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UNIT-3

AIMS AND OBJECTIVES OF TEACHING COMPUTER SCIENCE

AIMS

- Aim is a long term process.
- Aim are psychological and sociological in nature
- Aim are broader and comprehensive.
- Aims are objectives
- Aims bring desirable behavioral changes

AIMS OF TEACHING COMPUTER SCIENCE

- **Utilitarian Aim :** designed to be useful or practical rather than attractive.
- **Intellectual Or Mental Development Aim :** possessing a highly developed intellect
- **Disciplinary Aim :** concerning or enforcing discipline
- **Cultural Aim :** relating to the ideas, customs, and social behaviour of a society
- **Moral Aim:** concerned with the principles of right and wrong behavior , holding or manifesting high principles for proper conduct.
- **Aesthetic Aim:** a set of principles underlying the work of a particular artist or artistic movement.
- **Social Aim :** relating to society or its organization.

OBJECTIVES

- Objectives are short term process.
- Objectives are physiological in nature
- Objectives are narrow.
- Objectives are part of aims.

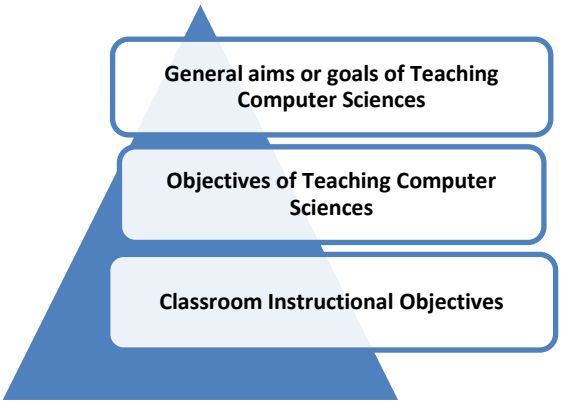
INSTRUCTIONAL OBJECTIVES

- Teaching learning of a particular lesson unit or sub unit of computer sciences.
- A teacher has to place before him some definite and very specific objectives.
- To attained within a specified classroom and resources in hand.
- These so specific classroom teaching-learning objectives, known as instructional objectives.

WHAT IS INSTRUCTIONAL OBJECTIVES?

- Instructional objectives can be defined as a group of statement formulated by the teacher for describing what the pupils are expected to do or will be able to do once the process of classroom instruction is over.

HIERARCHICAL ORDER AIMS AND OBJECTIVES



GENERAL AIMS OR GOALS OF TEACHING COMPUTER SCIENCES

- **Instructional objectives are quite narrow and specific.**
- **They are definite, tangible, precise and functional.**
- **They are desirable learning or teaching outcomes.**
- **It brings in terms of expected pupils behavior or desirable behavioral changes.**

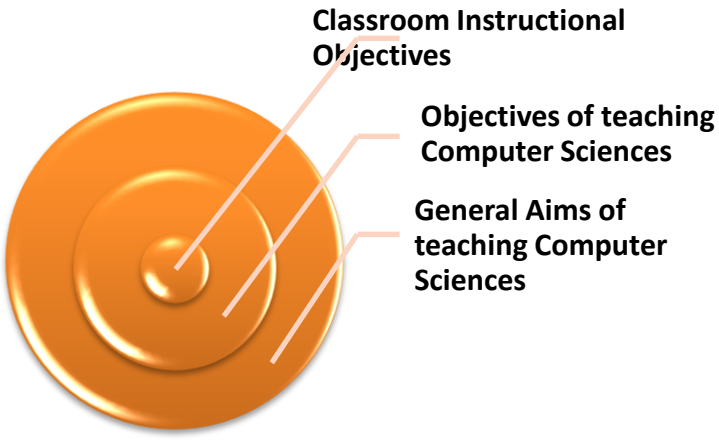
OBJECTIVESOF TEACHING COMPUTER SCIENCES

- **Objectives of teaching Computer Sciences fall midway between goals of aims of teaching Computer Sciences and instructional objectives.**
- **They are more specific and definite than the general aims or goals but less specific and much wider that the classroom instructional objectives.**

CLASSROOM INSTRUCTIONALOBJECTIVES

- **In fact classroom instructional objectives, objectives of teaching Computer Sciences at a particular or entire stage of school education.**
- **The general aims or goals of teaching Computer Sciences represent a hierarchical order.**

A DIAGRAMMATIC VIEW OF AIMS AND OBJECTIVES



TAXONOMY OF EDUCATIONAL AND INSTRUCTIONAL OBJECTIVES

- **Taxonomy means a system of classification.**
- **In this sense taxonomy like Bloom's taxonomy presents a system of classification of the objectives in the similar way as Dewey's decimal system.**
- **The taxonomy of educational and instructional objectives has been worked out on the assumption**
- **That the teaching-learning process may be conceived as an attempt to change the behavior of pupils.**

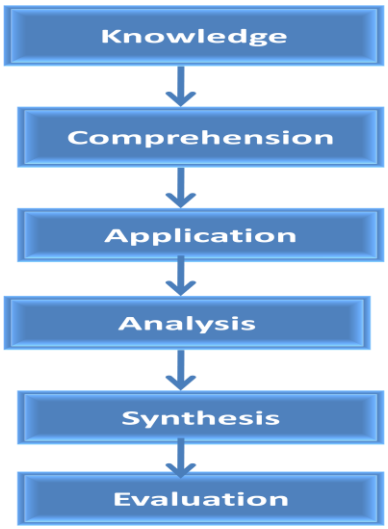
BEHAVIOR IS DIVIDED INTO THREE DOMAINS

- **Cognitive domain has been presented by Dr B.S Bloom 1956**
- **Affective domain presented by Krathwohl in 1964**
- **Psychomotor domain presented by Harrow in 1972 and Simpson in 1966**

COGNITIVE DOMAIN

- **Bloom and his associates have classified the objectives related to cognitive domain into six categories.**
- **They are arranged from the lowest to the highest level of functioning .**

COGNITIVE DOMAIN(KNOWING)



COGNITIVE DOMAIN

1) Knowledge

- **a) Knowledge of Specifics**
  - I. **Knowledge of terminology**
  - II. **Knowledge of specific facts**
- **b) Knowledge of ways and means of dealing with specifics.**
  - I. **Knowledge of conventions**
  - II. **Knowledge of trends and sequences**
  - III. **Knowledge of criteria**
  - IV. **Knowledge of classifications and categories**
- **c) Knowledge of universals and abstractions in a field**
  - I. **Knowledge of principles and generalizations**
  - II. **Knowledge of theories and structures.**

Action verb:Define, measure, label, recall, write recognize, select etc.

Knowledge:

a) **It represents the lowest level of the objectives**

b) **It is belonging to the cognitive domain and primarily aims for the acquisition of the knowledge concerning.**

2) Comprehension

a) **Translation**

b) **Interpretation**

c) **Extrapolation**

Action verb:Change, classify, explain, identify, illustrate, justify, cite examples, discriminate.

Comprehension

a) **It is based upon knowledge.**

b) **If there is no knowledge there will be no comprehension.**

c) **It involves basic understanding of methods, facts, principle or theories.**

3) Application

Action verb:Access, change, choose, conduct, construct, demonstrate, explain, modify, perform, solve,use,discover.

Application

a) **The knowledge is useful only when it is applied.**

b) **The application of idea, concept, principle or theory may be possible when grasped and understood properly.**

c) **It involves both the earlier categories i.e. knowledge and comprehension**

4) Analysis

a) Analysis of elements

b) Analysis of relationship

Action Verb: Analyze, associate, compare, conclude, critize, resolve, select, separate

Analysis

a) **Analysis refers to understanding at higher level.**

b) **It is a complex cognitive process that involves knowledge, comprehension, and application.**

c) **The realization of these objectives is to acquire the necessary skill in drawing inferences, discriminating or elements of a concept, principle or theory.**

5) Synthesis

a) **Production of unique communication**

b) **Production of a plan or a proposed set of operations**

c) **Derivation of a set of set of abstract relations.**

Action verb:Argue, conclude, combine, discuss, generalize, integrate, organize, prove, summarize, synthesize etc.

Synthesis

a) This category is to acquire the necessary ability to combine the different elements or components of an idea, object, concept.

b) It involves the knowledge, comprehension, application as well as analysis.

6) Evaluation

a. Judgment in terms of internal evidence

b. Judgment in terms of external criteria

Action verb:Associate, choose, compare, judge, verify, identify, recognise, relate, select, conclude etc.

Evaluation

a) **This category of objectives aims to develop in the learner to make proper value judgment.**

b) **About what has been acquired by him in the form of knowledge, understanding, application, analysis and synthesis.**

c) **The learner is able to take proper decision in the form of particular idea, object, principle, or theory.**

AFFECTIVE DOMAIN

AFFECTIVE DOMAIN(FEELING)

1) Receiving

a) **Awareness**
b) **Willingness to receive**
c) **Controlled or selected attention**

Action verb:Ask, accept, attend, beware, catch, discover, identify, receive, select etc.

Receiving:

a) **It involves the certain interests, attitudes, value or ideas the learner has to receive.**
b) **The desired intension or willingness for receiving or attending the stimuli is created in the learner.**

2) Responding

a) **Acquiescence in responding**
b) **Willingness to respond**
c) **Satisfaction in response**

Action verb:

Answer, assist, complete, discuss, develop, help, practice, record, stage, write etc.

Responding:

a) **Once the learner is receive the particular ideas, event or thing he must be able to respond to it as actively as possible.**
b) **This involves the obeying, answering, reading, discussing, recording, writing etc.**

3) Valuing

a) **Acceptance of a value**

b) **Preference for a value**

c) **Commitment**

Action verb: Accept, attain, choose, decide, increase, develop, prefer, recognize etc.

Valuing:

a) **Once the learner attends as well as responds to a particular thing, idea or event he can make judgment.**

b) **It is concerned with the development of typical value pattern attitudes etc.**

4) Organization

a) **Conceptualization of a value**

b) **Organization of a value**

Action verb: Add ,associate, change, compare, complete, coordinate, prepare, relate, synthesize, organize etc.

Organization:

a) **It is concerned with the organizing and synthesizing the different value patterns imbibed by him time to time.**

b) **It involves the construction of enduring value structure.**

5) Characterization by a value complex

a) **Generalized set**

b) **Characterization**

Action verb:Demonstrate, develop, face, identify, judge, prove, solve, verify, etc.

Characterization by a value complex

a) **It is the highest level of the affective domain**

b) **The learner is able to imbibe all the essential affective behavior i.e. various interests, attitudes, values, value patterns.**

PSYCHOMOTOR DOMAIN(DOING)

1) Reflex Movements:

a) This is motor responses to the various stimuli in the environment.
b) Examples are based on action the jerking of hands, the closing of eyelid, stretching of the arms etc.
c) These movements represent the lowest level of the psychomotor behavior.

2) Basic fundamental Movements:

a) This movements are not innate or inborn as the reflex movements.
b) These movements in the form of kneeling, creeping, stumbling, walking, jumping, moving **hands, neck etc**

3) Perceptual Abilities:

a) This development of motor abilities related with the perception belongs to this category of objectives.
b) When some meaning is attaches to sensation it is termed as perception.
c) The learner is able to derive useful meaning out of the exposure of their senses to various stimuli in the environment
d) His bodily movements are governed and controlled by his perceptual abilities.

4) Physical Abilities:

a) For an effective motor abilities there is an urgent need of development of physical abilities.
b) This category aims at tolerance to bear and stand against rough weather, to do hard labor to carry the large load, to bend an article, stopping or running an object etc.

5) Skilled Movements:

a) These movements are to be acquired through an organized and systematic learning process.
b) It requires certain drill or practice work on the part of the learner.
c) This movements relate to art of dancing, diving, playing games, skating, typing etc.

6) Non Discursive Communication:

a) This category represents the highest level of the psychomotor behavior.
b) This movements relate with the inner feelings and affective behavior of the learner.
c) This movements relate to facial expression, sketching, painting or acting.

THE FOLLOWING ARE SOME OF THE CHIEF AIMS AND OBJECTIVES OF TEACHING BASIC COMPUTER SCIENCE AT THE PRIMARY LEVEL. THEY ARE

(i) Arousing and maintaining interest
(ii) Developing the habits of observations exploration, classification and a systematic way of thinking
(iii) Developing the child's power of manipulation and so on.

AIMS AND OBJECTIVES AT THE MIDDLE STAGE

In addition to the above, the following aims and objectives should be included at the middle school stage:
(1) Developing the ability to reach generalizations and to apply them for solving everyday problems.
(ii) Understanding the Impact of computer science on our way of life.
(iii) Developing interest in hobbies related to computer's their generations and so on.

AIMS AND OBJECTIVES AT THE HIGHER SECONDARY STAGE

(I) To familiarize the pupil with the world in which he is living and to make him understand the Impact of computer science on society so as to enable him to adjust himself to the environments.
(ii) To develop scientific attitude which Includes
(a) A desire for accurate knowledge,
(b) Belief in cause and effect
(c) Critical thinking
(d) intellectual honesty open mindedness and so on.
(iii) To give the students a historical perspectives, so that they may understand the evolution of computers and development in computers etc.

VALUES OF TEACHING COMPUTER SCIENCE

The real importance of the subject in our modern life can be quite obvious from Its chief values which are described below.

Practical Value

Utilization of the various facts drawn from the study of computer science in modern life has revolutionized our life. To day we cannot find even a single thing which is left untouched by the hands of computer. Uses of computers in transportation and communication have shortened the world.In short, computers have become a part and parcel of our life and without them, it is impossible for us to keep ourselves alive in the modern world.

Social Value

Computers have achieved the best place in the society as well. They form the foundations of so many professions like medicine, Engineers etc. Computers are highly helpful to the society. Lots and lots of social changes have taken place after the introduction computers. The study of computer science develops in us honesty, truthfulness and critical reasoning, objective thinking and a belief in basic facts.

Disciplinary Value

The learning of computer science involves some scientific disciplines and scientific attitudes which are transferable to our later life also. It involves self-expression, creativeness open mindedness, critical thinking and observation suspended judgment which are free from superstitious and false beliefs etc. These good habits if they are once developed in a child can prove beneficial for his later life also.

Cultural Value

The role of computers in the development of modem civilization can be quite obvious just by our comparison with our ancestors. Our present culture and advancement in our standard of living gives a clear cut picture of our cultural development and role of computers in this field for removing old traditional beliefs and superstitions. Computers has proved itself as In best helper in overhauling the consciousness of the universe.So at the end, from the above mentioned values of computer science, we come to this conclusion that computer science has achieved a most important place in our daily life as well as in the modern establishment of the whole world.

COMPUTERS IN EDUCATION

Technology continues to evolve over the years, and integrating it into classrooms as a teaching tool can be very beneficial for students as well as teachers.

Computers in education enable us to:

Teach more effectively.

With computers we can individualize instruction, grant students autonomy, and empower students to learn at their own pace, rather than wait for the teacher's personal Attention. Each learner benefits from having an omnipresent tutor to individually tailor schoolwork.

Reach and teach more students.

Computers and internet access can expand the educational horizons of children in isolated rural communities, children with limited community resources, or those children who are homebound because of disability or illness.

Make the world our classroom.

Students with internet access can directly tap resources in their communities or venture beyond the neighborhoods.

Students can draw from limitless books, articles, pictures and sound clips; follow links to experts or virtual field trips; and participate in real time communications across the globe.

Turn latchkey kids into connected kids.

Too many youngster have no one to talk to and are hesitant to asks questions of adults or teachers.The internet offers a homework helper, a companion at the end of the school day, or a chat room of friends so that no one needs to be home alone.

Get ready for the future.

Technology encourages interdisciplinary and collaborative work, facilitates problem-learning and provides an outlet for students to express their creativity. Students at ease with technology will be assets to future employer.

Activity Based Learning (ABL)

Activity - Based Learning (ABL) Modules (Joyful Learning)

The ABL approach is unique and effective to attract out-of -school children to schools/AIE centres. The teachers who are involved in implementing this method have developed activities for each learning unit which facilitated readiness for learning, instruction, reinforcement and evaluation. ABL has transformed the classrooms into hubs of activities and meaningful learning.

ABL – An innovative approach

The ABL concept has been taken from the Rishi Valley practices. This has been introduced in the Corporation Schools of Chennai with slight modifications. Seeing the success of the scheme this has been introduced in the Panchayat Union Schools.

Initially, a core team was asked to investigate the current practices of classroom process and find out the reasons for the low achievement of children. As the team members had rich exposure in the field of primary education they had strong faith on children, parents, teachers and the government that they would not be responsible for low achievement of children. Then, after close study in some of the schools in the corporation area, the team identified the following as the malady of conventional process.

- Ø Teacher dominates the classroom always.
- Ø Rare use of teaching learning materials.
- Ø Most of the time the lecture method was followed.
- Ø Importance was given to rote learning.
- Ø Teachers are under the assumption that they know everything and children do not know anything.
- Ø Teacher assumes uniform learning pace and uniform level of achievement among children.
- Ø The gap between teacher and children are more.
- Ø Focus is given on teaching rather than learning.
- Ø No scope to cover the loss of learning during the period of absence of children.

- Ø Multigrade and multi level is not addressed.
- Ø Traditional way of evaluation.
- Ø Absence of joyous based extra activities.
- Ø Absence of play way and learning by doing activities.
- Ø Less chance for mutual and self learning.
- Ø Coverage of syllabus by the teacher and not by the children.
- Ø Classroom with less facilities for learning activities.
- Ø Instructional materials neither intensive nor attractive.
- Ø Lack of learning freedom - more of time restricted environment.

To overcome the above malady in teaching learning process a suitable strategy called Activity Based Learning (ABL) was evolved to be implemented in the Chennai Corporation Schools.

Implementation of ABL approach

Implementation of this approach was divided into four phases viz. I) Preparation Capacity Building Phase II) Experimental Phase III) Extension Phase and IV) Evaluation Phase.

Ø During capacity building phase a core team consisting 4 programme coordinators and selected 26 practicing teachers were trained by Rishi Valley Project people three (or) four times repeatedly during 2003 and 2004. The four co-ordinators with I to V and experience in the background along with the teachers developed the module.

- Ø The ABL approach was experimented for one year in selected 13 schools in 10 zones during (2003) the experimental phase.
- Ø Since printed cards were not available at that time photocopies of the same were used in the classrooms.
- Ø During this stage, only classes I & II were integrated. The ultimate idea is to integrate upto class IV.
- Ø As the results were encouraging, this approach was extended to all 264 schools in Chennai Corporation during 2004.

- During this phase, learning cards for classes I & II (4 subjects) and teachers manual were prepared, printed and distributed.
- In the year 2005, class III was integrated with class I & II.
- Workbooks for classes I & II for four subjects were prepared, printed and distributed during 2004-2005.

Training of classroom teachers and other Staff

- Experimental school teachers handling class I & II were trained initially and recurrently with reasonable time in ABL methodology during 2003 and 2004 under capacity building phase.
- Appraisal and review meetings were conducted periodically for smooth conduct of the programme.
- To enhance resource support a team of 100 members ten in each zone / block were trained sufficiently in the ABL methodology (Teacher instruction) who in turn trained all the classroom teachers handling classes I to III and other teachers also who are handling IV to VIII.
- For effective monitoring and supervising of the ABL, all BRTEs, HM's, DEOs, CEOs and ADPCs, Supervisors, AEEOs were trained by core team members in various cycles during 2004-2005.
- Teachers and Headmasters are also trained and oriented by visiting model schools and other schools of appreciable performance and interaction with successful teachers.
- Apart from these, teachers were provided on the spot support by expert team periodically and regularly.
- A resource centre was functioning to offer all time support to teachers at Corporation Middle School, Ranganathan Street, Nungambakkam.

The Process of ABL approach

- Competencies are split into different parts/units and converted into different activities.
- Each part/unit is called a milestone.
- In each subject, the relevant milestones are clustered and linked as chain and this chain of milestones is called LADDER.

- Each milestone has different steps of learning process and each step of learning process is represented by logo.
- Milestones are arranged in a logical sequence from simple to complex and also activities in each milestone.
- To enable the children to organize in groups group cards are used.
- Evaluation is inbuilt in the system. Separate cards / activities are used for this purpose.
- Each child is provided with workbook/worksheet for further reinforcement activities.
- Children's progress are recorded through annual assessment chart.
- Each milestone has different type of activities such as introduction, reinforcement, practice, evaluation, remedial and enrichment activites represented by different logos.

Benefits of ABL approach

- Children learn on their our pace.
- Provision of more time for self-directed learning and teacher directed learning is reduced considerably.
- Group learning, mutual learning and self learning are promoted.
- Teachers teaching time is judiciously distributed among children. Only needy children are addressed by teachers.
- Children's participation in every step is ensured in the process of learning.
- Evaluation is inbuilt in the system it is done without the child knowing it.
- Rote learning is discouraged and almost no scope for rote learning.
- Periodical absence of child from school is properly addressed.
- Classroom transaction is based on child's needs and interests.
- Freedom to child in learning as he chooses his activity.
- Multigrade and multilevel in learning is effectively addressed.
- No child can move to the next higher step of learning unless attains the previous one.

- Ø Sense of achievement boosts child's confidence and morale.
- Ø Attractive cards and activity create interest among children.
- Ø Scope for child's development in creative and communicative skills.
- Ø Children will have a feel of security as they sit in rounds in the groups.
- Ø Children are allowed to move in the classroom as they choose their activity.
- Ø Moreover the distance between the teacher and the child is largely reduced and the teacher acts as a facilitator rather than teacher.

The ABL concept is used in selected regular schools in the State apart from 6,000 AIE centres. The ABL cards which can match the pace of learning have been placed permanently in Block Resource Centres. This ground–breaking approach have been tried out experimentally in a few schools (10 schools per block). After field-testing of the ABL modules and Self Learning Material kits are to be used in other schools. The Directorate of Teacher Education, Research and Training and Directorate of Elementary Education have been involved in implementing this programme including imparting training for the same. Yet another silent revolution in Innovative Education.

LESSON PLANNING

Goods define lesson plan as :

"Outline of the important points of a lesson arranged in the order in which they are to be presented to students by the teacher."

For a successful and effective teaching planning is the first and the most important step.

The teacher should know beforehand what to teach and how to teach . He should have the clear aim of the lesson before him and should plan accordingly.

He should know how he should introduce and present the lesson and the aids he will make use of.

He should also know how to evaluate the lesson in the light of the aim set.

A lesson plan, in the word of Laster B. Stands, "is actually a plan of action. It, therefore includes the working philosophy of the teacher, his knowledge of philosophy, his information about and understanding of his pupils, his comprehension of the objectives of education, his knowledge of the material to be taught, and his abilities to utilize effective materials."

ADVANTAGES OF LESSON PLANNING

It keeps the teacher to be systematic and orderly in the treatment of the subject matter. He proceeds on well-thought of and definite lines and does not follow haphazard and thoughtless teaching.

The teacher sets forth with some definite aims in view and is conscious of the interest, attitudes, etc., that he is to develop in the students through certain activities or some other means.

Planning a lesson give confidence and self-reliance to the teacher which is of great value for successful teaching.

It saves time.

Because the lesson is correlated with the social and physical environments of the students, their interest is maintained throughout the lesson.

STEPS INVOLVED IN LESSON PLANNING HERBARTIAN STEPS

1. Preparation or Introduction
2. Presentation
3. Comparison or Association
4. Generalization
5. Application
6. Recapitulation

1.Preparation:

The teacher must prepare the students to receive new knowledge. Knowledge is to be linked with the previous knowledge of the students. Preparation in fact, means the exploration of the pupil's knowledge, which leads to the aim of the lesson. Teacher's skill lies in leading the pupils to see that their knowledge is incomplete and that to conquer lies before them.

This can be done:

- By testing of the previous knowledge of pupils and introducing the lesson with an explanation.
- By asking questions that may reveal their ignorance, arouse interest and curiosity to learn the new matter.
- Through the use of chart, maps or pictures.

- Through skillful conversation.

It should be noted that this step should not in any case take more than five minutes.

2.Presentation :

Before the presentation of the subject matter , the aim of the lesson should be clearly stated. By this teacher as well as the students are engaged upon a common pursuit.

In the presentation step , the pupils must get some new ideas and pupil should be the active participant in the teaching – learning process. The teacher should try to introduce everything from the learner. A sort of heuristic attitude should prevail the whole teaching.

Questioning should form an important device of this step. Other aids should also be used to make the lesson more interesting and comprehensive. Black board summary should be developed along with.

3.Comparison or Association :

Some examples are given to the students and they are asked to observe carefully and compare them with other set of the examples and facts. This step is important where some definition or some generalization is to be induced from the students.

4.Generalization :

In this step the aim of the lesson is achieved. This step involves reflective thinking because the whole knowledge learnt in preparation is to be systematized which leads to generalization , formulae, rules etc., through comparison or association. This step completes the enquiry by providing the answer to the problem with which it began. Thus , the students get a new knowledge which is ready for me.

5.Application :

At this stage , the students make use of the acquired knowledge in familiar and un familiar situations. In this way , the new knowledge gained by the pupils will become permanent in the minds of the students and will not fade from consciousness soon.

6.Recapitulation :

This is the last step. The understanding and comprehension of the subject-matter taught by the teacher can be tested by putting some suitable questions on the topics to the students. This will also help the teacher to find out whether his method of teaching is effective and successful or not.

Active learning methodology is also a form of activity based learning. It makes all learners to participate in learning. In this method the students involve in reading, writing, speaking, drawing, sharing, expressing the skills and questioning individually and in groups. Active learning involves students in doing things and thinking about what they are doing.

According to Bonwell and Eison students must do more than just listen. They must read, write, discuss and solve problems. They must engage in higher-order thinking tasks. The tasks are analysis, synthesis and evaluation. Students like strategies promoting active learning than traditional lecture method. In active learning, the students are doing something including discovering, processing and applying information.

Many teaching strategies can be employed to actively engage students in the learning process. The activities in ALM improve skills in critical thinking, increase motivation and retention and interpersonal skills. Active learning involves students directly and actively in the learning process. Instead of simply receiving information verbally and visually, the students are receiving and participating and doing. Active learning methodologies require that the student must find opportunities to meaningfully talk, listen, write and read.
MERITS:

- Students are involved in learning.
- More emphasis on developing students' skills.
- Students are involved in higher-order thinking (analysis, synthesis & Evaluation)
- They are engaged in reading, discussing and writing activities.

Active learning shifts the focus from the teacher to the student. Active learning derives from two basic assumptions:

(1) that learning is by nature an active endeavour and

(2) that different people learn in different ways.