. Differentiated instruction strategies allow teachers to engage each student by accommodating to their specific learning style.



a) Be Supportive!

- Engage students in planning for their own future
- Encourage parental involvement in student learning and find ways for them to be included in the student's support system.
- Assist adolescents in setting their own goals.
- Compliment and praise adolescents for well-thought-out decisions.
- Assist adolescents in re-evaluating poorly made decisions for themselves.
- Include adolescents in discussions about a variety of topics, issues, and current events.
- Encourage adolescents to share ideas and thoughts with the teacher.
- Encourage adolescents to think independently and develop their own ideas
- Offer assistance to students who need help
- Be a positive influence to students, they will respond in a positive way
- Praise good behaviour and academic improvement
- Be an advocate for students in any appropriate way that they may need
- Reach out to students in need. If you suspect they are having problems at home, allow them to open up about it.

b) Encourage peer interaction

- Implement peer review/tutoring systems in your classroom
- Get all students involved in class discussions

- Create activities that require students to rely on each other to succeed.
- Give ample opportunity for and require respectful communication between peers
- Teach students about cultural diversity and tolerance
- Encourage and promote extra-curricular activities like clubs and teams

c) Create a pleasant classroom environment

- Engage students to help design the classroom environment in a way that makes them comfortable
- Let students have a chance to decorate the classroom walls
- Allow students to have a hand in creating the class rules, so everyone is comfortable in it
- Be patient with students so that they feel valued and respected and feel safe enough to share ideas
- Demand that students be respectful of one another and if someone isn't, handle it immediately.
- Accommodate students who need supplemental help or have assistive needs

d) Create interested in the students and show it to them

- Ask students about their time outside of class
- Learn every student's name and use it often!
- Provide opportunities for students to talk about themselves
- Create plans with each student for their learning goals for the year and refer to them regularly till the students meet a goal
- Be involved in your community and show support for student-led organizations

e) Make students engaged in your class

- Use diverge instructional methods to reach all students
- Do not use lectures method in all class periods
- Work in fun activities to keep students from getting bored
- Use technology when possible and appropriate
- Be aware of what is happening in your classroom. Monitor, observe and keep an eye on them.
- Plan effectively and make sure transitions in your instruction are smooth
- Relate new information to popular culture when possible
- Expect students to live up to their potential
- Make sure students can understand before moving on to new concepts

f) Be effective at classroom management

- Apply reasonable and consistent disciplinary policies that are agreed on by parents and students and enforce them fairly
- Communicate clear expectations for behaviour
- Be flexible with instructional strategies to personalize instruction when needed
- Establish a reward system for good behaviour and academic achievement

- Encourage respectful communication, even when viewpoints differ
- Assess students regularly to ensure that they are in line with expectations

g) Create a trusting relationship with your students

- Learn every student's name and use it often!
- Provide students with opportunities throughout the day to express their feelings
- Empower students to communicate openly with school staff by providing them with a mechanism to evaluate their learning and instructors
- Be consistent in class with each student. Don't play favourites.
- Interact more in class, lecture less
- Smile, be friendly
- Be enthusiastic about teaching your subject matter
- Allow students to get to know things about you

h) Model appropriate behaviour

- Correct inaccurate perceptions about "normal" behaviour
- Be respectful of students and other teachers/administrators at all times
- Have patience but be firm
- Have a positive attitude
- Be encouraging of others and promote that attitude to students
- Be understanding, forgiving, and realistic.

5.7.4 Important tips for teaching late adolescents

When the teachers are properly trained, warm and enthusiastic and recognize the hidden talents of the students, they bring out the best in the adolescent which makes them feel very good about themselves. Morals are caught, not taught.

Introduce educational concepts by making meaningful associations to students' lives:

- ✓ Introduce new concepts through a variety of prompts, resources, and activities that connect lesson topics and skills with students' multifaceted lives.
- ✓ All students have some individual knowledge about the topic taught.
- ✓ It is the teacher's creative challenge to continually discover, or pre-assess, for meaningful connections between essential subject matter concepts, associated topics, and the experiences students bring to the classroom.
- ✓ These connections create springboards for learning.

Use movement and peer interactions

- ✓ Increase variety of interactions with each individual student's focus on learning of each and every student.
- ✓ The lessons should incorporate some socio cultural styles of commitment and communication, like cooperative group activities, debates, or presentations.
- ✓ Make the students work in group since students learn more interestingly with their peer group.

- ✓ Engage the students in a five-minute debate about a hot-topic controversy, or ask them to describe in detail what they see in a photo or three-dimensional model or the news.
- ✓ Make the learners demonstrate the concept through drama and read the text concept loudly.
- ✓ As part of building on their prior knowledge, prompt the other students to write whether they agree or disagree with the concept what their peer said and ultimately, more students will be enthusiastic to take a more active role in front of their peers.

Show respect for your students.

- ✓ Learners are from various community, language, and cultural backgrounds and remember that each and every student is unique on his/her own.
- ✓ Affirm students' progress in learning academic concepts, successes in reaching certain goals, and improvement in behaviours that benefit them as learners.
- ✓ At all cost, avoid put-downs and sarcasm in your feedback to students and use neutral, direct language to coach them towards ways to improve.
- ✓ Accept the student's opinion and doubts and clarify it.

Respond and/or give corrective feedback to student work as soon as possible.

- ✓ Make the students work count.
- ✓ Provide and carefully walk through components of rubrics and expectations linked to major assignments, and perhaps even expectations for behaviour and productive participation.
- ✓ Engage students in assessing their current strengths and learning needs related to these productive behaviours.

View your classroom as a place to establish a different community of peers.

- ✓ Teacher's enthusiasm, team-building efforts, meaningful questions, and even what display on the classroom walls can help foster students' interaction with subject matter content and one another, as well as with the teacher.
- ✓ Consider how the lessons and the resources you use encourage all of your students in some way to view themselves as historians, readers and writers of literature, scientists, mathematicians, artists, athletes, or tech-savvy seekers of information.
- ✓ Uplifting or thought-provoking pictures on your walls depicting people from the same socio-cultural backgrounds as your students help to make them feel connected to the learning environment.

Provide assignment calendars, a detailed syllabus, or sample projects.

- ✓ Refer students to publish calendars and your class syllabus at least once per week.

- ✓ For independent, long-term assignments, a routine check-in a couple of times per week to surface key ideas, possible problems, questions, or confusions they might have is also helpful.
- ✓ It should feature at least the titles or components of what you require for the project; the possible layout of these components; plus a separate sheet describing your expectations, types of resources to reference, and the length of written components.

Speak to individual students.

- ✓ When the teacher notices patterns of distraction, absences, lethargy, or other evidence that a student may be performing below (his or her) potential.
- ✓ Speak to the student privately.
- ✓ Discuss with the student your observation about the students past participation that is positive and concerns about problem that appear to be hindering his or her academic progress.
- ✓ Keep privacy so that other staff and students don't know the interaction between you.
- ✓ Find the reason for the distraction and motivate them to solve the problem.
- ✓ If after meeting with the student you notice that not much has changed after a while, you may want to speak to the student again, and suggest that perhaps meeting with a parent or guardian is your next step.

Facilitate a few short, project-based assignments.

- ✓ When equipped with sufficient background knowledge and the interest you've generated about a concept, students' interest can be increased even more through project-based learning.
- ✓ In-class projects could feature their viewpoint on high-interest topics or the real-life application of an academic concept.
- ✓ It's still a good idea to check in with the whole group from time to time during a class period to ask some clarifying questions or offer suggestions to address confusions voiced by students.
- ✓ Encourage students to respectfully suggest how their peers might improve the quality of the visuals, layout, and information they plan to present to others.

Use quick demonstrations and multiple types of visual and auditory resources.

- ✓ Using graphics, three-dimensional models, music, art, appropriate videos, or Web-based resources can enhance students' experience in learning a lesson's key concept.
- ✓ Try using various types of materials or student demonstrations to illustrate an academic concept in a non-linguistic way

5.7.5 Accountability of a good teacher

Dress: Dress properly as you are handling the late adolescents, since the students observe you. They will treat you as they perceive.

Over plan at first: Be organized with your content knowledge. Keep things moving and decrease "down-time." Late adolescent students can find very creative ways to fill the time.

Teacher's passion about a subject: Accustomed to multiple types of input and stimuli found outside of class, most adolescents tend to grow restless in class when attempting to passively concentrate for long periods.

Give directions that are clear: Remember the adolescent brain can only hold seven pieces of information (plus or minus two). Whenever possible, give directions orally and visually – on the board, in PowerPoint, or on a handout. Leave these visuals displayed until the task or activity is finished.

Establish clear expectations: If the teacher wants students to mingle quietly with the groups, give a time frame and stick to it.

Use multiple resources: To avoid students' sleeping on their desks during your presentation, try using multiple resources. The human voice can be very hypnotizing to some people, and others are easy distracted by it, as you know. Bring videos, music, slideshows, toys and games, tell stories, bring in a special guest for a talk.

Sense of humour: The teacher should possess the quality of having sense of humour. Let the teacher makes sure the joke is in general or on them self and not the students. This can really de-escalate a situation if used properly.

Teachers are the adult and the professional: Teacher can be friendly and approachable, but you are not their friend. Be sincere and honest with the students. If the teacher doesn't have an answer to a question, tell the students so – they will respect honesty more than a made up answer. It will also lend more credibility to the other facts you have told them. You can offer to look up the unknown answer and email it to students.

Invest time in knowing who your students are and what they bring: Each of the students brings multidimensional strengths as well as instructional needs. Learning about these dimensions may seem daunting given the number of students you teach. Learn about the multiple dimensions of the students and use that information to plan instruction and programme that increase motivation and engagement. As an individual teacher, you can do something as simple as routinely ask students about their experiences linked to a concept you are about to teach. This signals that the teacher value their perspectives and potential contributions

Respect: The teacher must show respect to the students to earn the students' respect the teacher must know students have many problems. Some time they may perform well and sometime dull.

Fairness: Fairness is an important expected quality with a teacher. The students will watch and see that the teacher is not having partiality. The teacher should not be biased and treat all the students equally despite of their differences.

Relationships: The pressures at school often exist because of the insecurity at home. Of course, the school itself can be a hotbed of tension in several areas; academic, co-curricular and extra-curricular activities, adjustment problems with teachers and peers, relationships with classmates and college-mates. The negative relationship with the parents, teachers, and classmates disturb the adolescents.

Motivation: The educational institution being their second home and the place where they are be moulded for the future responsibility and job. The teacher's motivational behaviour and motivational words play a pivotal role to mould the character of the late adolescents.

Cultural gap: The friction between parents and children, due to cultural gap reaches its peak during adolescence. Parents are realizing that children cannot be controlled any more. They want to be seen and heard.

Stress: All young people today face significant stresses in their lives and many go through their youth without significant problems. However, nearly one in five children and adolescents will have emotional and behavioural disorders at sometimes in their young lives regardless of their geographic region or social economic status. Even by conservative estimates ten percent of child population, has mental disorder with serious associated impairments, including learning problems, health problems and drug abuse, at any given time. At least three percent of school children suffer from serious emotional disturbances viz., severe depression, suicidal thoughts, psychosis and serious attention problems.

Mental health among the adolescents: Mental health experts say that the shift towards the nuclear family living has brought about disorientation because of the absence of emotional roots. It has given rise to many neuroses that are reflected in the growing fragmentation of our society.

Sex education for late adolescents: The adolescent needs to be educated about his/her sexual development and needs to adjust to these changes. The adult sexual behaviour of an adolescent will be determined by the attitudes he/she acquire about sex. The appearance of secondary sex characteristics and the activity of hormones in the body raise many questions in his/her mind.

Teacher as a counsellor who offers advice: Counselling is an act of assistance. When a person is in difficulty and seeks out someone in whom he/she has confidence for advice and guidance, a situation exists for counselling. It requires the special knowledge, skill and competence of a counsellor in order to understand the problem of the other person in the perspective of the other person.

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Mr S. Lenin	5.3.1 – 5.3.4
Ms B. Viji	5.3.5 – 5.3.7
Ms V. Sasikala	5.4.1 – 5.4.2
Dr S.R. Sundaravalli	5.4.3
Ms M. Pradheeba	5.5
Dr A. Veliappan	5.6
Ms D. Chandra Prabha	5.7

Editor

Dr B. William Dharma Raja