1

TECHNIQUES OF TEACHING AND LEARNING

Unit Structure :

1.0 OBJECTIVES

After going through this unit, you should be able:

- To be familiar with the meaning of Self learning techniques in education;
- To understand the Different types of Self learning techniques and their significance in education;
- To be familiar with the meaning and significance of SQ4R method in education;
- To be familiar with the meaning and significance of Seminar and cooperative learning method in education
- To understand the meaning and significance of Peer Tutorial, Brainstorming and Jigsaw learning methods in education;
- To be able to differentiate between Small group learning and Large group learning methods;
- To be familiar with the meaning and significance of Lecture method of learning

- To be familiar with the meaning and significance of Simulation and Role play Methods of learning
- To comprehend the characteristics of Small group learning and Large group learning methods;
- To appreciate the significance of Small group learning and Large group learning methods in education;

'Formal education will make you a living; self-education will make you a fortune'. -Jim Rohn

1.1 INTRODUCTION

Techniques of teaching and learning are various methods and strategies that are used by educators to enhance the learning experience of their students. These techniques help to create an environment that promotes active participation and engagement in the learning process, leading to better retention and comprehension of the material being taught.

1.2 SELF-LEARNING

The increased Rapid development of science technology and information technology has expanded the Horizons of knowledge information and learning. there have been some notable development in the field of teaching and learning in recent years by the influence of Technology. digital resources and internet have provided the information and knowledge to learn. in the new age of learning only the traditional learning methods are not sufficient and there are some non traditional and new methods emerging for the learning. examples For example online learning blended learning and massive open online courses.

Amongst the most prominent learning methods, the process of self-learning is a useful Method of learning through which a learner can enhance is knowledge and skills on his own. Self learning is a modern way of learning and it has proven effective result oriented and convenient for the learners. Nowadays a self-learner can seek the help of several resources, besides the traditional books and text to learn. These resources include e-books, open educational resources (OER), online courses/ e-Learning courses, online tutorials, learning applications and online videos to explore the topic of his choice. Several online learning platforms are there to help the self - learner for learning on their own, these include, Coursera, SWAYAM, NPTEL, Khan Academy, Udemy, Byju's, Tree house, Future learn among the others.

Self-learning is defined as the process of Learning, garnering information, and after processing and retaining it without taking the help of another individual. In self-learning, it is the responsibility of the learner to learn and hold on to the knowledge without the help of another Person. Self-learning is a modern method of learning which helps a learner to learn skills and knowledge, which will be important and relevant to his daily life.

In Self-learning, the knowledge gathering, processing, and retaining is done by an individual, without the help of another person. Any knowledge which a person collects outside of a formal educational system, like using self-study or self-experience, is self- learning. Self- learning allows the learners to assess and enhance knowledge through self-efforts and application with no formal evaluation. It can also help you gain critical skills that may help you advance in your career. Printed books, e-books, Videos, podcasts, experiments, webinars, online/ e-Learning courses are the other formats which are useful for Self- learning.

1.3 PROCESS OF SELF-LEARNING

Self learning process can be divided into the following steps-

- Making clear and realistic Objectives and Goals - A self-learner has to make clear Objectives and Goals in his mind about his Learning. A self-learner has to study and learn independently through intentional learning and thus he needs to be clear in his perception from the beginning.
- Learners need to Assess their Own Readiness to Learn
- Selecting a reliable source of learning- For a self learner, the other step is to find reliable sources of learning and information. Today numerous online and offline sources are available for a self-lander on any of the topics which he can use. the learning source should be reliable in terms of credibility of the information.
- Create a schedule
- Be a curious Learner- A curious person will try hard and big Deep to uncover facts and find information and knowledge which will help him to turn into a good self-learner.
- Review and revise the information on the same day
- Get Motivated and make the subject interesting
- Experiment with different learning tools and formats- A self learner motivate himself early on if he wants to attain his goal, and Develops interest in the subject.
- Evaluate Regularly Your progress of Self Learning.
- Take short breaks regularly
- Apply what you learn
- Connect with the self-learner community
- Use technology for your benefit

1.4 ADVANTAGES OF SELF-LEARNING

- Self learning Gives control over the learning experience
- Self learning Facilitates the individualized learning

- Self learning Builds critical soft skills within learners
- Self learning Creates intrinsic motivators within learners
- Self learning provides the opportunity to learn at his own pace and to the self-learners
- Self learning provides *Learning without restrictions*- Self-learning is not limited to Any particular location for learning and a self-learner can make use of the learning process from anywhere he wants.
- Self learning provides the flexibility of time to learn for the self learners they can study at the time when they feel it comfortable to learn.
- self-learning boosts the self-esteem and self-confidence of a learner because he knows that he has learned everything on his own.
- Self-learning gives Learners the freedom to choose their mode of learning and media of learning i.e. book internet and his own rules to choose for learning.

1.5 IMPORTANCE OF SELF-LEARNING

Self-learning helps a person to understand the basic concept of learning. Self learning emphasize on the fact that everyone has to learn by himself at the end of the day. If a self-learner starts exploring new horizons and goes deeper then it can open further doors of learning. Actively pursuing his learning goals by his own effort gives the necessary confidence to learner to deal with the Problems in learning. eventualities of life by any means. Self-learning prepares the learner for the future where he has to learn and work alone to reach his goal.

Self-learning has the potential to help an individual to excel further in his learning efforts. The following points show the importance of self-learning.

- Self learning helps the learners to gain a diverse set of skills or multiple skills.
- Self learning process is a stress-free learning process as there is no pressure to complete a certain topic within restricted time limits. Instead of it a self-learner manages his own time and learns at is preferable time.
- In self-learning, a learner can explore different learning resources and learning methods.
- Self learning is flexible for learners in terms of time place and pace (speed) of learning.

- Self learning develops curiosity among learners and this curiosity makes their brain more receptive for learning, as the learners stay in touch with their curiosity during self-learning.
- Self learning open the door of new opportunity of learning.

1.6 DIFFERENT TECHNIQUES OF SELF-LEARNING

Reading:

A self-learner read, can take notes and make connections, and learn, you. He can read a book, a blog articles, an e book or any reading material which is available online.

Visual Note Taking:

Visual note-taking is a method of recording information that A learner finds during self learning, it can combine both text and visuals. Visual note-taking Method improves memory and comprehension As this method use images, illustrations, connectors, and structuring. A learner can use this method to quickly note down important information, listening to a podcast, or watching an educational video. He can easily do it while online, with an online visual workspace like Creately, Mind maps, Concept maps Flowcharts and Venn diagrams.

Educational Videos:

Learning with videos is simple and enjoyable for any person. A self learner can utilize their features for his learning. Different video Resources for self learning are listed below,

- YouTube Learning
- TEDEd
- Google Videos
- BBC Bitesize
- National Geographic Education

Online Courses:

Different online platforms around the world Wide Web offer thousands of free and paid online courses that A person can use for his self learning skill improvement and expanding his knowledge. Here are some of the online learning platforms-

- Google Digital Garage
- LinkedIn Learning
- Future learn
- Coursera
- Khan Academy

- edX
- Academic Earth

Learning Apps and Software:

There are Several educational applications that offer online learning with a big range of courses. A few of the online- learning applications for self-learning are listed below:

- Duolingo
- TED Talks
- Dictionary.com
- Amazon Kindle
- Udemy
- SWAYAM (app)
- Duolingo
- Teachable
- Learnworlds
- Wiziq
- Treehouse

1.7 SQ4R

What is SQ4R?

SQ4R is a method of reading and studying textbooks. It's an acronym for: Survey, Question, Read, Respond, Record, and Review. The SQ4R method is an effective method for reading, understanding, and remembering information from your textbooks.

SQ4R Study/Reading Technique:

Designed to help process and increase retention of written information, the SQ4R method consists of 6 steps that help to guide you through your textbook and other written information.

One drawback to this method is that it adds times to what you normally set aside for reading your textbooks. The end benefit is increased understanding of written material and more efficient studying. This can be well worth the learning process.

1. Survey (S):

Scan the textbook or written material to establish its purpose and/or to get the main ideas. This can include skipping the summary at the end of a chapter and reading the main points and looking at the questions. The purpose of this is to get a "big picture" idea of what the material is about. While surveying the material look at:

a. Titles and Headings – these indicate the main topics and concepts

b. Pictures, questions, bold or italicized print – these emphasize important information

c. Introduction and Conclusion – may summarize the topics and the purpose of the material

d. Footnotes – the may provide extra information for your benefit

2. Question (Q):

Before reading the material create questions based on what you observed during the first step. These questions can be based on:

a. Titles and Headings

b. Pictures and bold or italicized print

c. Introduction and Conclusion

d. Footnotes

e. First sentence of a paragraph

For example, the title "The First Law of Thermodynamics" can become "What is the first law of thermodynamics?"

3. Read (R#1):

Actively read the text, meaning do not skim through it or passively glance it over. In this step you are trying to find the answer to your questions. One important point on this step is to make sure you are not trying to find the answer only. This may cause you to miss out on other important information.

If you have a question for each section of the chapter or reading, read only that section then move on to step 4. If not, keep reading until you've read the information relating to your questions.

One last note on this step – do not write down the answer to your question yet. That comes in step 5.

4. Respond (R#2):

After you've read the section, without looking at the text and in your own words,try to answer your question(s) you made. If you can answer them correctly move on to step 5.

If you are unable to answer the question(s) reread that section until you can. If after 2-3 tries you are still not able to answer the question, go on to the next couple of sections and see if it becomes clearer. You may find in this step that you need to change your question. For example, the question "What is the first law of thermodynamics?" for the subtitle "The First Law of Thermodynamics" might not be answered in that

section. Instead, a better question might be "Where is the first law of thermodynamics applied?"

Because subtitles are often ambiguous, the questions you create may not be relevant and that is okay. Change these as needed, but make sure that you really need to first. In other words, do not change the question just so you can answer it.

If you are still unable to answer the question(s) or are having a hard time understanding the section, please contact your professor, a tutor through the Center for Academic Resources, or the Reading & Study Skills Center for more help.

5. Record (R#3):

Once you know the material and are able to answer the question(s), the next step is to record what you have learned. This can be done in multiple ways and is based on your preference:

a. Highlighting the information

b. Make notes in the margins

c. Take notes on a separate piece of paper

d. A combination of these

6. Review (R#4):

Reviewing the material on a consistent basis is an effective study strategy that is often overlooked. Many students will review the material once or twice before an exam, but not on a weekly basis leading up to it.

It is best to review the material weekly as it will help you remember more of the information longer. This means that you are reviewing what you already know versus relearning the material before an exam. This can also have other positive benefits such as decreased study time before an exam and increased confidence because you already know the material.

One recommendation for your weekly reviews is to start from the beginning of the course in each session. Although it may seem like this will add time because there will be more material to review, it will only add a few minutes to each review session. The reason for this is that as the semester progresses the amount of time needed to review older material decreases since you will already know it and only need to skim over it to recall main points

Fig. 1-SQ4R method of Learning

1.8 SMALL GROUP LEARNING

Definition-Small group learning, which is also known as small group tutoring, is a supplementary teaching method, delivered on a consistent basis for a pre-determined period, to support student learning in small groups (approximately 2-5 students). Small group learning reinforces classroom instruction.

Supporting student learning in small groups is an effective strategy. Learning by children is more effective if the teaching process is joyful and activity based and allows for active participation and thinking at their level. This is possible through group work as it involves "students working together in a group small enough so that everyone can participate in a task that has been clearly assigned" (Cohan, 1986). Therefore, group work is a first step towards making learning a joyful experience to children.

1.8.1 Need for small group learning: Small group learning is a highly effective learning and teaching strategy for students. It provides an environment in which differentiated and targeted interventions reinforce the classroom teacher's instruction.

There are two purposes for small grouping in the classroom: individualization of instruction and socialization.

For individualized instruction, teachers often group students homogeneously for the purpose of teaching a specific concept or skill.

For socialization purposes, heterogeneous groups are formed to promote interaction among students.

The grouping of students in small groups can be done in two different ways-

Vertical grouping In it, children of different grades are combined together. For example, you may combine class I students with class II or

class III and so on. Vertical grouping is more useful in peer tutoring and mixed group work where children are randomly assigned.

Horizontal grouping: In this grouping children of the same grade are combined. This type of grouping procedure is considered when children are required to do self-study.

The immediate goals of small group teaching are to get students to talk and to think. The long-term goals are personal growth and competence. These goals may be expressed as following:

1 The development of communication skills.

2 The development of intellectual and professional competencies.

3 The personal growth of students (and perhaps the tutor?).

These three goals are interconnected in practice and each has implications for the role of the tutor in small group teaching.

1.8.2 Seminar: A seminar is a small group teaching strategy (face-to-face or online) where a number of students participate as actively as the teacher, although the teacher may be responsible for the design of the group experience, such as choosing topics and assigning tasks to individual students.

Six or more students can be accommodated in a seminar group (up to 30 students in the same group). Generally, seminars work best when the participating student's numbers are relatively small. Seminars have a very long history, going back at least to the time of Plato. Seminars reflect a strongly constructivist approach to learning and teaching. Their format can vary Considerably. Teacher sets advance work for a selected number of students, and then the selected students present their work Before the entire group, for discussion, criticism and suggestions for improvement.

Seminar as a method of group discussion is similar to symposium. It is usually used with students At Higher educational level i.e. at colleges and universities. It can also be used for higher level students in the schools.

The purpose of seminar is to provide opportunity to students to actively participate and find the answers to questions, or solution to problems using scientific approach of analysis and synthesis of facts observed. In the Seminar method, the class as a whole or in several groups or individual students selects problems and systematically applies the steps of problem solving. In the process, students do lots of literature search and collect facts from primary source when necessary and feasible. The facts are compiled, analyzed, and critically evaluated and summarized under the close supervision and guidance of the teacher. The periodic reports and discussions are held at various phases of problem solving to share the experience and do critical evaluation under the control and direction of the chairman. The chairman usually is the student. The role of the chairman is the same as that of a chairman of symposium. But the teacher needs to lead and control the discussion. She should encourage all students to

participate in discussion. The effectiveness of seminar would depend upon selection and preparation of the topic. The teacher needs to help the students to select, plan and organize, prepare and collect data, analyses and report to the group as students.

Advantages Seminar has the following advantages:

It gives training in self-learning.

It promotes independent thinking.

It promotes team spirit and.co-operative attitude.

Disadvantages:

The main disadvantage like in symposium, it consumes considerable time on the part of students and teacher in planning, organizing, preparing etc; for investigations, library search, analysis, and presentation etc; and thus, can be used for selected problem areas.

1.8.3 Cooperative learning: Typically, teachers randomly or intentionally assign students to groups of 2-4 people and provide some structure (e.g., assign group roles, specify procedures, lead whole class discussions following small-group activities). The focus is on students working together to accomplish a common goal in an interdependent, mutually helpful manner. Each person is "responsible for learning all parts of the material, not just their own piece" (Davidson et al. 2014). Teachers move among groups, providing assistance as needed. Most cooperative learning activities can be completed within one class period, and examples include: think-pair-share, timed pair share, three-step interview, and jigsaw.

Fig. Cooperative learning

https://oxford-review.com/why-some-people-learn-better-using-cooperative-learning-techniques/ , in Blog by Kafilat

1.8.4 Peer tutoring: An effective teacher uses all available resources including the children themselves in peer tutoring. You yourself might have adopted this practice in situations when some day one of your colleagues might be absent and you had to handle more than one grade together at a time. You might have adopted your own techniques to handle this situation. Sometimes you might have taken the help of a monitor to handle the class. Sometimes you might have split the class into various pairs who learn among themselves. Working in pairs or a group of 4-5

children is effective in comprehension and application level activities, in either a seat work or class discussion. For example suppose you have introduced a new concept like multiplication in mathematics to grade four children. After your explanation of basic principles with suitable examples you can split the class into small groups of four children per group. In each group the children may discuss the concept among themselves in their respective group and try to apply it by doing more sums. After, sometime the groups can combine and may discuss the problems, which they faced, with their teacher. This process is simple and promotes high level of students' involvement even in large classes. All these techniques are part of 'peer tuition' procedure. Peer tutoring has been defined by Goodled and Hirst (1999) as "The system of instruction in which learners help each other and learn by teaching". Therefore, it is a method of offering individual (one-on-one) instruction in the regular classroom by using peers (or classmates) to teach their peers. The student who teaches is the tutor and the student being taught is the tutee. Peer tutoring has two specific benefits. First, it provides ample opportunity for individualized instruction, which is effective for all teaching situations especially for skill learning. Second, it can be motivational for both the tutor and the tutee. Helping someone is intrinsically motivating for the tutors (Salvin, 1995), and it also benefits the tutee as he/she is often able to learn more effectively from a fellow student than from the teacher. Among the other advantages of peer tutoring are, that, the tutor models appropriate academic and non-academic behaviour of the tutee and the relationship between the two children (tutor and tutee) offer both of them an opportunity to build social relationships within the classroom. Furthermore, peer tutoring as a group activity helps to reduce the workload of teacher and also facilitates students in their learning. The idea of students helping students is not new. Gurukulas of ancient India, ancient Greeks and Romans utilized the services of brighter students for helping their peers. In the nineteenth century England exercised this method because of higher pupil teacher ratio (400 or 500:1). Teachers coped with this situation first by teaching monitors who worked with younger students. Teachers in America's one room school houses also resolved their problems of handling multiple grades at a time by utilizing the services of elder and more capable students for helping others.

Selection of Peers The peer : Tutoring group is formed by bringing intelligent, average and weak children together. Two primary peer tutoring arrangements are popularly used. Cross-age tutoring is one in which an older child helps younger children. It benefits from the matured tutor's knowledge and skills but is difficult to manage logistically. The tutor's own studies may suffer badly as he/she has to be pulled out of his/her own class to help other students. Same age/grades peer tutoring is another arrangement which can be used in a heterogeneous class in which students are at different levels of learning. Since they are of the same age group, they constitute a cohesive group. Peer tutor is generally selected by the student themselves under the guidance of their teachers. Anyone who is best in a particular field becomes the tutor of the group for that particular activity. In a group situation a high achieving student in one subject may

be selected to help other students. This student in turn may seek the help of other high-achieving students in other subjects in his own area of deficiency. Let us explain it with the help of an example. Suppose student A of your class is very good in Maths but comparatively weak in language. He may tutor his group in Maths but seek help of student B of the same group who is good in language. In this way both students are benefitted by each other. Sometimes a peer tutor may be self-appointed by his co-student. For example, if children are engaged in writing a paragraph in language and one of the chilclren faces difficulty in writing a particular word, he himself can seek help of this costudent who has written the word correctly. Peer group strategy helps in sustaining the interest of children. It also helps in increasing individual attention of children. It helps children to progress at their own pace and seekimmediate guidance whenever required. However, as a teacher you should constantly monitor the progress of children and provide them necessary guidance.

Process of Peer Tutoring: In order to adopt tutoring in your classroom you ought to be well-oriented with the process of peer-tutoring. The process of peer-tutoring includes two phases: Planning and implementation, each having four steps.

Fig: The process of peer-tutoring

Identify the Topics:

Identification of suitable topics for peer tutoring is the first and crucial step. As a teacher you have also to decide the size of a group in peer tutoring, one-to-one pairs or tutoring in small groups of four to six children. The nature and difficulty) level of a topic will determine the size of a group. One-to-one peer tutoring can be used in any subject for whom the topic includes convergent information with clear right or wrong answers. For example, small multiplication, addition, subtraction and

division etc. finding the longitude or latitude of various locations, variety of grammar and spelling, rules and exercise are all appropriate for peer tutoring in small groups. However, topics requiring higher level of divergent thinking and complex in nature may not be more suitable for peer tutoring and need to be handled by the teacher.

Prepare Instructional Materials:

You should prepare specific 'practice' and 'feedback' exercises so that the focussed solution of the topic at hand is possible. Research experiences have shown that student tutors are not very effective in providing initial instruction. Hence, the instructional materials should be properly developed so as to help the teather to monitor the progress.

Assign Children to Pairs:

Arranging children in different pair groups is the next step once the topic and instructional material is finalized. One option is to pair a high achiever with a low achiever and let the high achiever be a tutor. Another option could be reciprocal tutoring where children of comparable ability are grouped together with turns as tutors. In this approach children simply work together no one is formally designated as tutor. It is just studying jointly with each student helping the other wherever such help is needed.

Training Students to be Effective Tutors:

Students just like teachers require some orientation to become effective tutors (Fucheatet.al, 1994, Salvin, 1995). While orienting the student to become effective tutors you should bear the following points in mind.

1. Explain objectives of peer tutoring to students.
2. Encourage tutors to make supportive comments for incorrect answers. Such as 'letus make another attempt', 'let us look at it again', 'let us go step-by-step' and 'see what is the first thing we did..." etc.
3. Encourage a tutor to provide positive feedback to tutees. Therefore, discuss the importance of positive feedback and provide verbal and non verbal examples of various forms of praises like nodding the head, smiling, making positive comments like good, very good etc.
4. Instruct the tutor to encourage thinking both for himself/herself and his/her partners. This makes learning observable, providing a model for the partner and feedback for the tutor.

Implementation of Peer Tutoring Implementation of peer tutoring includes group presentation of the content to children, dividing children into peer groups, assigning the task to various groups, providing worksheets to reinforce the content you have just presented, specifying the time limit they have for the tutoring session and clarifying expectations from them after the tutoring session. You need to constantly keep a watch and monitor the progress of work. You as a teacher is also excepted to ensure that the tutoring is proceeding smoothly. Provide freedom to the groups to

function as they wish and answer content questions only when the tutor is unable to do so. If a tutor pair is not functioning at the expected level, rearrange the pair to the advantage of children.

Advantages of Peer Tutoring:

l Peer tutoring helps in accomplishing individualized instruction.

l If peer tutoring is frequently used, each child may get an opportunity to become a tutor for some activity and for other activities they may be receiving assistance. This provides an opportunity for self-evaluation for children and determine their own capacity to accept or to provide help.

l It encourages self-learning and develops independent study habits. When children make plans for the work at teaching, they became more effective learners themselves.

l It develops a sense of responsibility and accountability among children.

l It also helps in developing mutual respect, socialization and understanding for each other as children, plan and work together. Children take pride in teaching others and assure pride in teaching-learning. As children become involved in teaching other children they begin to feel good about asking for offering each other help. Competitiveness is replaced by cooperation as students work together in learning teams.

Limitations of Peer Tutoring:

Children especially at the primary level do not have the necessary skill to teach other children. Some skills are required for tutoring and therefore, the tutoring process needs to be taught. However, in practice the students are just assigned the task without any prior training, which may have a negative impact on learning. Therefore, as a teacher you must develop a step-by-step process for the tutor to implement. Another problem is that the desired learning behaviour may not be achieved by the children as precisely as visualized by the teacher. To remove this problem you will have to orient the tutor.

1.8.5 Brainstorming: Brainstorming is a group-based learning technique which is useful in developing the creative abilities of the learners. in brainstorming a problem which has a creative or innovative solution is presented by the teachers to the students group for brain storming session.

For example, if a Science teacher asks students to watch a television documentary related to environmental pollution issues. in the next period he gathers and the students and put a question that what steps we can take to overcome or minimize the environmental pollution. The students provide ideas and suggestions like management of Industrial waste etc according to their knowledge thinking and Outlook. These ideas are listed on blackboard by the teacher and the ideas are not judged to be right or wrong. in the last the teacher summarise the ideas by analyzing and arguments to reach a possible solution of the problem.

For example, the social science teacher asks students to watch a television programme on population related issues. In the next period he/she says to students, "we have watched the TV programme and can now find out how human beings can be made into resources. The students come out with a list of suggestions like education, health facilities, etc. The teacher lists them on the blackboard and does not give any judgement on the list. He then summarizes the arguments by emphasizing the role and importance of human resources.

Organization Of a brainstorming session: The teacher can identifies a problem-oriented topic for the class, and ask students to express their ideas and opinions freely on various aspects of this topic. The teacher has assure the students that their expressions will not be criticized or judged or commented negatively. The Students of the class should be encouraged to freely come out And speak with their ideas opinions and suggestions. The teacher notes of all these ideas/ opinions/ and suggestions expressed by students . After the session, the teacher discusses, evaluate, elaborate, integrate the ideas and Summaries them In Sach a wayto reachh a solution and to encourage further thinking among the students on the newer dimension.

brainstorming technique helps students to think creatively and develops the creative thinking ability of students. This method is suitable for problem-oriented themes.

Rules of Brainstorming:

Focus on quantity: It means the greater the number of ideas generated, the greater is the chance of producing a radical and effective solution.

No criticism: In brainstorming 'no criticism' means all ideas are welcome, even if they partly solve the problem or not. It helps the learners to focus on extending or adding or modifying the ideas. *Unusual ideas are welcome*: To get a good and long list of ideas, unusual ideas are welcomed. They may open new ways of thinking and provide better solutions than regular ideas.

Combine and improve ideas: Good ideas can be combined to form a single very good idea, as suggested by the slogan "1+1=3". This approach is assumed to lead to better and more complete ideas than merely generating new ideas alone.

Procedure to conduct the brainstorming: For conducting the brain storming session a teacher can follow the given steps:

- The teacher presents the problem and if needed provides further explanation.
- The teacher invites ideas from the students.
- Every student presents his or her ideas, and the idea is recorded by the teacher.

- The most Appropriate idea is selected from the number of ideas. These Ideas are elaborated to improve its quality.
- The teacher organizes ideas based on the topic goal and encourages discussion. Additional ideas may be generated and categorized. The whole list is reviewed to ensure that everyone understands the ideas.
- Duplicate ideas and Inappropriate ideas/ solutions are removed.
- Finally collecting the best ideas, a possible solution to the problem is generated.

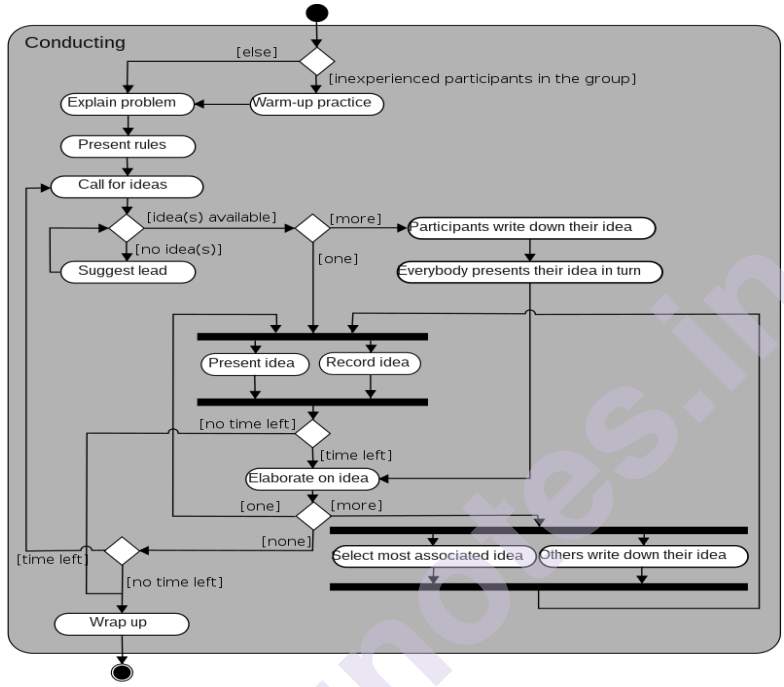


Fig: Process of Brainstorming

By spanish Wikipedia user Gwaur, CC BY-SA 3.0,
https://commons.wikimedia.org/w/index.php?curid=4812400

Brainstorming is an effective Method for generating ideas because of two reasons-

- Brainstorming generates a large quantity of ideas.
- Brainstorming generates a large variety of ideas Which are related and can address different aspects of the problem.

1.8.8 Jigsaw:

Jigsaw teaching approach is a collaborative learning method, which was developed by Elliot Aronson and his pupils at the University of Texas and the University of California in 1970s. The Jigsaw technique is a strategy used for cooperative learning in small groups. in this technique, Students are provided opportunity to become "experts" in a particular subject or topic, and share the knowledge with their fellows. Jigsaw technique promotes both self-learning and peer teaching, as it requires students to

understand the Content or topic deeply and engage themselves in problem solving, discussion, and learning.

The Jigsaw technique Is helpful for the students:

- To develop expertise in a Topic, concept, Lesson or principle.
- To apply the language of the discipline for learning.
- To practice on themselves for self and peer teaching.

In jigsaw learning technique, each student in a group takes responsibility for one chunk of the content, then teaches it to the other group members. Students learn with members from other groups who are assigned similar tasks, and after learning the material, they return to the “home” group and teach the material to their group members. Similarly, as the pieces of a jigsaw puzzle, students fit their individual chunks together to form a complete body of knowledge.

The jigsaw method resembles a jigsaw puzzle in which each student represents a piece of the puzzle, and each student presents the task assigned to him, to complete the puzzle.

The Jigsaw Learning method empowers learners to take charge of their learning, and facilitates retention, peer tutoring skills, communication skills and retention of concepts.

The purpose of Jigsaw Learning method- The purpose of Jigsaw is

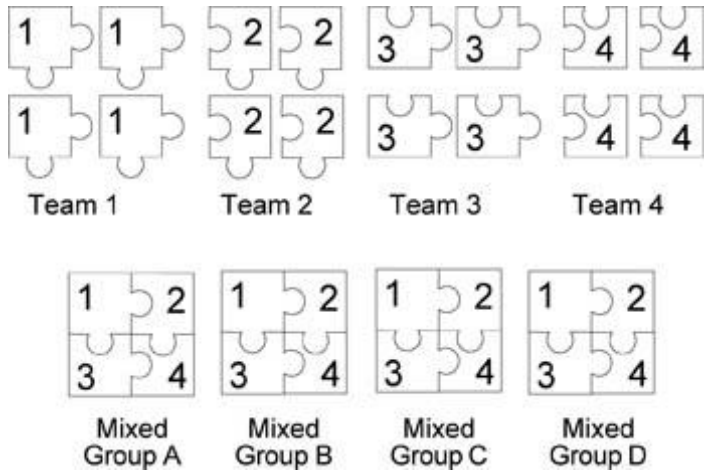
- To develop teamwork and cooperative learning skills within all students.
- To helps in developing deep knowledge of the topic.
- To improve cooperation among the students.
- to enhance the self-learning skills of students.
- to improve the peer teaching and presentation skills of students.

Planning and Preparation for conducting jigsaw learning method:

The teacher selects the content to be taught for the next lecture. The content is divided into subtopics (according to the number of the students in a group). The teacher should prepare clear instructions for students, and she/he should also explain the critical terminology so that students can understand the topic easily.

In Jigsaw learning strategy each student of a "home" group has to specialize in one aspect of a topic (for example, one group studies habitats of rainforest animals, another group studies predators of rainforest animals). Students meet with members from other groups who are assigned the same aspect, and after mastering the material, return to the "home" group and teach the material to their group members. With this strategy, each student in the "home" group serves as a piece of the topic's

puzzle and when they work together as a whole, they create the complete jigsaw puzzle.



- The teacher Prepares several different, related assignments for the class. Each team Formed by the teacher then prepares one of the assignments.
- Once each team is prepared, the class is divided into new groups. Each group will have one team member from each of the previous teams. Each member of the group is responsible for teaching the rest of the group what he/she has learned from his/her team assignment.
- The group then puts all of the pieces together and completes a group task that can only be answered once all of the team pieces are together (That is why the strategy is named as "jigsaw").

Benefits of the Jigsaw learning technique:

- Jigsaw technique provides students the opportunity to teach themselves, instead of having only content presented to them. Thus, jigsaw technique fosters depth of understanding among the students.
- Each student Under this method practices self-teaching, which is an important skills for learning.
- For students to practice in peer teaching, they have to understand the material more deeply than the other students.
- Every student can contribute meaningfully to a class discussion; this experience is difficult to achieve in large-group discussion in class setting. Every student develops his expertise and contributes something important.
- Jigsaw method fosters real Classroom/ peer discussion when each group is asked to discuss a follow-up question after the individual presentations.
- It helps build comprehension.
- It encourages cooperative learning among students.
- It helps improve listening, communication, and problem-solving skills Of the students.

1.9 LARGE GROUP LEARNING

Meaning of large-group learning:

The term Large-group learning/ teaching is used when the teaching learning process involves class sizes of 25 or more students, generally in a big lecture hall.

It also depends on the subject. For example, in some programmes such as medicine, large groups may include several hundred students.

Teaching large groups has several challenges, such as:

- keeping students interested and engaged (and knowing whether they're all paying attention)
- ensuring all students have an equal opportunity to learn
- ensuring that students' work is consistently.
- answering students' questions and giving them feedback outside teaching time.

Large group learning is a convenient way to transmit large amounts of information to a large number of students. Lecturing or Large Group Teaching is one of the oldest forms of teaching. Lectures are an efficient means of transferring knowledge and concepts to large groups. Large group teaching/ learning is aimed to stimulate interest, explain concepts, provide knowledge and direct student learning. However, they should not be regarded as an effective way of teaching skills, changing attitudes or encouraging higher order thinking. In Large group learning, students receive information but have little opportunity to process the new knowledge Received. In Large group learning, there is one or few educators to teach a large number of students i.e. teacher to student ratio is very low. Large group learning methods may include lectures, workshops, conferences, symposia, Laboratory sessions, distance and online learning, teleconferencing, television, DVD/videos and films. In these Learning methods, the teacher and student do not usually interact or very less interaction is there. The knowledge of one teacher is propagated to many students at once, and a large group can be taught.

Following are the methods which are used for large group teaching learning-

1.9.1 Lecture Method:

Historical background Lecturers may be traced back to the Greeks of the fifth century BC. In medieval times lectures were the most common form of teaching in both Christian and Muslim universities. The term 'lecture' was derived from the medieval Latin lectare, to read aloud. The lectures consisted of an oral reading of a text followed by a commentary. The method of reading aloud from a text or script is still used by some lecturers in the arts even though the conventions of written and oral language differ over time and across cultures. In contrast, lecturers in

medicine and surgery have long used the demonstration as part of the lecture. By the nineteenth century, Effective Teaching in Higher Education demonstrations, pictures, and blackboards were used in lectures in science as well as medicine. Today it is still the lecturers in science, engineering, and medicine who are the more active users of audiovisual aids. Lectures are the most common method of teaching in universities throughout the world (Bligh 1980). Their continued use may be attributable in part to tradition and in part to economics. Classes of one thousand or more are not uncommon in countries which are anxious to minimize costs in higher education. In some countries the lecture may be the major source of information, and only the lecturers may have access to texts and articles in the major languages of the world. These simple facts suggest that lectures are likely to be widely used well into the twenty-first century. Hence the importance of exploring ways of making lectures more effective as well as economical in the years ahead.

The preparation of lecture and different skills are shown in the figure below.

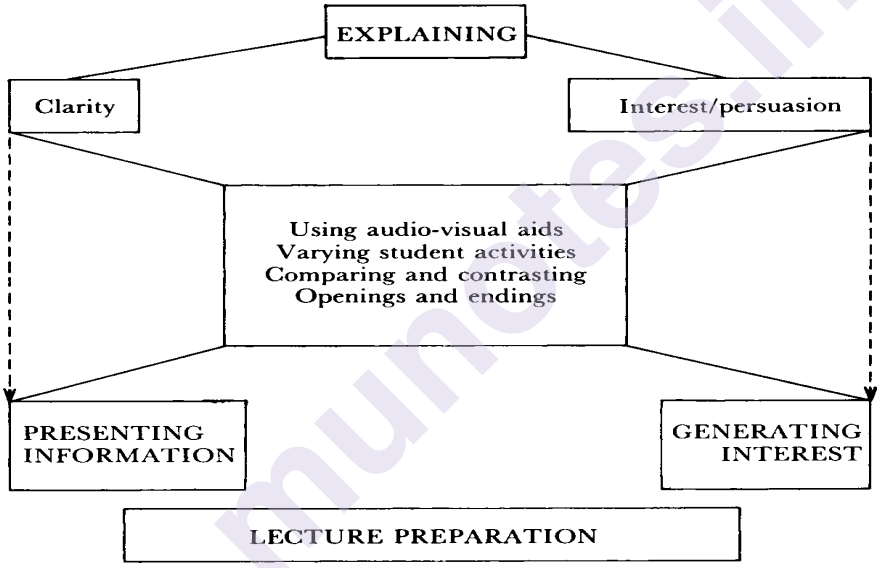


Fig: The Skills Of Lecturing

(source- Effective Teaching In Higher Education George Brown and Madeleine Atkins. ISBN 0203221362. Routledge, 1988, p-20)

The lecture method has been the most widely used Group teaching method among the several methods of teaching, at the secondary and senior secondary levels. The effectiveness of lecture method depends upon the communication skills of the teacher.

Nature of Lecture Method : The lecture method is a popular method due to its simplicity and flexibility. It enables a teacher to teach large sized classes and to cover a greater amount of content during a given time period, as compared to other teaching methods. A teacher can provide an overview of the course content, or the unit, or the topic and its background knowledge, which is necessary to understand the topic. This method also enables a teacher to Deliver more concepts, to Present a large number of

facts, and to clarify principles, terms, and theories, etc.. Which in turn promotes comprehension and their use in problem solving.

A teacher has to prepare a lecture plan/ lesson or topic and deliver a talk or lecture in the classroom.

The teacher decides and controls the speed of content delivery (i.e. pace of the lesson) and Types of illustrations used to clarify terms and concepts, according to his assessment of the learning capabilities of average students of that class. The teacher presents the subject matter without any interruption. The role of the students in lecture method Remains less active, which is limited to listen the lecture, taking notes and ask difficulties. Generally students ask their queries, questions or seek clarifications from the teacher at the end of the lecture. Lecture method is a teacher-centred method of teaching and the teacher plays a more active role in the process of Teaching aur delivering the information. in lecture method, the communication is often unidirectional i.e. one-way communication, Which is directed from the teacher towards the learners. The role of students is relatively passive role, that of listeners generally.

Lecture-based Teaching Skills:

In lecture method, the teacher remain active and speaks most of the time. For deliverying an effective lecture, the teacher has to acquire some skills and some components of the lecture.

In this context an important skills is variation or modulation of voice. Modulation of voice has many dimensions viz., speed of voice, pitch of voice, volume of voice, intonation of voice, etc.. these components, have been explained as follows:

Speed of voice; refers to the rate of vibrations of voice cords during speech.

Volume of voice; refers to the degree of loudness of the speech.

Intonation of voice; refers to the rise and fall of voice in speech caused by variation in pitch.

A teacher can modulate his voice according to that Type, he wants to communicate to his students. A lecture is always more effective when the teacher puts proper stress on various words and phrases.

To Gain the attention of the students during lecture, a teacher can overcome it by acquiring competence in the skill of stimulus variation. Stimulus variation can be achieved through frequent variations in the style of presentation of subject matter, media, interaction pattern, etc. The skill of stimulus variation has eight components.

A brief description of these components is given as follows:

i) **Gestures of the teacher:** Gestures consist of movements of hand, head, eye and facial expressions. These are helpful in making verbal communication effective. A teacher can make use of gestures to draw attention, to emphasize the importance of a particular point or idea, to illustrate feelings, to indicate shapes, sizes and movements of objects.

ii) Movements of the Teacher.

iii) Modulation of voice by the teacher: Appropriate modulation of voice by the teacher is helpful in sustaining students, attention.

iv) Focusing: Focusing behaviors is of three types:

- **Verbal focusing:** To secure attention of the students using statements like 'Look at the diagram/table/figures', 'Listen to me carefully; I am going to describe this important feature', 'Watch what happens when red litmus paper is placed in an alkaline solution', etc.
- **Gestural focusing:** To secures attention of students through gestures. e.g. underlining of important words, statements written on the blackboard, pointing out important features of a diagram; figure and graphic presentation, with a point.
- **Verbal-cum-gestural focusing:**

v) Pausing: It is deliberate silence or pause for a short interval taken by teacher, during lecturing.

vi) Audio-visual switching: For making his lectures interesting and to Maintain student's attention, the teacher may shift from one medium to another.

For example, after delivering a talk for some time, a teacher may show slides or a video.

vii) The skill of explanation: During the course of lecturing the teacher has to make clear the meaning of terms, concepts, situations, etc.

viii)Avoiding undesirable behavior during the lecture: While explaining, the teacher has to avoid certain behaviours like- irrelevant statements, lack of continuity lack of fluency, and inappropriate vocabulary.

ix) Illustration with example While lecturing, the teacher should describe concepts, principles, theories, etc., with the help of Suitable examples,

Limitations of Lecture Method:

Some limitations of the lecture method can be Divided into under two categories - related to the nature of the lecture method, and those which make communication ineffective. The Limitations falling under the first category are:

In the lecture method the student's participation is Very less. This turns the teaching-learning process dull and ineffective.

Because of one-way communication, this method makes students only passive listeners and does not encourage students to become and explorative.

It makes students dependent upon the teacher and his notes.

This method Has limitations to obtain feedback from students on the effectiveness of teaching.

The defects of the lecture method Due to Ineffective communication are:

- Poor command over language;
- Providing too many facts without linking them properly to a concept, generalization. theory, etc.;
- Use of ambiguous words;
- Poorly structured lecture:
- Lack of logical and psychological sequence in the various parts of the lesson;
- Use of monotonous voice during lecture; and Distracting mannerism. For example, very frequent use of phrases like 'You see', 'O.K.', 'I mean', etc., distracts the student's attention from the learning process.

steps for delivering an effective lecture: To bring improvement in the use of the lecture method, the following suggestions can be useful:

Success in lecturing depends on its appropriate planning. It is, therefore, essential that the lecture be planned properly.

Before planning the lesson, the teacher should try to collect as much information as possible about the entry level behaviour of the students. Enhy level behaviour refers to the amount of knowledge and skills, experiences, attitudes, aptitude, competence in language, etc. that the students possess. This background information helps the teacher in farming appropriate instructional objectives, selection of content, teaching - aids and proper structuring of the lecture.

Effectiveness of a lecture increases if it is properly structured Structure of the lecture relates to the arrangement of the key concepts points to be dealt with.

Classification of lectures:

Brown classifies a lecture into five main types. A brief description of each is given below:

i) **The classical lecture:** A classical lecture is divided into broad sections. Each section is further divided into sub-sections, which in turn are divided into smaller segments. Each sub-section contains a key point to be explained and illustrated.

ii) **The prablem-centred lecture:** This lecture is structured around problems. In it, the teacher first makes the problem clear and identifies the issues and related components of the problem. For arriving at the solution each issue isthoroughlyy examined by the teacher.

iii) **The sequential lecture:** These lectures consist of arranging the subject matter in a sequential form leading usually to a conclusion. This type of lecture is used in teaching almost all subjects. The teacher may sequence the subject matter in a logical or psychological order. While

iv) **The comparative lectu**re**:** The comparative lecture is based on comparison of similarities and dissimilarities of different ideas, views, characteristics, etc.. on some criteria. Such a lecture can be applied to different subjects such as Economics, History. Literature, etc.

v) **The thesis lecture:** This lecture begins by presenting a proposition. This is followed by presentation of a wide range of evidence and arguments that support or reject the assertion. Towards the end the evidence and arguments are summarized and conclusions are drawn.

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".

planning 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 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.

Types of Lectures : P lectures may be categorized in terms of the level of student interaction, the classification of content, and the medium by which information is disseminated.

Categorized by Levels of Student Interaction:

- **Formal lecture:** The lecturer delivers a well-organized, tightly constructed, and highly polished presentation. This type of lecture works well for teaching large groups of students and has been popularized by outlets such as TED Talks and, recently, massive open online courses (MOOCs), such as those offered through Coursera, SWAYAM or EdX.
- **Socratic lecture:** This type of lecture typically follows a reading assignment to give students a baseline of knowledge, it is structured around a series of carefully sequenced questions.
- **Semi-formal lecture:** This is the most common type of lecture. It is some. similar to the formal lecture, the semiformal lecture is less elaborate in form and production. The lecturer entertains student questions during the presentation of material.
- **Lecture-discussion:** This type of lecture encourages greater student participation. The instructor presents the content, but he or she stops frequently to ask students questions or to request that students read their prepared materials. The direction of interaction can occur in one of three ways:

  (1) instructor to class,

  (2) instructor to individual student, or

  (3) individual student to instructor.

- **Interactive lecture:** In this version of lecturing, the instructor uses mini-lectures about 20 minutes long, and involves students in a range of brief content-related activities in between. Interaction may occur between instructor and students or between and among students.

Tips for Better learning from lectures:

Before the lecture:

prepare for lectures - find out what is in the books on the subject so that you are aware of what you do not need to note in the lecture.

Form an opinion about the subject of the lecture Set yourself questions and leave spaces to have these answered during the lecture

During the lecture:

listen to 'make sense' rather than to make notes listen for 'signposts' about what is coming next or for summaries of key points listen for answers to questions you set in advance write yourself questions so you can trace answers and information after the lecture make brief notes of essential points

After the lecture:

read your notes and fill in any gaps discuss the lecture with other people consider how the lecture changed or developed your opinions of the subject label and file your notes.

Unit end Question While lecturing to a large-sized class, what steps would you take to make it effective?

1.9.2 SIMULATION

Simulated Method of Teaching

1) Meaning of Simulation

Simulation may be described as an artificial condition (situation) resembling the real and is used for teaching and learning various skills before these are performed in actual situation correctly. In nursing, there are a variety of skills which are learnt on dummy (imitation of human) or mannequin before these are performed on human being. It follows all the characteristics and principles of demonstration method of teaching in live setting.

2) Merits of Simulation

i) It builds up confidence.

ii) It enables to learn directly from experience.

iii) It provides feed back to the learners on the consequences of actions and decision made.

iv) It promotes critical thinking.

v) In enables individual to empathize with the real-life situations.

3) Limitations of Simulation

i) It attempts to portray real situation as simple but which is not so.

ii) Simulated dummies are expensive.

1.9.3 ROLE PLAY METHOD

Role Play Method:

The role play is another student centered method of teaching. Roles are enacted in clearly defined social situations.

1) Definition and Meaning:

"Role play is defined as the spontaneous acting of roles in the context of clearly defined social situation(s) by two or more persons for subsequent discussions by the whole class". The role play is the medium to express one's opinion and feelings about certain social situation, what people can think, feel and why do they behave and what can be done to handle the situations through presentation and discussion in the group. This method thus, can generate data about human behaviour and human relations which are not available by traditional methods. For example, student can do role play on nursing procedure, interpersonal relationships and problems, social issues like large family, infertility problems, drug abuse, gender sensitivity etc; guidance and counselling, interview technique etc. This method permits teachers to evaluate their understanding of such issues and related concents. This method is enioved both bv the teachers and students.

Advantages:

Develops skill in leadership, interviewing and social interaction, e.g., how to lead a discussion, how to be a member of team responsible for patient care. Provides an opportunity for the student to put herself in another's place and to become more sensitive to another's feelings. Develops skills in group problem - solving. It helps the student in identifying critical issues and to come to neutral agreement. Develops the ability to observe and analyse situations, e.g., the problem of mothers not bringing the children for immunization, care of the child with diarrhea etc. Gives an opportunity to the student to practice selected behaviour in a real life situation without the stress of making a mistake. 3) Procedure There are three phases of the role play. These are (i) planning and pre-discussion, (ii) presentation (role playing), and (iii) post discussion and evaluation. The steps are as under: Planning and Pre-discussion Define the specific problem and establish the situation (writing out the scene/ script). Ask the students to volunteer for acting in the role of the different characters. Presentation Brief the actors and spectators and then make them stage the situation. Continue until enough has been acted out to make the desired discussion possible. Post Discussion and Evaluation Analyse and discuss the behaviour of actors. Clarify mistakes and &isconceptions. . Add new relevant point(s) to the subject matter. Sum up the role play theme.

Teaching-Learning Meth A point is to be noted when role playing is used as a method of teaching, i.e., the play itself should be brief with most of the time spent on the subsequent discussion. Encourage the students watching the role play to take the notes during the performance in order to have fruitful discussion later.

1.10 STUDY QUESTIONS

1. Write the importance of SQ4R learning method?
2. Any two advantages of brainstorming?
3. Two Steps for making a lecture effective?

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2

SUPPORT MEDIA FOR COMMUNICATION

Unit Structure :

2.0 INTRODUCTION

Making presentations lively, active, and memorable for learners is a typical goal of professionals. The most efficient way to accomplish this goal is to teach skills and communicate knowledge using audiovisual aids. By effectively communicating knowledge and imparting skills, audio visual aids directly improve the effectiveness of learning.

Instructional material also refers to audio-visual aids. Audio literally means "hearing," whereas "visual" refers to what is discovered through sight. Thus, "Audio Visual Aids" or instructional material refers to any such tools that aim to make the knowledge understandable to us through our senses. Through the use of the hearing and seeing senses, all of this instructional content makes the learning scenarios as real as possible. Therefore, audio visual content includes any tool that can be utilised to enhance learning by making it more real-world, dynamic, and concrete.

Our senses help us to learn. The avenues of knowledge are the senses. We can understand our surroundings thanks to all of our senses. The majority of the information we learn comes from

2.1 OBJECTIVES

After studying this Unit you will be able to:

- Explain the concept of Support Media for Communication
- Describe Educational Media and Media Psychology;
- Describe Dale's cone of experience
- Classify support media, with examples
- Describe important support medias; and
- Select support media for various occasions.
- Demonstrate the use of flash cards, maps , models and charts.

2.2 MEANING AND PSYCHOLOGICAL BASES

2.2.1 Meaning and Psychological Bases:

The most widely used form of communication is the media. Just because of the media, the term "global village" has been spread around the world. You cannot ignore the role of media in establishing a nation because the media is such a big part of our lives, they help to raise awareness of and discussion about social issues. Media's benefits aids in increasing global awareness. brings people from around the world together Low-cost method of communication. People are aware of good and wrong. aids in analysis and research. People's amusement Advertising has been made incredibly simple

The term "educational media" describes forms of media that disseminate information for educational purposes. They are typically used only for

teaching and learning. The most widespread aspects of contemporary life are the mainstream media. They educate, amuse, enrage, and entertain, but they seldom ever leave someone unaffected. A library or an encyclopedia can readily be compared to newspapers, magazines, books, the Internet, records, radio, and television because they all provide readers with the chance to expand their knowledge and promote self-education. Access to media is essential from a pedagogical perspective because of the range of themes and topics they cover, which makes mass media engaging and inspiring for students to use.

2.2.2 Educational Media and Media Psychology:

The term "educational media" describes forms of media that disseminate information for educational purposes. They are typically used only for teaching and learning. The most widespread aspects of contemporary life are the mainstream media. They educate, amuse, enrage, and entertain, but they seldom ever leave someone unaffected. A library or an encyclopedia can readily be compared to newspapers, magazines, books, the Internet, records, radio, and television because they all provide readers with the chance to expand their knowledge and promote self-education. Access to media is essential from a pedagogical perspective because of the range of themes and topics they cover, which makes mass media engaging and inspiring for students to use.

Media Psychology is the study of human behavior, emotions, and cognitions is also known as psychological science. Media psychology is the application of this discipline to all forms of mediated communications and technologies. It considers the full range of activity, including production, consumption, distribution, and impact. Itis a multidisciplinary field that is always evolving and has effects on people, organizations, and society as a whole. We apply it to usability and audience engagement based on fundamental human goals, needs, and motivations, as well as technology design, including augmented and mixed realities, marketing, and brand building, using methodologies like trans media storytelling.

Psychology is the study of the how and why of human behavior, emotion, and thought

Media includes all forms of mediated communications

Media psychology continually evolves as technologies change

2.2.3 Importance of Media Psychology:

Combining an understanding of psychology with a working knowledge of media applications Demand for media psychology is increasing as a result of new technologies. Creators and designers of media for all platforms, from entertainment to business training Technology, interfaces, usability, and content review and assessment Media literacy education initiatives, student assistance, and curriculum integration with technology all help students learn and manage their time.

2.2.4 Use of Media Psychology:

- Create awareness,
- Attract attention, and
- Improve retention (product memory).

Future of Media Psychology:

We must understand how to use media in order to maximize its advantages and reduce its drawbacks because it will only become more pervasive in the years to come.

Media psychologists have a crucial part to play in these developments, and while they shouldn't be afraid to discuss how media may be utilized to improve well-being and prosocial outcomes in both academic and applied sector contexts, they also shouldn't be afraid to do so as it continues to change.

The future is in media psychology. No sector of the economy, profession, nation, or procedure is untouched by the media revolution. Technology and usage promotion tools that can be helpful include: people prosper gathering of communities, communication between nations the opportunities for education and wealth.

Check Your Progress

Explain the role of Media Psychology.

2.3 DALE'S CONE OF EXPERIENCES

Edger Dale often cited as father of modern media in education, introduced the cone of experience idea in 1946. According to their respective positions in the teaching-learning process, the learning experiences are arranged in the cone in a hierarchical fashion. This is a diagram that consists of eleven levels, starting with concrete experiences at the bottom of the cone and progressing to increasingly abstract experiences at the top. The arrangement in the cone is dependent on both the number of senses involved and the concretization to abstraction principle. Although direct, purposeful experience involves more senses than indirect experience, this does not necessarily imply that actual experience is the best method to learn.

2.3.1 What is dale's Cone of Experience:

The cone of experience is a graphic tool used to illustrate how different audio-visual media interact with one another and occupy distinct roles in the learning process.

The cone's usefulness in choosing educational materials and activities is just asapplicable today as it was when Dale invented it.

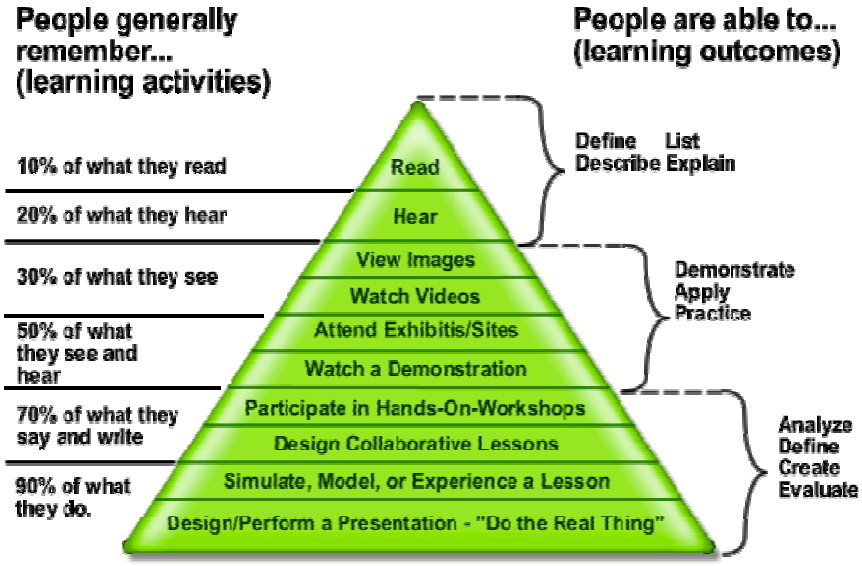

Figure 1. Cone of Learning example from Wikipedia (Jeffrey Anderson)

According on the type of activity they are engaging in, the figure above (fig1) illustrates what pupils will be able to do at each level of the Cone (the learning outcomes they will be able to achieve) (reading, hearing, viewing images, etc.). The numerical data on the left of the image, which represents what people will typically recall, shows that pupils will remember what they do best when they have practical,

hands-on experience in a real-life environment. It is crucial to keep in mind that this does not suggest that reading and listening are not worthwhile educational experiences; rather, it just means that "doing the real thing" might result in the greatest level of information retention.

2.3.2 Principles of the cone of Experiences:

- Audiovisual aids have been categorized and organized by Dr. Edgar Dale in a prototypical form known as the "Cone of Experience.".
- The cone is based on the connections between different educational experiences and usefulness.
- Any intellectual activity relies mostly on sensory interactions to communicate with the outside environment. Even cognitive functions like concentration, thought, conceptualization, imagination, association, and memory have their roots in sensory experiences.
- All of our senses can be used directly.
- Students are more likely to learn from a resource if there are more sensory avenues via which they can interact with it.
- The cone is built around how different educational experiences relate to practicality.

- Any intellectual activity relies mostly on sensory interactions to communicate with the outside environment. Even cognitive functions like concentration, thought, conceptualization, imagination, association, and memory have their roots in sensory experiences. the chance for a student to employ several senses.
- The opportunity for a learner to use a variety of senses.
- Direct experience allows us to use all senses.
- The more sensory channels possible in interacting with a resource, the better the chance that many students can learn from it.
- Learning experiences centered only on the use of verbal symbols are the furthest removed from real life since each degree of cone above its bases takesa student one step further away from real world experiences.
- Since watching a movie involves observation, that is why it is located there onthe cone.
- Contrived experiences are highly interactive and inspire real-world events or activities.
- Dramatized experiences are defined as those experiences in which a student plays a role or engages in an activity.

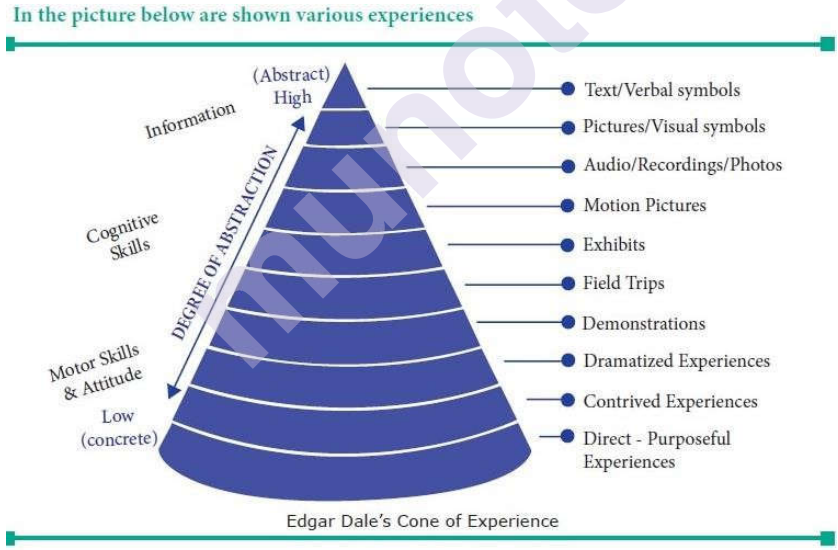

Fig 2 : Dale's Cone of Experiences showing Degree of Abstraction Source: https://www.brainkart.com/article/Teaching-Aids_33524/

The above cone represents the material utilized for audio-visual instructions.

i. **Direct Experiences:** The students get these experiences through field trips, excursions, etc.

ii. **Representative Experiences:** Although less concrete, these kinds of experiences can be quite helpful. Experiences of this nature can be obtained by models, specimens, film strips, radio, etc.

iii. **Verbal and Symbolic Experiences:** These are the learning opportunities that students receive verbally or in writing. These kinds of experiences take place at the conceptual level and are quite abstract. For instance, verbal illustrations. At the early stages of a child's learning, this type of experience cannot be adequately followed, hence at this level, greater focus should be placed on direct and representative experiences.

Summary:

To make the most of the learning opportunities, use a variety of resources and media. To support the learning of abstract concepts, concrete experiences must come first. It is not even desirable to limit oneself to concrete experiences. Limited to the contemporary technology available at the time According to the theory of audiovisual instruction, learning must be made permanent and experiences must be applicable. The argument in favor of the employment of new materials for improving education stems from the fact that verbalistic learning is out of date and that the complexity of the time has made our school curriculum extremely heavy as modern knowledge has advanced significantly. To adapt to the altered circumstances and the trends toward realistic learning, we need new strategies.

Check Your Progress

1. Who has created Cone of Experiences?

2. Use of cone of Experiences in teaching learning process.

2.4 PROJECTED (LCD PROJECTOR) AND NON PROJECTED SUPPORT MEDIA (3- D AND 2-D MODELS - CHARTS, MAPS, FLASHCARDS)

Objects, premises, events, machines, models, or computer programmes with which students interact to develop concepts, practice skills, and then draw inferences from spoken explanations in order to alter their behavior or attitude are referred to as educational media.

Concept and types of Support Media

The term "media" refers to a variety of communication and information-sharing tools. Media can also be described as things or vehicles that carry information between the source and receiver in order to facilitate communication between two parties. For example, language, newspapers, radio, TV, and the internet. In this case, the media aid the learner's sensory organs in comprehending the planned content and thereby enhance the teaching-learning process.

Any method of communication that enables instructor and student involvement and feedback is referred to as educational media. • EM can also be characterized as tools used in classrooms to support instruction and training. Objects, premises, events, machines, models, or computer

programmes that learners interact with to establish concepts, practice skills, and then draw conclusions from verbal explanations in order to modify their behavior or attitude are referred to as instructional media, or EM.

2.4.1 Media Classification:

Media Classification

- There are different ways to classifymedia
  - Print media,
  - non-print media and
  - electronic media

Support Media can be classified in different ways-

Print Media: Books, journals, periodicals, newspapers, workbooks, and textbooks areexamples of print media.

Non-print Media: Projected and non-projected media are examples of non-printmedia.

Electronic media: Electronic media comprises of audio, video, and audio-visual.

Projected and Non-projected media: Projected Media need a light source forprojection. Slides from a projector, for instance. Whereas Non-projected Media that isnot projected: these don't need a light source. They consist of models, prints, charts, 2D and 3D items, as well as other things.

Visual, audio, and audio-visual media

- Audio media: This type of media only transmits sound. Audio cassettes, arecord player etc.
- Visual media can be viewed, as the name implies. TV, computer, whiteboard,etc. and audio-visual media:
- The phrase "audio-visual" refers to educational tools that give pupils both auditory and visual experiences by simultaneously appealing to their hearing and seeing senses. TV, videotapes, and closed-circuit television (CCTV) are afew examples.

EDUCATIONAL MEDIA					
Non Print Media		**Print Media**	**Electronic Media**		
Projected Media	**Non-projected Media**		**Audio Media**	**Visual Media**	**Audio-Visual Media**
Films-8cm,16mm Projector-OHP-Opaque-Slides	Chart-wall Board-Chalk - Flannel _ Bulletin -Models	Books-Texts -Non texts -Journal Newspaper Magazines Posters Handouts	Audiotapes -Cassette -Records -Radio	Calculator Computer Electric Board White Board	Television Video Tapes Cine films

Fig 3: EDUCATIONAL MEDIA CLASSIFICATION

2.4.2 Projected (Lcd Projector) Media:

Projected Media:

Projected media are defined as media forms in which text and still pictures, occasionally printed on translucent film like an overhead transparency or a slide, are expanded and shown on an illuminated screen.

Projected media are a subset of educational resources that must be protected on a screen or wall with a projector machine made just for the job in order to be accessible.

Consequently, projected media are typically a combination of the necessary software and hardware. We must understand that all projected media is intended to be displayed on a screen by means of projectors.

Since they were originally used in schools, projectors have undergone substantial weight, technological, and size changes.

PROJECTOR:

Projector is an optical device that projects images onto a surface, most frequently a projection screen. Newer and more sophisticated projectors than those that merely create a picture using a light source are those that actually extend the image using lasers.

A virtual retinal presentation or retinal projector projects a picture directly into the retina rather than needing an external projection screen.

The most popular kind of projector in use today is a video projector. For instance, video projectors, which are computerized substitutes for slide projectors, have replaced slide and overhead projectors.

In the 1990s and the early 2000s, computerized video projectors replaced them, however some locations still have older, simpler projectors in operation. The most recent advancements in projector technology are handheld devices that display images using lasers or LEDs. It is challenging to study their projections in bright environments.

There are several types of Projectors like DLP projector, LED projector, LCD projector etc.

2.4.3 LCD Projector:

Liquid Crystal Display, also known as LCD, is a widely used projector technology. The same liquid crystal display technology that is used in LCD TVs and monitors is also used in LCD projectors.

A multi-step procedure is used to create the images seen on an LCD projector. Three LCD panels use the primary colors red, green, and blue to display images. Due to the simultaneous presentation of all three colors, the image is totally coloured.

Working of LCD Projector:

In the workings of an LCD projector, three liquid crystal panels are used to create a picture over the course of several steps. A white light beam is directed at three mirrors, each of which is designed to reflect a specific wavelength of light.

For each of the coloured light beams that an LCD panel receives, an electrical signal is received. The display panel receives electrical instructions that tell it how to arrange its pixels to create a picture. The identical image appears on each LCD panel in a different color as a result of the angle at which the light from the source strikes the screens.

The various coloured images are combined into one image using a prism. The image must then be passed via a lens so that it can reflect and be viewed on a projection screen.

Uses of LCD:

- Allows instructors to deliver multimedia content suitable for a range of studentswith various learning preferences.
- Students can take part in interactive, real-time activities.
- Problem-solving exercises encourage the growth of critical thinking abilities.Students exhibit their own work to the class while cooperating in groups.

Advantages of LCD Projector:

- LCD projectors consume less power and deliver a higher-quality image thanDLP projectors.
- LCDs provide images that are more vividly coloured when compared to otherprojection technologies.

- Even in a well-lit area, create stunning and vibrant colors.
- Visuals that are projected using an LCD projector are sharper and moredistinct.

Disadvantages of LCD Projector:

- An LCD projector is difficult to move around.
- As time passes, it fills with lifeless pixels.
- The expense to replace an LCD projector is high.
- They are also prone to becoming worn out.

2.5 NON-PROJECTED MEDIA 3-D AND 2-D MODELS - CHARTS, MAPS, FLASHCARDS)

Non-projected visuals are teaching tools that are utilized without the use of a projector to convey abstract concepts in a more concrete manner. They make it possible for instruction to progress from verbal to more concrete levels.

Non-projected media has the following benefits:

- It is widely available.
- Does not require electricity
- Is suitable for small budgets
- Using these graphic aids doesn't require much artistic talent.
- Can be applied in a variety of ways across all disciplines and levels oftraining.
- Encourages creative expression through storytelling and writing prompts.
- Many of them are capable of being transformed into projected assistance.
- Some of them can be displayed using a projector with opacity.

2.5.1 A Model (3-D and 2-D):

A model is a recognizable, three-dimensional representation of the genuinething; its height, width, and depth are perceived as reality.

Models, which are three dimensional, heighten reality and make learning immediate and relevant.

Models explain the complex and detailed activities in a simplified manner, making comprehension easier. Models highlight the application side of specific principles and rules.

Use of Models

- Models involve the use of all five senses, which enhances learning.
- Models are durable and ultimately work out to be less expensive teachingtools.
- Still, models are simple to construct with the use of discarded items likeempty boxes, pins, clips, nails, and clay.

Charts: A chart is a visual representation that summarizes, compares, contrasts, or provides other useful information to aid in the explanation of a subject. By strategically placing the most important details, it is intended to systematically represent both written and visual information.

Purposes: The primary purpose of a chart is to

- Represent relationships between variables, including comparisons, relative amounts, developments, processes, classification, and organization
- Visualize something that would be difficult to describe in words alone
- Emphasize key elements
- To provide a summary of the presentation's materials.

Charts can be used to

- Motivate pupils;
- Demonstrate process continuity;
- Show relationships through facts, figures, and statistics;
- Present matter symbolically;
- Present abstract ideas in visual form;
- Summarize data;
- Demonstrate the evolution of structures. creates issues andencourages thought

Types of Charts: Charts come in a wide variety. For your understanding, a few typical chart kinds are briefly presented below.

1. **Bar Chart:** A succession of bars along a measured scale make up a bar chart. Theyare utilized to compare amounts throughout time or in various contexts
2. **Pie Chart:** Pie charts are circular in shape, are used to display percentages andproportions.

3. **Tabular chart:** Tabular charts are used to condense a large amount of linked data. Example: Timetable.

4. **Tree Chart:** Tree charts are used to demonstrate the growth or development of a programme or project. The origin is represented as a single line or a tree trunk, while different advancements are represented as branches.

5. **Flowchart:** Using lines and arrows, flowcharts display the organizational structure of departments, institutions, and resources.

6. **A pictorial chart:** It uses graphic messaging like cartoons and images to provide the viewer a clear picture and prompt an immediate association. Each visual sign represents a quantity. For extension work, this sort of chart is more beneficial to illiterate audiences.

Features of a Good Chart:

Good charts should have the following qualities:

- Should be large enough to be easily seen;
- Should be simple and straightforward;
- Shouldn't be overcrowded with statistics;
- Should be appealing and should explain the theme in detail;
- Should highlight the major points.
- Should be expressed in words and symbols with few comparisons.
- Should be durable enough to withstand rough use.

Advantages Its benefits include:

- It is an excellent learning tool;
- Generating interest;
- Being low cost;
- Being portable;
- Being simple to manufacture;
- Being available for use and reuse; and
- Being used to explain, clarify, and simplify the complexmaterials.
- It draws attention,
- Minimizes verbal explanation, and promotes action.
- It can be used to compare and show relationships.

Disadvantages:

- Its drawbacks include the inability to utilize charts for large groups and
- The inability to use it with groups of illiterate people.

2.5.3 Maps:

Maps are a unique way to transmit a lot of information and are a wonderful visual toolsince they provide a basic visual depiction of geography. Maps can quickly and clearly present information about a problem.

Every map represents a summary of the surface of the world; as a result, it offers information in a streamlined manner. Maps are an effective tool in any field. Learninggeographic, historical, and economic ideas is crucial in social studies. Simple details on maps at the elementary school level help students find locations, identify various physical elements, and understand directions.

A map can be broadly categorized into the following groups:

- Physical maps, which depict climate, soil, forest areas, resources, rainfall,etc.;
- Political maps, which depict political divisions of nations and regions;
- Economic maps, which depict the distribution of crops, land use, transportation, etc.; and
- Social maps, which depict the distribution of the population in a nation. The literacy rate, languages, tribes, etc. are displayed on maps for simple comprehension;

The literacy rate, languages, tribes, etc. are displayed on maps for simple comprehension;

It is important to teach students how to interpret maps. The following are some important elements of map reading skills: geographic symbols, geographic locations (longitude, latitude), various physical features (landform, water form), human variables, climate and resources, distances, and transportation.

Advantages of Maps:

1. Globes cost more than maps.
2. Maps provide detail.
3. Maps can be used to compare objects and to display themes (thematic maps).
4. An atlas is a book that contains maps.
5. Maps are transportable.

Disadvantage:

- Because the world is not flat, maps can have form, area, direction, and distance distortions.
- Different map projections help to solve this issue to some extent.

2.5.4 Flash Cards:

Flash cards are short visual messages on poster board cards that are flashed (turned over at sporadic intervals) in front of the audience to emphasise key points in a presentation. While early media psychology research

virtually exclusively used this technique. Flash cards are displayed to the audience one at a time, in a sequence, along with the talk. Flash cards are a collection of image-filled, little paper cards that are flashed one at a time in a logical order. Flash cards are constructed of plain paper with coloured or inked drawings and can be manufactured by the user themselves or purchased from a vendor.

Preparation

- Simple flash cards can be made by writing, printing, or sketching on a whitepiece of paper, then adhering it to a piece of cardboard.
- 10–12 cards should be the maximum number
- For an audience of 30 to 50 people, the flash card should be 22" × 28" in size,and 11" x 14" for a smaller group.
- Letter size should be at least 1".
- Finish with a line drawing, or a cartoon.

Notes regarding the first card's contents should be written on the back of the lastcard; those regarding the second card should be written on the back of the first card; those regarding the third card should be written on the back of the second card; and so on until all of the cards have been written.

Presentation

- The presenter should be knowledgeable with both the entire story and specificdetails on each card.
- Arrange the cards in a proper stack.
- If the cards are little, hold them in one hand against your body, near to your chest. They could be put on a high table if they're big. In any case, make sure everyone can see the cards by putting them on display.
- Brief notes about the contents of the first card should be written on the backof the last card; notes about the second card should be on the back of I" card; notes about the third card should be on the back of second card, and, so on, tillthe end of all the cards.
- Flash the card and the notes simultaneously. You can silently glance at the notes written on the back of the previous card for the notes on the first card, and keep going through the cards in order until the finish.
- To change the card or to show the new point, slide the front card to the back ofthe set.
- Hold out the card long enough for reading or a quick glimpse.
- Post the cards on a bulletin board or hand them out to the audience for a quick peek once the story is finished.
- Use additional comprehension-related instructional resources

How are flash cards used?

- Complete the image, graphic, and narrative;
- Sequence the cards, flash each one with comments, emphasise key elements, and quickly evaluate.
- You can show the cards by holding them up to your chest or by using a folding casel, frame, or box. They may also be shown on walls or bulletin boards.

Advantages:

- Helps the speaker highlight the key points utilizing the notes on the back ofthe cards.
- Is very convenient to use and carry.
- It is dynamic and flexible, maintains continuity, and conveys messagesfast.
- It is also easy to create, portable, and affordable.

Disadvantages:

- It can't be used for a large group;
- it spoils quickly; and
- preparing takes a lot of time

Check Your Progress

Q1. Features of a good chart.

Q2. Uses of Models.

2.6 LET US SUM UP

Support Media for communication are developed and designed towards achievingthe learning objectives, therefore these are the tools which are used to learn concept with ease and efficiency

A paradigm called Dale's Cone of Experience integrates a number of theories about instructional design and how people learn. Edgar Dale proposed the idea that learning occurs more effectively when students "do" rather than "hear," "read," or "observe" inorder to remember information. The Cone of Experience is a result of his research.It also help in bringing novelty and freshness in classroom teaching as they relieve learners from anxiety, fear and boredom. Educational media help to provide a range of learning experiences to learners from direct to indirect. They are used to enhance the learning of students in classrooms. Some reasons to use communication media in classroom are:

- Motivate Learners;
- Longer Retention of Information;

- Organizing Classroom Teaching;
- Application of theoretical knowledge into practical applications; • Making learning fun in the classroom;
- Facilitate the concept formation and attainment among children.

Support media can be classified into three categories- print, non-print and electronic media. Projected and non-projected media are examples of non-print media

The pages that came before discussed a variety of audiovisual instruments and their uses in extension and development work. The production, benefits, and limitations of significant projected and non-projected media were later studied.

We learned from this conversation that not all medias can be utilized for all situations, but that there are medias that can be carefully chosen according to theirusability for the situation.

2.7 UNIT END QUESTIONS

Q1. Why do you think it is important to know about the Cone of Experiences inlanguage teaching? Explain your answer.

Q.2 Differentiate between Projected and Non-projected media.Q3. Explain different types of Media

Q4. Uses of LCD Projector.

Q5. Explain and two non-projected media. Q6. How are flash cards used?

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3

USE OF COMPUTER APPLICATIONS IN EDUCATIONAL RESEARCH

Unit Structure:

3.0 INTRODUCTION

Information and communication technology (ICT), which includes computers, the Internet, and electronic delivery systems, is widely employed in today's education area. ICT is increasingly being successfully used in education, learning, and evaluation.

It may be claimed that computers and the internet have become an essential element of daily life. It has an impact on our everyday activities, such as reading, socializing, locating addresses, staying informed, watching movies, shopping, talking, contacting friends, and so on. As a result, researchers are increasingly taking their study to the virtual world by publishing their findings online. Doing research via the internet is a relatively new activity among Indian academics and academicians. It has become a

valuable resource for researchers in terms of gathering related reviews, producing questionnaires for data collection, data analysis, and report writing. Not only that, but it also provides a forum for researchers to publish their research papers.

ICT is seen as a potent instrument for educational transformation and reform. Several prior research have indicated that using ICT appropriately may improve educational quality and relate learning to real-life issues (Lowther, et al. 2008; Weert and Tatnall 2005). According to Weert and Tatnall (2005), learning is a lifelong process in which learners adjust their expectations by pursuing information, which deviates from traditional techniques. They will have to expect and be eager to seek out new sources of information as time passes. ICT skills will be an essential prerequisite for these students.

3.1 OBJECTIVES

After studying this Unit you will be able to:

- Understand the function of graphs, maps and tables
- Interpret and analyze the data presented in the form of graphs, maps andtables, and
- Use these devices to communicate information more effectively.
- Distinguish between tables, charts, and graphs.

- Identify chief characteristics of tables, charts, and graphs.
- Identify and apply best practices in creating tables, charts, and graphs in technical communication.
- Role of Computers in Research Publication.
- Introduction of Analysis Tools used in research process.
- To evaluate the ethical legitimacy of individual research activities and projects

3.2 REVIEW OF RELATED LITERATURE – INTERNET SEARCH, EDUCATIONAL RESEARCH WEBSITE

3.2.1 Application of Computer in different Stages of Research:

Computers are essential in all stages of research, including review, datacollection, data analysis, and report writing.

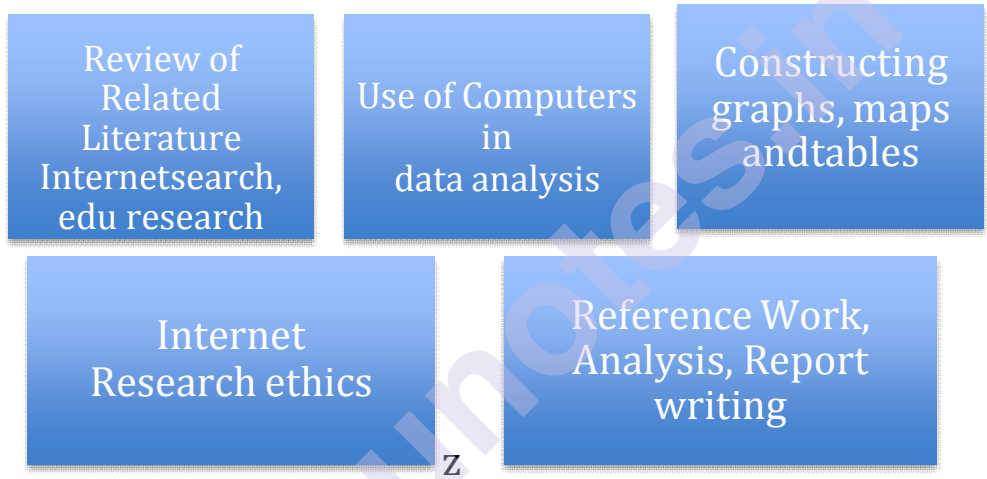


Figure 1 Use of Computer Application in Research

Review of Related Literature- Internet search, educational research website

3.2.2 Use of Computer in Literature Review:

Computers facilitate in the search for literature (for review of literature) and bibliographic references stored in electronic databases on the internet. It may therefore be used to save relevant published articles for later retrieval. This has an advantage over looking for literature in the form of books, journals, and other periodicals at libraries, which takes a significant amount of time and work.

The review of literature provides the researcher with several suggestions. It assists in the discovery of other research initiatives in the same topic and allows one to explore previously unexplored regions. It broadens the researcher's perspective and contextualizes the work. At various stages of study, a review of the literature is necessary. They are

- In the start of the research, look for other comparable studies and explore new topics of research.
- Throughout the research, to learn about the latest updates and current study in the same topic by others. Each researcher must also comprehend the methodologies and field of his research by examining related literature.
- Following the research, it allows the researcher to understand what influence his work has had, generate suggestions for future research, and so on.

There are virtual libraries that are both free and user-friendly. Anybody can downloador upload any book or article from this site. Several of these are also paid, requiring registration and payment before usage. For example:-

Virtual Libraries:

- The WWW Virtual Library (http://vlib.org/)
- Digital Library of India (http://www.dli.ernet.in/)
- Shodhganga (http://shodhganga.inflibnet.ac.in/)
- EdITLib (http://www.editlib.org/) etc

3.2.3 Check your progress:

Q1. Need and Importance of Review of Literature. Q2. Name few virtual libraries.

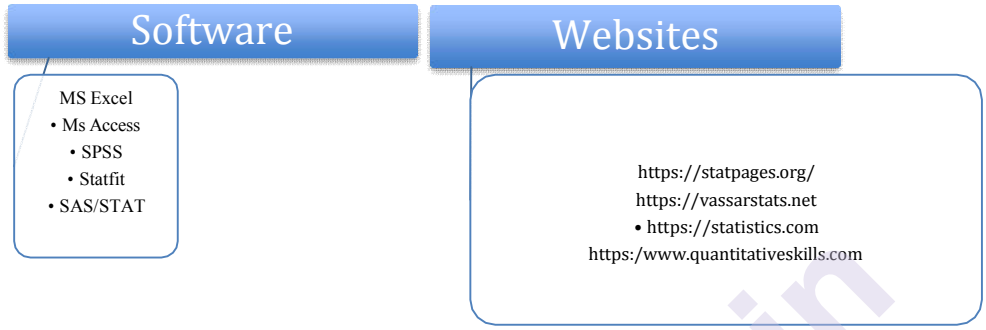
3.3 USE OF COMPUTERS IN DATA ANALYSIS

The information gathered from the subjects is saved on computers as word documentsor Excel spreadsheets. This allows for necessary corrections or editing of the entire layout of the tables, which is impossible or time-consuming when writing in papers. Thus, computers aid in data entry, data editing, data management, and follow-up actions, among other things. Computers also allow for greater flexibility in recording data while it is being collected, as well as greater ease in analyzing this data. The most labor-intensive and time-consuming aspect of research studies is data preparation and input. Typically, data will be initially recorded on a questionnaire or record form suitable for computer acceptance. To accomplish this, the researcher, in collaboration with the statistician and programmer, will convert the data into a Microsoft Word document or an Excel spreadsheet. These spread sheets can be opened directly in statistical software for analysis. Statistical analysis of the data and interpretation of outcomes.

The analysis of the data is the next step once data collection has been completed. Thisphase of scientific enquiry often entails some form of data coding, categorization, and tabulation. These days, computers accomplish most of this sort of thing automatically.The computer returns the results of

the calculations and comparisons requested, as well as the necessary data for statistical analysis.

Data analysis is the act of analyzing, organizing, manipulating, and modeling data in order to identify usable information, propose conclusions, and help decision making. Data analysis has many features and methodologies, spanning many procedures under various titles in various business, science, and social settings. Hence, analysis may be divided into two types: descriptive analysis and inferential analysis.



a) Descriptive analysis: descriptive analysis is primarily concerned with the distribution of a single variable. This research offers us with profiles of firms, work groups, individuals, and other subjects based on a variety of factors such as size, composition, efficiency, and preferences.

b) Inferential analysis: is concerned with the numerous significant tests for hypothesistesting in order to assess whether validity data may be stated to imply some conclusion or conclusions. It is also involved with population value estimate.

MS Excel, MS Access, SPSS, STATFIT, and other data analysis programmes are available. There are additional websites that allow researchers to upload data and analyze it on the web. Such websites provide an automated summary of input data and also give graphical display.. These can include things like estimating the sample size for a planned research, testing hypotheses, and evaluating the study's power. Any one package will serve to carry out the most complex statistical analysis. Computers are important not just for statistical studies, but also for checking the correctness and completeness of data as it is acquired.

Figure 2 Software and Websites for Data Analysis

SPSS is a widely used programme, particularly in social science research conducted by individuals, institutions, governments, or commercial organisations. SPSS (Statistical Package for the Social Sciences) was created for social scientists. Its statistical techniques have had less expert statistical input than other software.

3.3.2 Check your progress

Q1. What do you mean by Data Analysis?

Q2. Types of Data Analysis.

3.4 CONSTRUCTING GRAPHS, MAPS AND TABLES

The use of tables, charts and graphs enables you to highlight the main points of the information contained in the text. It enables you to present the information more concisely. Writing on a complicated topic can take up several pages, while the complete information can bepresented in less space by a table or a chart

These devices enable you make vivid comparisons and show the relation between facts. They help to summarize data and ideas, and simplify and arrange complicated details so that the reader can easily follow them.

3.4.1 Using Graph, maps and tables:

When you decide to use graphs, maps and tables, you should keep the followingpoints in mind:

- While planning your entire writing project, keep in mind the tables, charts and graphs, and where you can incorporate them. This will help you in the long run, and give clarity to your thoughts. Therefore, while you are still searching for information, identify concepts and data that will lend themselves to representation through tables, charts, etc.
- Pay special attention to those ideas or data that will present difficulties to your reader. It will be a good idea to present some of the 'difficult' items through tables, charts, etc.
- It is wise to use a fresh illustration each time you need one. The use of ready- made graphs or photographs will not always be so relevant to the point you aremaking.

3.4.2 Functions of Graph, maps and tables:

A graph is a graphical representation of tabulated data that facilitates comprehension of the data's contents.While there are benefits and drawbacks to each type of visual assistance, their core characteristics may be summed up as follows.

- Data is conveyed in a visual way that is simple to grasp.
- It's not possible to use a single graph for all possible data sets.
- Frequently, they are unable to clearly illustrate the key assumptions and driving factors that result in the observed variations in the data.
- They can be manipulated more easily than solid numbers.

When should you use a chart or graph in your research paper?

Whether you used primary or secondary sources for your research, the final product will be a report called a research paper. Nevertheless, not everyone has the background to make sense of the statistics and computations, and the reader may have to navigate through the entire document to get to the actual data. It's clear that weneed to adopt a less complicated strategy to make the whole thing easier.

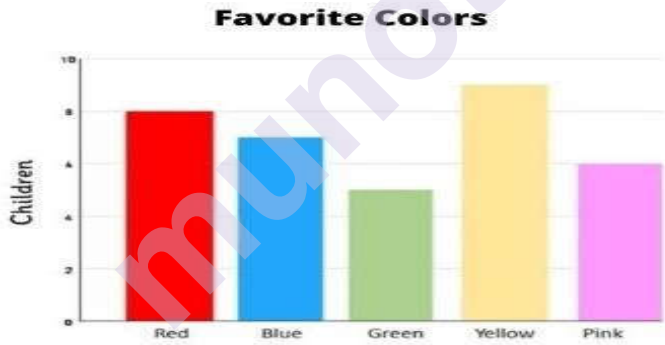
There are a variety of situations in which you can find yourself needing the help of a chart:

- To establish your viewpoint: In addition to the numerical data, a visual representation of your performance is quite helpful when explaining your position. Avoiding complicated computations that aren't necessary to grasp your conclusion might put your reader at ease.
- To make your analysis more comprehensive
- A graph's compact visualization of data saves valuable space.
- Provide in-depth explanations
- Analyze and contrast information
- Figure Out Whether a Graph or Chart Is Necessary
- Finding the Appropriate Graph to Express Your Thoughts

As was previously discussed, there are a wide variety of charts that may be used to represent data. While pie charts are great for approximating the distribution of time spent on various activities, line graphs are more suited to depicting market trends overthe course of several months or years so; it is equally crucial that you comprehend the various representations of this data. These are some of the broad categories that describe them.

Several kinds of charts and graphs Fig 3

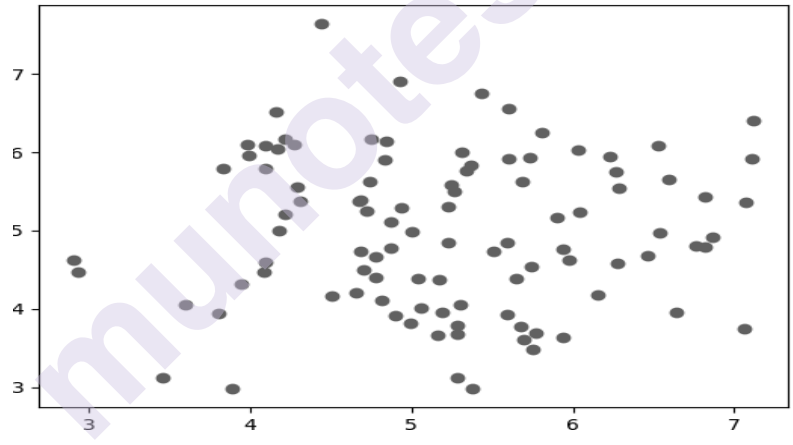
- **Bar Graph**



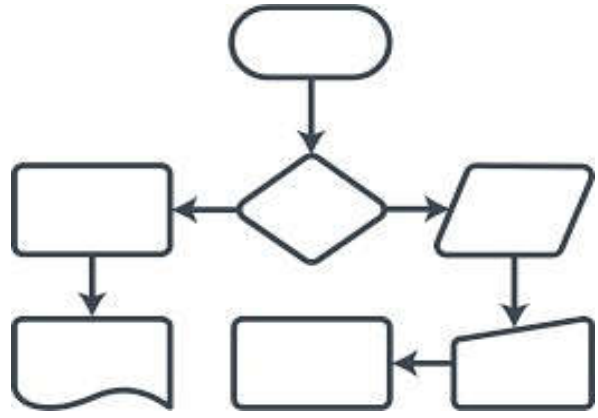
- **Pie Chart**

- **Line Chart**

Scatter Plot



- **Flowchart**



- **Histogram**

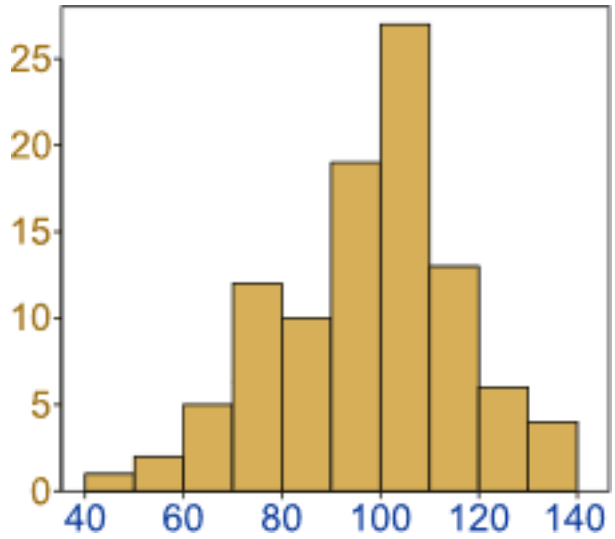


Table: Table is a 'collection of figures, facts, or other information arranged in columns and rows'. The readers locate the information they need by reading across a row, and up or down a column. So when you design tables your major concern is to provide adequate spacing between columns and rows, so that your readers can find the information easily. You will find that tables are useful for a number of things.

They can show large numbers of specific data in a brief space. such data were presented in the text itself, the reader would have to go through a succession of figuresoccurring in the text.

Tables eliminate tedious repetition of words, phrases, and sentence patterns that can be put at the tops of columns, or at the side of rows in the table.

3.4.3 Construction of Graph, maps and tables:

A few general Guidelines for making Graphs, Maps and Tables.Every table should:

- Have a structure formed by three horizontal lines, defining table heading andthe end of the table at its lower border;
- Not have vertical lines at its lateral borders;
- Provide additional explanation or context where necessary;
- Present values with the same number of decimal places in all its cells;
- Include a title informing what is being described and where, as well as thenumber of observations (N) and when data were collected.

Like tables, graphs need to include the following features:

- A descriptive title placed below the figure;
- Being referred to as figures throughout the body of the text.

3.4.4 Software available for drawing Graph:

- Excel
- Minitab
- SPSS
- ClassCalc
- CODAP
- DataClassroom
- Desmos
- GeoGebra

3.4.5 Tabulation:

After a large amount of data has been gathered, the researcher must arrange it in someform of simple and logical arrangement. This process is known as tabulation. In a larger sense, tabulation is an orderly organization of data in columns and rows. Following editing, which ensures that the information on the schedule is valid and properly classified; the data is assembled in various types of tables and may also undergo other sorts of statistical analysis. Tables can be produced manually or automatically. Each table should be assigned a unique number for ease of referencing.

3.4.6 The significance of tabulation:

Tabulation is necessary for the following reasons:

a. It helps the comparing process.

b. It serves as a foundation for different statistical computations.

c. Provide an overall picture of findings in a more concise manner. They see trends.

d. They show linkages between portions of the findings in a comparable fashion.

e. By convention, the dependent variable appears in rows while the independent variable appears in columns.

f. The table's column and row titles should be clear and concise

g. The columns may be numbered for ease of reference.

h. The row total should be placed in the far right column, and the column total should be placed at the bottom.

3.4.7 Creating a chart:

1. Select data for the chart.
2. Select Insert > Recommended Charts.
3. Select a chart on the Recommended Charts tab, to preview the chart.
4. Select a chart.
5. Select OK.

Note: Alt + F1 to create chart immediately

For a basic table, click Insert > Table and move the cursor over the grid until you highlight the number of columns and rows you want.

For a larger table, or to customize a table, select Insert > Table > Insert Table.To draw your own table, select Insert > Table > Draw Table

3.4.8 Check your progress:

Q1. What are the general Guidelines for making Graphs, Maps and Tables?

Q2. Significance of Tabulation.

3.5 INTERNET RESEARCH ETHICS

Ethics in research include a wide range of issues that might arise in the course of scientific enquiry. Ethical considerations in areas such as

1. The planning and execution of studies involving human or animal subjects,
2. The use of genetically modified organisms in experiments, etc.
3. Scientific misconducts (such as fraud, data falsification, and plagiarism) in academia; whistleblowing (reporting wrongdoing inside an institution to the public or those in charge); research regulation; etc. As compared to other fields of study, research ethics have advanced the furthest.
4. Fourth, unlike medical research, studies in the social sciences face a unique set of challenges.

The research community relies on a solid foundation of trust in order to function well. Researchers have faith in the veracity of other researchers' findings. People believe that scientists have made an honest effort to represent the world objectively and truthfully in their study. But, the scientific community must commit itself to modeling and passing on the ideals associated with ethical scientific practice if this confidence is to last.

There are several ethical concerns that need to be carefully considered during the study process. Sociologists need to be conscious that they are ultimately responsible for ensuring that the consent and best interests of all participants are protected. They have a moral obligation to treat the

participants with respect and refrain from misusing whatever data they collect. Participating individuals have a right to have their privacy and feelings respected throughout the research process. Participants' identities and privacy must be protected during the observation process.

Most people pick up moral teachings through their families, communities, institutions, and organizations. The majority of people's moral compass is established by the time they are children, but moral development continues throughout life, and people go through many phases of growth as they age. As ethical standards seem to pop up everywhere, it would be easy to write them off as common sense. On the other hand, if morality were simply a matter of common sense, then we wouldn't have nearly as many ethical debates and problems as we do.

3.5.1 Ethical standards:

Ethical standards are often wider and more informal than legal regulations, which are in place to regulate behavior in most communities. Although laws are used in most countries to enforce generally accepted moral standards, and the ideas used in both ethical and legal regulations are similar, it is essential to keep in mind that ethics and law are not the same thing. It's possible for anything to be both lawful and immoral. Ethical ideas and principles can also be used to analyze, assess, propose, or interpret legal norms. To oppose what they saw as immoral or unfair laws, several social reformers in the previous century encouraged citizens to defy them. Nonviolent civil disobedience is a moral technique to get one's political opinions through.

Standard-studying fields like philosophy, theology, law, psychology, and sociology are also included under this definition of "ethics." Someone who studies medical ethics is called a "medical ethicist." Ethical theory can also be seen as a framework for understanding and making judgments about difficult situations. Consider global warming as an example of a complicated topic that may be approached from a variety of angles, including economic, ecological, political, and ethical. An environmental ethicist might look at the ethical norms and principles at play while an economist looks at the costs and benefits of different strategies connected to global warming.

Behavioral expectations in various fields, organizations, and occupations vary to best serve their specific missions. These standards also aid practitioners in coordinating their efforts and earning the confidence of the public. Medicine, law, engineering, and business are just few of the fields that have established codes of ethics. Researchers and anyone engaged in the creative and intellectual arts can all benefit from adhering to established codes of behavior. Research ethics is a field dedicated to the study of these policies.

Ethical standards in research should be followed for several reasons.

First, standards advance the goals of research, which include learning, accuracy, and minimising mistakes. Prohibitions against, say, making up

or faking research data, help spread the truth and prevent mistakes.

Second, ethical standards encourage the values that are crucial to research since it typically requires collaboration and coordination among many individuals from various fields and institutions. Values essential to effective teamwork, such as honesty, openness, and consideration for one another. As an illustration, several moral rules for study authorship, copyright and patenting regulations, data sharing protocols, etc. and peer review procedures that need anonymity to safeguard proprietary information motivating people to work together. Most academics are eager to be recognised for their work and would rather have their ideas stolen or leaked before they are ready.

Third, various ethical standards aid in ensuring that Scientists might face public scrutiny and consequences for their work. The federal government's stance on research misconduct, issues of bias, human subjects' rights, and animal welfare must be addressed before any significant progress can be researchers receiving public funding should be subject to public scrutiny and oversight.

Fourth, research ethics rules contribute to increasing interest in and funding for the field. Trust in the quality and integrity of research has been shown to increase the likelihood of receiving funding for research projects. Lastly, many of the standards of research support a wide range of other essential moral and social values, including social responsibility, human rights, and the dignity of the human person. and legality, safety, and the well-being of animals.

Accidental violations of research ethics have the potential to cause serious harm to study participants, students, and the general public. A researcher's health and safety,as well as the health and safety of staff and students, may be at risk if, for instance, he or she fabricated data in a clinical study, which could have dire consequences for the participants.

3.5.2 Regulations and Guidelines for Ethical Research:

There is a wide variety of standards, norms, and policies pertaining to research ethics that have been enacted by various professional groups, government bodies, and institutions. Ethics guidelines for government-funded researchers may be found at organizations like the National Institutes of Health (NIH), National Science Foundation (NSF), Food and Drug Administration (FDA), and Environmental Protection Agency (EPA). Also important are the APA's Ethical Principles of Psychologists, the APA's Statements on Ethics and Professional Responsibility, the APA's Statement on Professional Ethics, and the International Committee of Medical Journal Editors' Uniform Requirements for Manuscripts Submitted to Biomedical Journals (American Association of University Professors).

Some basic ethical principles are briefly outlined below:

1. Be honest in all of your scientific writings. Explicitly discuss your research questions, process, and the state of its publishing. Do not make up or falsify information. Do not mislead. peers, funding bodies, or the general public.

2. Attempt to be objective while doing experiments, analyzing data, interpreting data, or performing peer reviews. Research, grant-writing, expert evidence, and other contexts where impartiality is essential include: necessary or anticipated. Be objective and honest with yourself. Declare any Financial or Personal Interests It might have an impact on the studies.

3. A person of integrity is one who is truthful, reliable, and consistent in their beliefs and actions.

4. Avoid thoughtless mistakes and sloppy work; instead, thoroughly and critically evaluate your own efforts and those of others. the output of your contemporaries. Research efforts, including data gathering, analysis, and drafting of design and communication with external bodies or publications.

5. Transparency: Give and take information, results, thoughts, and equipment. Have an open mind and listen to feedback.

6. Recognize the value of intellectual property such as trademarks, copyrights, and patents.

   Do not make use of unreported procedures or findings without proper citation and citation. Recognize accomplishments when they are due.

   All contributions to a study should be properly credited. Plagiarism is a cardinal sin.

7. Maintain the privacy of sensitive information, including applications for funding and scholarly articles.

   Publication, Employee Files, Trade Secrets, Military Files, Patient Files.

8. Publication Ethics: Putting Research and Scholarship First, Not Yourself personal professional development. Don't publish the same thing twice or waste time on it.

9. Assist in the teaching, mentoring, and advising of students in a responsible manner.

   Foster their happiness and give them the freedom to choose for themselves.

10. Workplace courtesy: Treat your coworkers with dignity and respect.

11. Duty to Society: Efforts to Promote Social Good and Remedy Social HarmsScience, outreach, and lobbying all play important roles.

12. Do not discriminate on the basis of gender, race, religion, sexual orientation, or any other protected category while interacting with coworkers or students. variables unrelated to one's ability or honesty in the scientific realm, such as one'srace or ethnicity.

13. Competence: Always strive to learn more and better your field of expertise bycontinuing

    education and training; make progress towards overall scientific proficiency.

14. Respect for the law requires familiarity with and adherence to applicable regulations.

15. Caring for Animals: Experiment on animals with the utmost regard and compassion. Avoid engaging in animal testing that is pointless or ill-conceived.

16. Human Subjects Protection: Take great care to protect vulnerable groups and make that everyone involved in the study receives their fair share of the benefits and shares the responsibilities of protecting human subjects.

Although not technically "misconduct," many additional behaviours are generally considered unethical by the scientific community. Some variations from standard research procedures include the following.

- Submitting the same work to many publications without informing the editors is plagiarism.
- The only way to be sure that you are the original creator of an idea is to file a patent without telling anybody else about it.
- Adding a coworker on a paper as an author in exchange for a favor, even though they did not contribute significantly to the article. Sharing sensitive information from a manuscript you are reviewing for a journal with a coworker.
- Avoiding the peer review process by releasing your findings at a press conference without providing sufficient information for peers to examine your work Skipping the peer review process by using an improper statistical approach to improve the relevance of your study
- Reviewing the literature without giving credit to previous researchers' efforts or ignoring pertinent earlier work.
- Exaggerating a project's potential impact on the pitch in a grant application in attempt to win over reviewers.

- Ignoring the advice of your institution's Animal Care and Use Committee or Institutional Review Board for Human Subjects Research and deviating significantly from the approved research protocol; using unnecessary animals;

Most scientists would consider these acts unethical, if not criminal. Most of these would also contradict various professional ethics rules or institutional norms.

3.5.3 Check your progress:

Q1. What are the basic Ethical principles of Research?

3.6 REFERENCE WORK, ANALYSIS, REPORT WRITING

In order to effectively convey your thoughts and ideas to others, you need to develop the complicated and creative talent of writing. This includes the following steps: concept refinement, expression, presentation, and editing. Throughout the course of a document's development, writers toggle between these stages many times (Hayes & Flower, 1980).

The final phase in the research process is report writing. The researcher should begin drafting the research report as soon as the study begins. That will save him/her time and assist in finishing the report on time. The computer is very useful in recording your study. Here, data may be stored and retrieved as needed. Once the data has been analyzed, it is time to write data interpretation and discussion. A researcher must accurately explain the entire procedure. A researcher should keep track of what he has read. Creating the contents page Make a list of references or a bibliography. Create a section or chapter structure.

While creating a report on a computer, the procedure becomes more easier. This allows the researcher to readily access the portions he wants to edit or update, move text sections around, make basic changes across the text, and check spelling and grammatical errors. This also helps to save the researcher's time and efforts.

3.6.1 Online Text Editors:

In writing the report, the computer is also useful for creating graphs, diagrams, and tables. A researcher can apply smart arts to make his paper more fascinating and appealing. After authoring it, the researcher can post it on the internet.

Microsoft Word is perfect for research documentation. It is simple to use and helps researchers to present and organize their thesis or report. It is beneficial in thefollowing ways.

Apart from that, there are other online text editors that are simple to use. They are:

- **Google Docs:** Google Drive has a number of intriguing options for editingdocuments.
- **Edit Pad:** This is a simple text editor that does not support formatting. Thepaper may be typed and downloaded from this page.
- **Edit with Friends:** This feature enables a group of people to collaborate onthe same document from various machines.
- It displays the modifications made by the teammate without requiring a pagereload.
- **Shutterborg:** Shutterborg is a free and simple online document editor. It has a simple interface with a single menu bar and its own mouse content menu.
- The CKEditor is a free online editor with a plethora of capabilities.
- Online Text Analysis: This programme analyses text and presents informationon the words, characters, and structure of the text.
- **Word Counter:** When typing, it counts the words, characters, and phrases inthe document.
- **Text Comparison:** This tool aids in the comparison of two documents. The amount of characters in each document is also compared.
- **Spell Check:** The Spellchecker highlights incorrect words and suggestsalternatives.

3.6.2 Paper Publication:

A vital step after finishing your report is to publicize your research work. The Internet is extremely useful for publishing research papers. It enables researchers to present their study findings to others. Nowadays, we all utilize the internet to search for knowledge in any subject. It provides a large number of viewers for your published work. There are several online publications where one may submit a research paper and have it referenced by others. They have

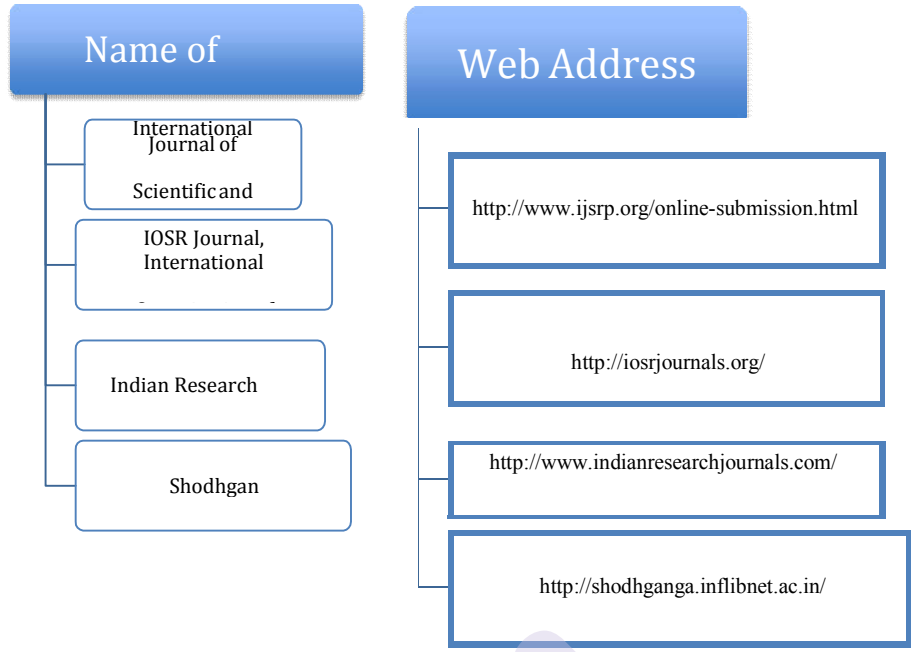


Table 1: Name and Web Add

Researchers can not only subscribe to these publications, but also submit their research articles online. Some of them are free, while others need a charge for paper submission. Also contradict various professional ethics rules or institutional norms.

3.6.3 Check your progress:

Q1. What is Report Writing?

3.7 LET'S SUM-UP

The use of computers for study has become very common in recent years. Practically all researchers utilize it in their study. This has made data collecting more efficient and cost-effective. Respondents are also given the option of completing out the questionnaire at a time that is convenient for them. The Internet and a computer are vital tools for conducting research. They have been shown to be effective at every step of study. It may be used for a variety of tasks such as reviewing literature, gatheringinformation for a certain topic, collecting data, analyzing data, generating reports, making presentations, storing data, and publishing research papers.

Since computers have made research easier, researchers must pay close attention because there is a risk of incorrect data gathering and interpretation. As a result, at each stage, a researcher must double-check everything done by computer. This reduces the possibility of incorrect data analysis, on which the results will be based. Together with this, he or she should consider study ethics and the constraints of using the Internet. As a result, the use of the Internet and computers in research makes the procedure easy and quick. Regular usage of a computer and the Internet

will help you grasp it better. A researcher must always adhere to the regulatory standards established by the authorities for its use.

3.8 UNIT-END ACTIVITIES

1) Explain the significance of computer application in research.
2) Give a brief description of the different kinds of Graph.
3) When should you use a chart or graph in your research paper?
4) Explain the regulations and guidelines for Ethical Research.
5) Give examples of some online text editors.
6) Steps to draw Table.
7) Name few Software available for drawing Graph.

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4

TRENDS IN TECHNOLOGY MEDIATED COMMUNICATION

Unit Structure :

4.0 OBJECTIVE

After going through this unit, you should be able:

1. To be familiar with the meaning of Computer Assisted Instruction in education;
2. Tounderstand the significance of Computer Assisted Instruction in education;
3. Tounderstand and apply the Modes of CAI
4. Tobe familiar with the meaning of Computer Managed Instruction in education;
5. Tounderstand the significance of Computer Managed Instruction in education;
6. To be able to differentiate between CAI & CMI;
7. To be familiar with the meaningof Mobile learning in education

8. To comprehend the characteristicsof Mobile learning in education

9. Toappreciate the significance of Mobile learning in education;

"The illiterate of the 21st century, will not be those who cannot read and write, but those who cannot learn, unlearn and relearn."

Alvin Toffler

4.1 INTRODUCTION

Globalization and technological change—processes that have accelerated in tandem over the past fifteen years—have created a new global economy "powered by technology, fueled by information and driven by knowledge. Technology has revolutionized the way people do business. Rather than rely solely on face-to-face communication, company owners and their employees have a wide variety of technology-mediated resources at their disposal. Computerized communication allows immediate access to customers, business associates, vendors and employees in other parts of the country and even the world.Computers in Education refer to educational computing. It means the applications of computers in Education. The computer has created a revolution in the content of education and in the nature of the learning process. They have the capability of multiplying the human intellect beyond past conceptions and have tremendous implications in education.

a. Computer Assisted Instruction – meaning, significance and modes:

Computers are a familiar sight in classrooms in the twenty- first century, and technology has been used to streamline many educational tasks. There are different types of educational computer use, and not every use of a computer in the classroom is considered computer-assisted instruction. The educational uses of computers that are considered to be computer-assisted instruction (CAI) or computer-managed instruction (CBI) are those cases in which either instruction is presented through a computer program to a passive student, or the computer is the platform for an interactive and personalized learning environment**.**

4.2 MEANING OF CAI

Meaning of CAI:

Computer has contributed a lot in each and every sector of life. Computer assisted instruction (CAI) has emerged as an effective and efficient media of instruction in the advanced countries of the world. In fact, CAI is being used in formal and non-formal education at all the levels. In India too, computer has been introduced in most of the areas such as data processing, decision making.

Computer-assisted instruction (CAI) is an interactive instructional technique whereby a computer is used to present the instructional material

and monitor the learning that takes place. CAI uses a combination of text, graphics, sound and video in enhancing the learning process.

It has also impact on the working methods of research and development in the fields of science and technology. The computers are being used in the almost all areas of life such as transportation, communication, national defence, scientific research and education.

CAI is a method of instruction in which there is a purposeful interaction between a learner and computer device the individual learner to achieve the desired instructional objective with his own pace and ability.

Bhatt and Sharma (1992): - "CAI is an interaction between a student, a computer controlled display and a response entry device for the purpose of achieving educational outcome".

Hilgard and Bower (1977): - "Computer assisted instruction has now taken as so many dimensions that it can no longer be considered as a simple derivative of the teaching machine or the kind of programmed learning that skinner introduced."

4.3 SIGNIFICANCE OF CAI

- **Instant feedback:** Each student receives rapid feedback for his response. Computers provide immediate feedback, letting students know whether their answer is correct. If the answer is not correct, the program shows students how to correctly answer the question.Computer - assisted instruction improves instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills.

- **Individual attention:** All units of learning are broken down into subunits and small elements of learning. Reinforcement of learning is achieved by personal messages.

- **Self-directed learning:** Students can learn in their own styles and ways, i.e., through examples, through case studies or through problems. Anyone, Anytime, Anywhere Learning. Students can access the computers at any place.

- **Self-Assessment:** Students can test their own learning at any time of progress.Programs provide differentiated lessons to challenge students who are at risk, average, or gifted. One student can move onto more demanding educational activities before the rest of the class without disrupting anyone else 's learning. Simultaneously, another student can repeat certain learning activities as often as advisable.

- **Learning time:** time required for learning is considerably less than that of classroom teaching.

- **Student's attitude:** Students develop a more positive attitude towards computers in general as a result of their exposure to CAI.

- **Digital divide:** It will improve the ICT literacy in the rural areas particularly and will go a long way in removing the digital divide in the state
- **Interest Level:** Improve the interest of students in school studies and thus increase school attendance and better performance in examinations
- **Use of Multimedia:** It will improve the teaching process with the integration of the ICT in the class
- **Rapid Learning:** CAI enhances student and teacher learning and productivity and ensures the students enjoy learning and learn rapidly.Each student responds continuously as he receives instruction
- **Self –pacing:** CAI provides one-to-one interaction with a student, as well as an instantaneous response to the answers elicited, and allows students to proceed at their own pace. Computer-assisted instruction moves at the students 'pace and usually does not move ahead until they have mastered the skill. They allow students to progress according to their own pace and work individually or in a group.

4.4 MODES OF CAI

Modes of CAI:

Tutorial Mode: In the Tutorial Mode, information is presented in small units/chunks followed by a question. The student's response is analysed by the computer and an appropriate feedback is provided. This is similar to programmed Instruction.

Drill and Practice Mode: In the Drill and Practice Mode, the learner is provided with a number of graded examples on the concepts and principles learnt earlier. The idea is to develop proficiency and fluency through doing. All the correct responses are reinforced and the incorrect responses are diagnosed and corrected. The computer continues the drill until mastery is achieved by the learner.

Gaming Mode: In the Gaming Mode, the learner is engaged in playing opposite the computer or opposite another learner. The extent of learning depends upon the type of the game. Games on spellings, names of places and general knowledge are some examples of the gaming mode.

Simulation mode: In the simulation mode, the learner is exposed with scaled-down simulated situations bearing correspondence with the real situations. Simulations are made to avoid risk. Save money and conserve time. Simulation of an aero plane in light, an experiment on titration. a nuclear reaction, collision two bodies etc. are good examples of the simulation mode.

Problem Solving Mode:

Problem solving can be readily achieved provided the typical computational capability of the computer is available and there is a

typewriter and display response device with remote control of two-way communication. The students need to know how to communicate with computer and low to solve his problem.

Inquiry Mode:

Inquiry is mode of third type of CAI application. In this CAI system responds to student's inquiry with answers it has stored. In this mode instructional staff must learn how the system operates.

Discovery mode: In the discovery mode, the inductive approach to teaching and learning is followed. The learner is encouraged to proceed through trial and error approach, i.e.; by solving a given problem, realizing, where and how he / she went wrong, trying again and finally solving the complex problem.

CAI therefore, can be said to be an effective tool under proper conditions. The course material should be carefully prepared by persons who are knowledge by persons who are knowledgeable in the subject matter, computer technology and learning theory. The academic support required by the students must be provided by the teachers CAL course ware must be high quality, user friendly and well organized.

Check your Process-I

1. Elucidate the meaning of CAI?
2. State the significance of CAI?
3. Explain the various modes of CAI.

b. Computer Managed Instruction – meaning and significance

4.5 MEANING OF CMI

Meaning of Computer Managed Instruction:

Computer: managed instruction is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, and assessment of learner performance. Computer-managed instruction (CMI) aids the instructor in instructional management without actually doing the teaching.

BURKE (1982): "CMI is the systematic control of instruction by computer. It is characterized by testing, diagnostic learning, prescription and through record keeping"

LEIB (1982): "CMI includes all applications of the computer aid to the instructor in instructional management without actually doing the teaching".

CMI is the management of instructional courseware through a computer software application. User registration, course enrolment, random test generation and scoring, student record-keeping, and other registrar functions are maintained by the CMI system.

CMI systems vary depending on the needs of an organization. A government agency may have laws requiring the tracking and data storage of the training records of its employees, but a small company would not need such intensive capabilities. CMI systems also vary depending on the vendor and are often developed and custom-designed to fit the needs of a specific organization.

4.6 SIGNIFICANCE OF CMI

Significance of Computer Managed Instruction:

- **Reduce instructor workload:** CMI implementation can reduce instructor workloads by automating tedious and routine functions such as grading, scheduling, and keeping track of resources.
- **Small chunks:** CMI can be introduced in phases and adapted to meet the needs and concerns of any particular instructor or group of instructors.
- **Requires less input devices:** CMI can be done with just one computer.
- **Better Organisation of instructional materials**: CMI provides an excellent way to organize and integrate both online and traditional (off-line) instructional materials.
- **Curriculum Needs:** CMI helps instructors and curriculum planners determine curriculum needs.
- **Individualised Instruction:** CMI may be used for either individualized or group instruction.
- **Evaluation:**CMI provides a basis for evaluation of both students and instruction.
- **Solving Problems:** CMI can solve some problems posed by incompatible software and hardware.
- **Tracking:** CMI helps in recording and tracking Student performances over a period of time
- **Information:** CMI helps to provide information concerning performance data

Check your Process - II

1. Elucidate the meaning of CMI?
2. State the significance of CMI?

c. Mobile Learning – meaning, characteristics and significance:

4.7 MEANING OF MOBILE LEARNING

Meaning of Mobile Learning: Mobile Learningis a new way to access learning content using mobiles. Mobile Learning supports continuous access to the learning process.

Mobile learning, also known as M-learning, is a new way to access learning content using mobile devices. It's possible to learn whenever and wherever you want, as long as you have a modern mobile device connected to the Internet.It is a way of accessing learning content through mobile devices. This method empowers learning at the point of need, enabling users to access content whenever and wherever suits them.The most important element of mobile learning is its focus on the mobility of the learner - giving them the ability to choose when and where they want to access learning means that they can go at their own pace, increasing engagement and improving knowledge retention.

Mobile learning is the capability to attain or provide educational content on individual. pocket devices such as PDAs, smartphones and mobile phones. Educational content in this. context refers to digital learning resources accessible on any individual electronic device.

Mobile learning (M-Learning) is gaining much importance among the new generation. Mobile learning enhances students thinking and motivates them for deep learning and thus leads to meaningful creation of knowledge. Among the advantages of mobile learning, few important ones include; mobile learning is an additional or supporting source of learning that are available any time; anyplace; any network; on any wireless device, etc. Mobile learning raises the learning interest and communication of learners as it provides learning material in different formats that are accessible at any time. Mobile learning supports new ways of learning through mobile devices, such as, mobile phones, smart phones and MP3 players. The main objective of the present chapter is to describe the present state of mobile learning, benefits, features, and its challenges to sustenance learning and also describes about various mobile apps. A mobile application is a software application that is developed for various learning activities and works on like smartphones and tablets, rather than desktop or laptop computers.

4.8 CHARACTERISTICS OF MOBILE LEARNING

Characteristics of Mobile Learning:

Mobile learning has different characteristics. The chief characteristics of mobile learning are; spontaneous, transferable size of mobile tools, combined, private, communicating, collaborative and immediate information. The core characteristics of mobile learning enables learners to learn at any place and any time.

- **Ubiquitous/ Spontaneous:** Mobile learning is more spontaneous than other types of learning. It is this spontaneity that is probably the most denying characteristic of mobile learning. Mobile learning is context aware, meaning that students can learn everywhere. Wireless

technologies such as laptop computers, palmtop computers, and mobile phones are revolutionizing education and transforming the traditional classroom-based learning and teaching into anytime and anywhere education.

- **Portable size of mobile tools:** Mobile learning tools are small and portable. Students can use it anywhere for their learning activities.
- **Blended:** Teachers can use mobile learning as a blended learning approach. Students can use mobile tools for completing homework, projects, etc. Blended learning, which combines classroom instruction with m-learning, can maximize the benets of both face-to-face and online method.
- **Private:** M-learning is private. It means that only one learner at a time usually has access to the mobile tool and that when students want to access information they connect and download independently from other learners.
- **Interactive:** M-learning environment utilize the latest technologies to create an interactive learning environment for learning. Students are not passive; the functions of mobile tools and learning environment allow students varying levels of interactivity. The technological layer represents learning as an engagement with technology, while tools such as computers and mobile phones function as interactive agent during the process of learning.
- **Collaborative:** Mobile technologies support communication between students and teachers. So, mobile technologies may be used for collaborative learning activities during learning.
- **Instant information:** Using a mobile tool is all about immediacy. According to Cohen (2010), "the need is for quick answers to specific questions". Learning content must meet the requirement by providing material that enables a learner to quickly zoom into information.

4.9 SIGNIFICANCE OF MOBILE LEARNING

Significance of mobile learning:

The Millennial generation has grown up with digital devices. So Mobile learning is tailored to the way millennials work and think. But there are so many advantages with M-learning that all generations can benefit from it. Let's take a look at some of the advantages of M-learning.

Learn wherever and whenever you want:

M-learning enables learners to take their learning materials with them. Your employees or customers don't have to be at a specific place or to learn at the same time. Their learning content is available for them in their pockets. Waiting time such as waiting for a plane or flight time can be used for more productive tasks like learning something new.

Come on! It's even possible to take an online course or complete a survey while lying in bed!

More motivation:

Employees can feel more motivated to learn something new or to take online training if they know they can take their learning materials everywhere with them. That is especially the case if they don't have time to learn during their regular work hours.

Real-time feedback:

Mobile Learning facilitates (and speeds up) any feedback you may want to receive from your team. Since it's much easier for your employees to access the content you are sharing, you can expect higher completion rates for your training courses and faster results and statistics from your online tests!

Long-distance is not a problem:

Reach scattered employees that are always on the go and need easy access to content. Content such as product updates, customer personas, compliance updates, and sales pitches can easily be made available with just a few clicks.

Check your Process - III

1. Elucidate the meaning of Mobile Learning?
2. Explain the various characteristics of Mobile Learning.
3. State the significance of Mobile Learning.

4.10 CONCLUSION

Teaching is generally considered as an activity which is designed and performed for multiple objectives in terms of changes in pupil behavior. Pupils on the other hand have multidimensional personalities having different styles. The common implication of both these facts is that the teacher should use different strategies of teaching which match the objectives of teaching on one hand and pupils learning styles and personality dimensions on the others. CAI package have revolutionized the whole teaching and learning process by adapting to individual learning needs.

Computer: managed instruction is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, and assessment of learner performance. Computer-managed instruction (CMI) aids the instructor in instructional management without actually doing the teaching.

M-learning or mobile learning is "learning across multiple contexts, through social and content interactions, using personal electronic devices". A form of distance education, m-learners use mobile device educational technology at their convenient time. Mobile learning allows multiple mediums for engagement that can be tailored to suit individual preferences. This aspect of mobile learning provides students the opportunity to take control of their education and develop a sense of ownership.

4.11 STUDY QUESTIONS

1. Explain the concept of Computer Assisted Instruction.
2. 'Computer Assisted Instruction plays a significant role in our lives". Justify with respect to its significance in education.
3. Illustrate the various modes of Computer Assisted Instruction.
4. Explicate the concept of Computer Managed Instruction.
5. Elaborate the significance of Computer Managed Instruction.
6. Explain the concept of Mobile Learning.
7. Enumerate the various characteristics of Mobile Learning.
8. "Technology is enabling us touse mobile and to ensure that Learning opportunity reaches to any student, anywhere at any time."Justify with respect to significance of Mobile Learning ineducation.

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5

PRACTICAL WORK IN ICT IN EDUCATION

Unit Structure :

5.0 OBJECTIVES

At the end of this chapter, the student will be able to:

(a) Describe the real life applications of ICTs in Education.

(b) Develop tools based upon ICTs in Education.

(c) Describe the effective ways of using ICTs in Education.

(d) Explain the emerging Trends of ICTs in Education

5.1 INTRODUCTION

Information and communication technology, ICT enables the use of innovative educational resources and the renewal of learning methods, establishing a more active collaboration of students and the simultaneous acquisition of technological knowledge like usage of Internet, wireless networks, cell phones, tablets etc. ICT has become an essential part of our everyday life. ICT plays a vital role in improving functional effectiveness of educational systems.

ICT comprises technologies for capturing, transmitting and disseminating information. It powers our access to information, enables new forms of communication and serves many online services in the spheres of communication, culture, entertainment and education. It is also a force that

has changed many aspects of the way we live. It also helps teachers support or scaffold the development of historical thinking and understanding at all levels. ICT is considered as the vehicle for change i.e. activity centered from traditional centered. It motivates the learner by quick acquisition of knowledge. ICT helps educators in being efficient administrators, facilitators and evaluators. E-books play an important means in accessing the books remotely.

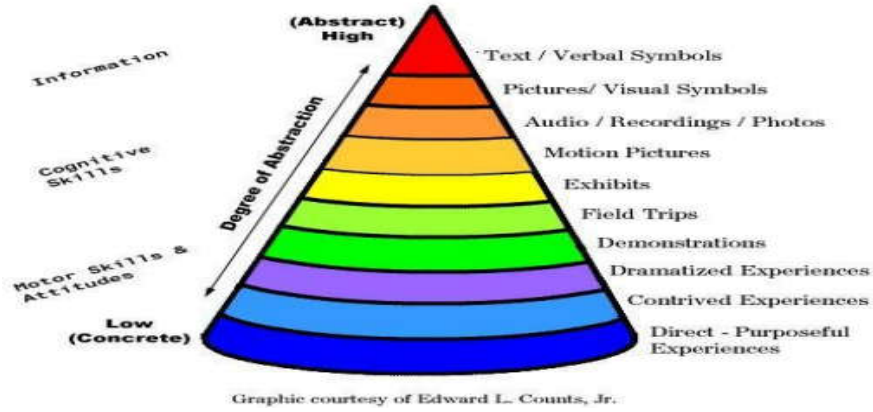
ICT is not only the tool for development of scientific attitude but also the change in the social process. It helps in effective construction of educational principles for quality teaching-learning by development and implementation of methods and techniques. ICT helps in organizing the resources to achieve the goals of education. Curriculum planning, designing, implementation and execution is more user friendly. Use of ICT helps in having a more productive and powerful approach in education. ICT can be used for designing Non-Projected Support Media using charts, flash cards and models.

5.2 THE EDGAR DALE'S CONE OF LEARNING EXPERIENCES

Edgar Dale's Cone of Experiences is the representative model of the visual analogy set up to show the progression of learning experiences from direct, first hand participation to pictorial representation and on to purely abstract, symbolic expression

He showed that all learning experiences can be used for classroom teaching and he arranged these learning experiences pictorially in a pinnacle form called the Cone of Experiences. The cone's utility in selecting instructional resources and learning activities is as practical today as when Dale created it.

Dale's Cone of Experience is a visual model that is composed of eleven (11) stages starting from concrete experiences at the bottom of the cone then it becomes more and more abstract as it reaches the peak of the cone. Also, according to Dale, the arrangement in the cone is not based on its difficulty but rather based on abstraction and on the number of senses involved. The experiences in each stage can be mixed and are interrelated that fosters more meaningful learning.



Graphic courtesy of Edward L. Counts, Jr.

Characteristics of Dale's Cone of Learning Experiences:

1. The cone represents the range of experiences from first-hand or enactive to observation or Iconic on to Symbolic communication.
2. The cone does not represent the increasing difficulty of learning but the degree of abstraction.
3. The cone classifies various types of Instructional materials according to the relative degree of learning experiences that each band provides. Accordingly, various levels of cone suggest the appropriate method of teaching an abstract concept , in accordance with the student's needs and abilities. e.g. Using actual flowers to teach about it to provide direct experience.
4. Dale's Cone suggests the interrelated and interdependent nature 0f learning

Dale's Cone of Experience

5.2 MULTISENSORY INSTRUCTION IN EDUCATION

Senses are said to be the gateway of knowledge. In accordance with these well-known maxims of teaching and learning, it is always better to employ as many senses as possible in the process of instruction for the best possible outcomes.

As a literal definition, multi-sensory, comes from two words. The two words are "multi" and "sensory." "Multi" means "more than one." "Sensory" "involves or is derived from the senses. That means multi-sensory "involves more than one of the bodily senses at a time."

Moreover, the experiments and research in the field of teaching-learning has established that the teaching-learning process is best organized and facilitated through the use of multi-senses or multimedia

instead of a single or routine type of media or techniques. For example, in case a teacher, while lecturing, makes use of the audio-visual aids, charts and maps, writes on the blackboard, demonstrates on the demonstration table and asks his students to respond in a theoretical as well as practical way, he is surely to communicate well instead of a teacher who is simply resorting to lecturing or demonstrating. The use of educational technology in the field of teaching and learning, thus, has given birth to a new approach namely the multi-sensory or multimedia approach consisting of the use of multiple senses involving appropriate and carefully selected devices, techniques and media in such a combination that leads to the most effective realization of the teaching-learning objectives in the best possible way.

In other words, in multi-sensory approach, the teaching-learning process is carried out through a number of media by using them in such a planned and organized combination that leads to their utmost utilization for achieving the desired ends. The characteristics of such an approach are:

1. Involves the use of our senses. It focuses primarily on using visual, auditory, and kinesthetic-tactile elements.
2. Is taught incorporating all senses into the learning process, to activate different parts of the brain simultaneously, enhancing memory and the learning of written language.
3. Helps learners discover what learning style (V-A-Q) fits them best.
4. Provides more ways for understanding new information, more ways to remember it and more ways to recall it later.
5. Multisensory instruction integrates visual, auditory, tactile (touch) and kinesthetic (movement) learning elements, for more effective memorization.
6. Different teaching methods can only be used in specific
7. Helps learners discover their learning style and the learning-teaching techniques best for them.
8. Effective for all learners but particularly effective for dyslexic students. 9. Can be used in any subject from reading to math to science and drama. 10. Enabled more and more by assistive technology, so as to see, hear, touch and move your way to understanding.

Advantages of multi-sensory Instruction:

1. All learners can benefit from multi-sensory lessons, including kids who don't have learning and attention issues. If a student learns something using more than one sense, the information is more likely to stay with him.

2. Students with dyslexia have trouble with language skills involving speech sound (phonological) and print (orthographic) processing and in building pathways that connect speech with print.

3. Children with sensory integration challenges sense information normally but have difficulty perceiving and processing that information because it is analyzed in their brains in a different way.

4. Multi-sensory learning can be particularly helpful for kids with learning and attention issues. For example, these kids may have trouble with visual or auditory processing. That can make it hard for them to learn information through only reading or listening. Multi-sensory instruction can help kids learn information more effectively. All kids can benefit from multi-sensory instruction.

5.3 ASSIGNMENT 1

Assignment 1: Select a Topic from the syllabus

Discuss using the multi-sensory learning approach.

Create a multisensory learning-teaching document in PPT

Practical Report FORMAT:

- Cover slide: Title, Affiliation
- Introduction : Case Study, needs, significance
- Presentation Content Slides
- Conclusion: Concept Maps
- Bibliography

5.4 SUPPORT MEDIA IN EDUCATION

Support media are those aids which supplement the teaching-learning process. Examples of support media are blackboard, whiteboard, computer, Radio, television, tablets, internet etc. Use of support media in the classroom is greatly helpful for the students in developing an understanding of complex concepts. The use of these devices enables the students to grasp concepts quickly and easily. Latest technological advancements present many options before the teachers to make their jobs easier. It is for this reason that teachers all over the world have started incorporating the use of support media in their lesson plans.

Use of support media in education:

- Students will gain knowledge of the latest in evolving theoretical and practical application in the communication field utilizing various resources and methods of inquiry.

- Students will grow intellectually in their oral and written communication and critical thinking skills.

- Students will become aware of the ethical and spiritual implications of communication on a diverse and global level.
- Students will be knowledgeable of the latest in technology, software applications, and visual communication skills with the ability to demonstrate the skills in using technology.

Advantages:

1. It helps to make the learning process more effective and conceptual.
2. Its helps to grab the attention of students
3. It builds interest and motivation teaching students learning process
4. It enhances the energy level of teaching and students
5. It is even better for over burden classrooms
6. It provides students a realistic approach and experience.

Limitations:

1. It's easier to lose focus
2. Requires a well-designed presentation or material
3. Participants might pay more attention to the graphics than the audio.

Projected Support Media:

Overhead Projector, Slide Projector and LCD Projector

OHP: In the early 1980s–1990s, overhead projectors were used as part of a classroom computer display/projection system.

An overhead projector having a flat, glass transparent top, on which a sheet like transparency (cellulose acetate) is placed, and an overhead mirror that reflects the image on the transparency onto a screen or a white wall. A projector was capable of projecting enlarged images of written or pictorial material onto a screen or wall from a transparency placed horizontally below the projector and lighted from underneath. The overhead projector facilitates an easy low-cost, interactive environment for educators. Teaching materials can be pre-printed on plastic sheets, upon which the educator can directly write using a non-permanent, washable color marking pen (OHP pens). This saves time, since the transparency can be pre-printed and used repetitively, rather than having materials written manually before each class.

Slide Projector: A slide projector is a device that is used to view photographic slides by using optical and mechanical methods. It contains an electric light bulb. Focusing lenses, Reflector and condensing lenses, a holder that holds the slide. Slide projectors were common in the 1950s and 1960s as a form of entertainment; family members and friends would gather to view slideshows. In-home photographic slides and slide projectors have largely been replaced by low cost paper prints, digital cameras, DVD media, video display monitors and digital projectors.

LCD Projector : Liquid Crystal Display projectors are as different from Overhead and Slide projectors. Where overhead and opaque projectors primarily use 19th century technology (electricity and light bulbs), LCD projectors use liquid crystal panels plus the latest computer and optical technology to project both still and moving images in vivid color. Many projectors also have built-in audio speakers, making them all-in-one audiovisual presentation units.

LCD video projectors are rapidly becoming standard fixtures in many educational organisations across the country. Teamed with a computer (desktop or laptop), DVD player or other media device, the LCD projector displays clear, high-resolution images and video to a classroom of students. Schools and colleges use them to replace traditional film and overhead projectors as well as to develop new applications. Falling costs technology have made LCD projectors increasingly attractive for even the most budget-conscious schools.

Check your Progress

1. Compare between the OHP and LCD Projectors

2. Describe the benefits of the Slide Projector.

5.5 NON-PROJECTED SUPPORT MEDIA

Information and communication technology is a prime concern as well as a top national objective in many countries. The contribution of ICT in higher educational fields is unquestionable. The steady increase in bandwidth and computing power available have made it possible to conduct complex calculations on large data sets, use of online full text databases and online libraries/forums to access diverse information in depth. Rapid development of Information and Communication Technology (ICT), with the help of the Internet, is one of the most interesting phenomena that has characterized the Information Age.

Three Dimensional Aids:

1. **Globes**: like maps, facilitate understanding of international political & economic involvement. A globe is the most basic equipment of the geography class and helps to explain the shape of the earth, the position of different places, time zones etc. globes make available the following geographical information:

- Surface features – plains, rivers, mountains etc.
- Places, directions and distance.
- Scientific data such as ocean currents.
- Social and cultural data such as population, language etc.
- Political data such as country and state boundaries.

2. Models:

are 3 dimensional concrete replicas of real things. They are the reproduction of costly or delicate items which are safe to use. They may be smaller than the real size for the sake of space, economy and for convenient study. A working model or 'cut away' provides an interior view of objects, which are normally covered or otherwise invisible. E.g. model of the eye, ear etc.

3. Mock-up:

is a simplified version of reality. It is a representation of the real thing constructed, so as to highlight essential parts or functions and eliminate unnecessary details. It is useful in giving training in complex skills e.g. a simulator.

4. Dummy:

is a stuffed object looking like the original in all ways. Rare animals and birds can be made available for study in the dummy form.

5. The real object:

Real objects are available freely but the challenge is to locate and acquire them and find profitable ways in which to put them to work. Real objects like living animals, plants, preserved materials; mounted specimens etc. may be available commercially. Real things may be of 2 types – modified and unmodified. The unmodified real things are alive or they work and can be operated. E.g. a rabbit or an automobile engine. In modified real things, parts may be separated and rearranged.

6. Specimens:

A specimen may be a part of the environment or it may be part or some aspect-item it is generally a typical sample of the character of others in the same class or group. E.g. live snakes, unique lizards, rock samples etc.

7. **Diorama:**

A diorama is a three-dimensional scene in depth, incorporating a group of model objects or figures in a natural setting. It may be a small stage with objects blended into a realistic background. A diorama provides vividness and realism and is effective in the teaching of social and biological sciences.

8. Puppets:

are used very extensively in teaching especially in early childhood education. They make the class interesting and lively. They are mostly used for teaching languages. They are dolls usually representing human, animal or abstract figures that can be manipulated to give an illusion of life. There are 4 types of puppets – string puppets, hand puppets, rod puppets and shadow puppets. They cross the language

barrier. Puppetry is creative and has several purposes like a) developing social and moral values b) understanding various cultures c) understanding historical facts d) enhancing vocabulary, sentence structure and speech training e) cultivating aesthetic sense f) providing scope for personal development. It also has application in play therapy.

Two Dimensional Aids :

1. **Flash cards:** are small compact cards made out of cardboard or any other thick material. They are often used to convey a concept effectively in the form of posters, pictures, words and sentences. They develop in students the power of observation, identification, quick comprehension, retention. The communication of new ideas requires repetitive study methods, drill work and review of the topic. Flash cards provide an easy and simple medium for communicating the message. They also provide students with a systematic approach to drill work. However the disadvantage is that they cannot be used for too long as they become boring for children after a while.

2. **Map:** is an accurate representation on a plain surface of the earth or some part of it showing physical or political features. Maps are meant to show precision in relationship with space which in actual life enables us to tell exactly where a given place is located. Maps help students to visualize and localize important world realities and give an enormous amount of inspiration regarding size, shape, location of areas, distribution of people and water, animal and vegetable life. Economic and industrial resources and many other natural phenomena may be shown on it.

   Maps have several advantages. They make things vivid, concrete and interesting. They can be used along with blackboard teaching. They can also be used with posters, charts, photographs and models. Comparatively, they are easy to store, use and are often lightweight.

   However, they have certain disadvantages too. They cannot be updated and new maps need to be purchased. They only give a two-dimensional view. They deteriorate in quality when kept for a long period of time.

3. **Charts:** are combinations of graphical and pictorial media for the orderly and logical visualization of relationships between important facts, ideas and concepts. Charts serve the following purposes.

- They show relationships by means of facts and figures.
- They present matter symbolically.
- They summarize information.
- They present abstracts.
- They can be used to create problems and stimulate thinking.

- They encourage the use of other media of communication.
- They motivate and arouse student interest.

There are various types of charts:

1) Line charts (E.g. time table)
2) Flow or organization charts (e.g. classification charts)
3) stem or tree chart (e.g. to show mathematical concept)
4) compare and contrast charts (e.g. comparing maximum and minimum temperature)
5) Progress charts (used to record the progress of students).

5.6 ASSIGNMENT 2

Assignment 2 (a): Select a Topic from the syllabus

Design a chart, or a set of flash cards

Submit a Practical Report.

Assignment 2 (b): Select a Topic from the syllabus

Design a 3-dimensional Model

Submit a Practical Report.

SELF ASSESSMENT QUESTIONS:

1. Develop and manage a Social Networking site/Blog/Chat forum for college based on ICT courses.Write your reflections.
2. What is Educational Technology? State the various fields of education in which it is being applied in India. Describe its use in any one field.

5.7 CONCLUSION

Communication is an essential factor of knowledge construction. It is a key for opening the gates of knowledge and information to a knowledge seeker. ICT helps the educator in a quite effective way for communicating with a group of students in a classroom situation or masses in the informal/ non-formal communication situation for the proper realization of his teaching/Communication objectives. It reduces all types of confusion due to verbal-ism and provides an adequate impression on learners. Clarity of concepts. The education system is often large and dispersed. ICT has become the integral part of all facets of education. It helps in life long learning, better time management and being organized. Digital ethics and hygiene must be taught and reinforced at every level of computer use-from the novice user just learning to navigate a computer and the Internet, to an information professional whose job requires significant use of online

resources. Globalization of higher Education is basically a reality with the help of technology. ICT has brought a revolution in communication by the accessibility of opportunities. Self paced auto instruction related to curricular and non-curricular areas of learning like E-learning / Distance learning helps in reducing the gap of education. Accuracy, precision and speed has been accelerated in knowledge gaining, synthesis and presenting. Curiosity, inventiveness and construction of knowledge is much faster and feasible. Personality development to psychological analysis helps a learner to receive timely help for progress. Formal and In-formal education has got tremendous boost. Multi-sensory media and Multi-Media facilitates the inclusive within and outside classroom.

5.8 SELF ASSESSMENT QUESTIONS - ASSIGNMENT 3

1. List the educational uses of a computer.
2. Prepare your presentation (PPT / Video / Animation / StoryBoard / Doodle / online Concept-map) to demonstrate the use of any one LMS, for any one topic from your syllabus, based upon the ADDIE Model.
3. To get acquainted with technological tools and websites in education, go through any five educational websites/links and submit a report on it.

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