UNIT 5

INSTRUCTIONAL MEDIA

PRINT RESOURCES-Newspapers-Journals and Magazines –Science Encyclopedia
AUDIO RESOURCES-Radio Talk –Audio Tapes-DVDs/CDs.
VISUAL RESOURCES-Pictures-Flash Cards-Charts-Posters-Photographs-Models
ICT RESOURCES-Radio-Television-Internet, Multimedia, Interactive Whiteboard, Online Teaching Resources,
COMMUNITY RESOURCES –Zoological Gardens=Botanical Gardens ,Eco Park –Aquarium-Science Exhibition/Fair –Field Trip –New Emerging Media-Tele Conferencing ,Communication Satellites ,Computer Networking ,Word Processors, Blended Learning ,Flipped Classroom Artificial Intelligence And Augmented Reality .Qualities Of Good Biology Textbook Qualities Of A Biology Teacher

Introduction

Instructional media encompasses all the materials and physical means an instructor might use to implement instruction and facilitate student's achievement of instructional objectives. Instructional media carry messages with an instructional purpose. The design of the message andthe quality of teacher – learner interactions, not the medium, are what influences learning effectiveness. No one medium is capable of presenting all the required learning stimuli, so use a multimedia approach.

Classification of Instructional Media

Instructional Media are seen by educators as aids rather than substitutions for the teacher. Teachers spend a disproportionate amount of their time in routine chores – in collecting and assigning books, materials and in grading that could be partly obviated if aids could be so constructed as to free them to concentrate on the central job of promoting understanding, intellectual curiosity, and creative activity in the learner.

Instructional Media can be classified using their important characteristics. We will use four characteristics for this purpose:

- stimulation provided to sense organs

- learner's control over media

- type of experience they provide, and their reach

Classification of Media according to Sense they stimulate

The below lists media in a traditional classification i.e. according to the senses they stimulate and the message code they transmit. It may be noted that new emerging media stimulate more than one sense; they stimulate not just the ear or eye but both and sometimes touch. These media function in a more interactive way.

a) Audio media – focuses on sense of hearing

b) Visual media – involves sense of seeing

c) Audio – Visual – focuses on hearing and seeing

d) Multimedia – stimulates multiple sense (multisensory) which include hearing, seeing, touch,smell and taste.

Classification of Media

i) Audio

  * Voice (any human sender of the message)

 * Gramophone records

 * Audio tapes, to be used in a tape recorder or language laboratory

 * Stereo records / tapes

 * Radio

 * Telephonic conversation

ii) Visual (verbal) print or duplicated

 * Text books, supplementary books

   *Reference books, encyclopedia, etc.

 * Magazines, newspapers, etc.

 * Documents, clippings from published material

 * Duplicated written material

iii) Visual (non – projected, two – dimensional)

 * Messages / pictures on roll – up board
 * Flat picture, cut – outs

 * Posters, charts, graphs, etc.

* Cartoons, comics, etc.

iv) Visual (non – projected, three dimensional)

* Models, mock- ups, display materials

  *Diagrams

* Globes or maps (three – dimensional)

* Specimens (animate or inanimate)

* Puppets

v) Visual (projected – still)

  *Slides

* Filmstrips

* Overhead transparencies

* Micro image system; micro film, micro card.

vi) Audio – visual (projected – motion)

* Film

* Television

* Close – circuit television

* Video cassettes

vii) Multimedia packages (for more than one sense)

* slide + tape

* Slide + tape + work book

* Radio + Slide or posters (radio vision)

* Film + Posters + work book (print materials)

* Television + workbook (print materials)

* Any of the above + introductory and summarizing talk by the teacher / leader of the group.

viii) New emerging media (all of these are multisensory)

* Teleconferencing (Group discussion through telephones)

* Cable television (localized television where feedback is possible)

* Television / communication satellites

* Computer networking

* Video discs

* Mini computers / micro computers / word processors

Classification of Media according to the Learner's Control over them

Media can be used to classify them is the extent to which they can be controlled by the learner. While using a textbook or an audio tape for learning, the learner can use them at his / herown pace, he / she may go back and read the paragraph or listen to the part of the programme again and again. So these may be called learner – controlled media.

Now think of a television programme. The messages are transmitted according to the pace of the sender and it may not be appropriate for an individual learner. Mass media like radio or TV offer no control to the learner.

Thus various media can be placed on a continuum ranging from no control by the user to high control by the user. (Below table)

1	2	3	4
No control			High control
(TV, Radio)	Projected	Non – projected	(Computer, Tape recorder)
Media	Media		

All new emerging media are designed to provide more and more control to the learner over the learning process.

Classification of Media according to the Type of Experience they provide

Media can be classified on the basis of the type of experience they provide. The cone of experience has a broad base of direct purposeful experience which can be provided mostly through instructional media consisting of real objects, specimens and methods such as field visits, observation, experimentation, etc. As we move away from the base towards abstraction (verbal message only), we come across many instructional media which provide indirect or vicarious experiences. They differ in their degree of abstraction. Case studies, video and TV programmes provide more life – related experiences whereas radio or audio tapes tend to provideonly verbal experiences.

Classification of Media according to their Reach

Media can also be classified to the size of the group of learners (or an individual learner) for whom they are intended and used.

A computer – assisted instructional (CAI) programme, for example, is prepared for individualized learning. It takes into account the difficulties which may be encountered by the individual learner (who is learning on his her own without any help from the teacher or peers) in his / her learning and it aims at providing help to solve / overcome these difficulties.

Non – projected aids or graphic aids, such as charts, maps or models are used for a small group of learners. They are not quite useful to teach a class of 70 – 80 students.

Projected aids, such as slides or filmstrips can reach a larger group of their quality of enlargement. Media, such as TV, radio or newspapers (print) reach millions of people at a time. Hence they are called mass media.

Use of Mass Media in Classroom instruction
Mass Media
Mass Media is an important means of making teaching and learning more effective and interesting. A teacher needs to explore the full potential of these for more effective teaching.

Mass Media as agency or instrument through which ideas, attitudes, impressions or images are simultaneously communicated to a large number of people. Such media forms include not only the print and electronic forms such as newspaper, magazines, radio, television, etc. Mass Media are a popular non – formal agency of education. Although the mass media have been widely utilized in adult education, development activities.

John Dewey stated that education could not be limited within teacher and taught without social environment. So mass media is one such potent force in social environment in education. Through modern electronic techniques and technologies, mass media prove that education is, really comprehensive not confined within four walls of the classroom.

The Role of some important Mass Media in Education Radio

Radio has been playing a vital role in the field of education and Radio has established due credit in the field of education. Almost all the important centers of A.I.R. broadcast programmes on Education. These programmes are either related to general aspects of education or regular classes on topics for high school and higher secondary school education. Highly

Experienced teachers, teacher educators andresearch persons take part in such programmes. The Radio as a means of communication takes their voices to the millions of students and teachers listening to their programmes.

AUDIO RESOURCES: An audio tape recorder, tape deck or tape machine is an analog audio storage device that records and plays back sounds, including articulated voices, usually using magnetic tape, either wound on a reel or in a cassette, for storage. In its present-day form, it records a fluctuating signal by moving the tape across a tape head that polarizes the magnetic in the tape in proportion to the audio signal. Tape-recording devices include reel-to-reel tape deck and the cassette deck. Talk radio is a radio format containing discussion about topical issues. Most shows are regularly hosted by a single individual, and often feature interviews with a number of different guests. A talk show or chat show is a television programming or radio programming genre in which one person discusses various topics put forth by a talk show host.

DVDs/CDs: A compact disc (CD) is a small, portable, round medium made of molded polymer (close in size to the floppy disk) for electronically recording, storing, and playing back audio, video, text, and other information in digital form. Tape cartridges and CDs generally replaced the phonograph record for playing back music. At home, CDs have tended to replace the tape cartridge although the latter is still widely used in cars and portable playback devices. DVD is an optical disc technology with a 4.7 gigabyte storage capacity on a single-sided, one-layered disk, which is enough for a 133-minute movie. DVDs can be single- or double-sided, and can have two layers on each side; a double-sided, two-layered DVD will hold up to 17 gigabytes of video,audio, or other information. This compares to 650 megabytes (.65 gigabyte) of storage for a CD-ROM disk.

As for as possible, the teacher should try to integrate the radio programme with regular classroom instruction. The teacher can put up a list of progammes to be broadcast every week, on the classroom notice board so that the students keep track of the programmes. The students may be asked to take noteson the programmes and the teacher can follow it up with a discussion on the following day.

1. **Television**

Television has the greater advantages as it not only conveys the messages through sound, but also depicts the content with relevant pictures, figures and scenes. The teacher can supplement his regular teaching by making use of the relevant educational programmes telecast by Doordarshan in English and in regional languages. The list of programmes are published in advance in leading newspapers and the teacher can make use of this list as a guide to select the programmes should be based on the students' level of achievement and capacity to understand before the students view the programmes, they should be properly motivated, should be told what to look for, how to view the programme and how to pick up the key points. After viewing the programme the teacher can discuss with the students about the important points and ask questions for clarification and summarisaion. Though this is an interesting aid for teaching, the major disadvantage is that if the students are not able to follow any part of the programme, there is no way of replying. It for viewing it once again or interacting with the expert for clarification. This can be overcome if the teacher records the programmeand views it along with the students, interacting and clarifying s and when it is required.

Eg: Bank, Post-office, share market etc.

The teacher should try to take advantage of such learning opportunities by making himself and his students fully conversant with such programmes

2. News paper

Newspaper is an economical, effective and exciting teaching aid. It provides supplemental, supportive teaching materials. Using the newspaper bridges the gap between classroom learning and real-world living, helps foster global awareness and understanding of local issues, creates informed citizens, offers examples of conflict and resolution and fosters reading thinking and writing skills. In addition, using newspapers in class can encourage positive students' attitudes toward reading, improve skills, motivate students to talk with their peers and parents about what they read and help students learn how to solve real-life problems.

The statistics given in the newspaper in the form of weather charts, the prices of various commodities, budgets of stage and central government, interest rates of various private and government agencies stock and shares etc. All provide good means for making the teaching interesting useful and purposeful.

VISUAL RESOURCES

Pictures: Pictures are kinds of visual instruction materials might be used more effectively to develop and sustain motivation in producing positive attitudes towards English and to teach or reinforce language skills. Pictures attract children and motivate them like to learn English so pictures are unlikable things to teach and learn English. Picture is visual presentation of human, places, or things. The use pictures are more effective than the use words because they are easier to remember and retell. Children can see pictures, recall and retell or describe a human, a place, a thing or a specific situation that is shown in picture. It is much clearer than remembering boring words.

Flashcard: A flashcard or flash card is a set of cards bearing information, as words or numbers, on either or both sides, used in classroom drills or in private study. One writes a question on a card and an answer overleaf. Flashcards can bear vocabulary, historical dates, formulas or any subject matter that can be learned via a question-and-answer format. Flashcards are widely used as a learning drill to aid memorization by way of spaced repetition. Flashcards exercise the mental process of active recall: given a prompt, one produces the answer. Beyond the content of cards, which are collected index, there is the question of use – how does one use the cards, in particular, how frequently does one and how does one react to errors, either complete failures to recall or mistakes? Various systems have been developed, with the main principle being spaced repetition increasing the review interval whenever a card is recalled correctly.

Charts : A chart, also called a graph, is a graphical representation of data, in which "the data is represented by symbols, such as bars in a bar chart, lines in a line chart, or slices in a pie chart". A chart can represent tabular numeric data, functions or some kinds of qualitative structure and provides different info. The term "chart" as a graphical representation of data has multiple meanings. Charts are often used to ease understanding of large quantities of data and the relationships between parts of

the data. Charts can usually be read more quickly than the raw data. They are used in a wide variety of fields, and can be created by hand or by computer using a charting application. Certain types of charts are more useful for presenting a given data set than others. For example, data that presents percentages in different groups are often displayed in a pie chart, but may be more easily understood when presented in a horizontal bar chart. On the other hand, data that represents numbers that change over a period of time might be best shown as a line chart.

Posters: There are many teaching aids available to help improve your student's learning. Educational posters are an excellent teaching aid that can help children with spelling & comprehension, mathematics, language, geography, science, history and many more subjects. Educational posters are an excellent source for students to read and learn from when focusing on a specific subject. It is proven that visual learning is one of the most popular methods of learning that people find most effective. At Teach Starter, we have used this knowledge and developed a number of educational posters that help children learn through the use of visual aids. Educational posters are eye catching and visually appealing. The use of bright colours and bold text is helpful for getting the attention of children and adults. There are many benefits of having educational posters in your classroom or at home. Posters can be interactive as laminating certain posters means that students can write on them and then reuse them in the future.

Photograph: A Photograph is worth a thousand words through which a complex idea can be conveyed with just a single still image. Pictures make it possible to absorb large amounts of data quickly. Using photographs for explaining complex phenomena is one of the teaching aids of modern education system all over the world. As the world is changing day by day so are the methods of instructions as the modern curriculum requires conceptual elaborations. Visual aids have the tendency to materialize the thoughts of students in the form of graphics to give thoughts a concrete frame of reference. Use of photographs is important for students because they are more likely to believe findings when the findings are paired with colored images describing complex situations during learning as opposed to other representational data such as complex book text.

Models: Many researchers have tried to put together classroom- or school-based models that describe the teaching-learning process. A model is a visual aid or picture which highlights the main ideas and variables in a process or a system.

Importance of Mass Media

1. Mass Media provide information to the mass within a less time.

2. It takes a wide coverage of information regarding anything that is happening in any comer ofthe world.

3. It brings the entire world to the individual or to the classroom. Children spend hours togethersitting in front of the television and can visualize, hear and acquire knowledge about the world.

4. These media easily reach groups, allow repeated use, give more reality, influence attitudes, show cause and effect relationships and ultimately motivate the audience.

5.It sends information to remote places and helps in distant learning.

6.It helps in modification of attitudes, inculcation of desirable values and acquaintance with cultural heritage.

7. Mass media acts as an agency of social change.

8. Mass media are useful for reinforcing group dynamics and interpersonal communication.

9. Mass media as means of communication make ideas clear to children and help them to acquirecorrect knowledge. They help in simplifying and in giving vividness to explanation.

Using Mass Media

The teacher should make all necessary arrangements for using the mass media very effectively. He / She should select the mass media according to the age level of the students. He must know some general principles of using the mass media.

1. Organization:

Mass Media should be organized as integral part of the educational programmes. They should not be separated from other curricular activities.

2. Selection:

Mass Media should be properly selected and coordinated by the teacher. An

experienced and trained teacher can select the mass media according to the needs of the students.

3. Planning:

Mass Media should be available according to the need of the instructional programme. The teachers should possess skill in the use of mass media. They should have special training in their preparation. So they should be properly planned.

4. Experience:

Mass Media should be related to pupil's experience.

5. Preparation:

There should be adequate preparation on the part of pupils. The teacher should prepare himself before using it. He / She should know what the mass media teach and where they fit intohis plan of teaching. Adequate preparation should be followed by proper presentation and an adequate follow – up.

6. Evaluation:

Mass Media should be evaluated at regular intervals in regards to their use, effect on learning and their functions.

Advantages of Mass Media

➢ It educates individuals. People get to know regarding health problems, environmental protection, and more via television and radio programmes.
➢ In a very short period of time, citizens get the latest information. Distance does not constitute an obstacle. Via the newspapers, individuals get information every day and thismakes everyone updated on the current events.
➢ People have to bring their secret talents. In the media, their skills like acting, comedy and singing are demonstrated.
➢ The awareness in children is growing. From quiz programmes, animal programmes, and so on, children will understand.
➢ Radio is useful as individuals obtain brief news and can reach it via a cell phone and many more.

Disadvantages of Mass Media

➢ It contributes to individualism. On the website and watching tv, people waste too muchtime.

➢ As a consequence, it is affected by social interactions with friends, relatives andneighbours.

➢ Some content in the media is not appropriate for children.

➢ It can be tough to restrict children's access to certain stuff.

- Papers are geographically limited.

- Increased advertisements on TV and radio makes them less interesting.

- The Internet opens up the possibilities of fraud, theft and hacking as a type of entertainment.

New Emerging Media

The emergence of online technology, the production, distribution and consumption process of information has been changed. Printed and Audio –visual resources have shifted their importance to the online editions. Each and every media houses in India now have their own websites. Especially the electronic communication with the internet driven technology has brought lots of innovations. The new forms of media have created opportunity for interactions between the teachers and students. These new forms of media are known as Emerging Media.

Meaning and Definition

In common parlance by "emerging" we mean "upcoming". So "emerging media" we mean by upcoming media used to access information. It is very difficult to define exactly what the emerging media meant by. As media is evolving in nature so also its various forms. World Wide Web, Internet and digital technology have influenced both print and electronic media.

Neuman (1991) has defined the concept of emerging media more than a decade ago. He argued that what we define as emerging media will a) alter the influence of distance, b) increase the volume and speed of communications, c) enable interactive communications and d) permit the merging of media forms.

Thus we can define emerging media as "media used to share and exchange information with the use of emergent digital technologies having the feature of interactivity, on – demand and faster speed'. Thus emerging media not only contain new medium of communication but should also have the faster speed of delivery of information. New media definitions remain fluid and areevolving, with some definitions of new media focusing exclusively upon computer technologies and digital content production whilst others stress the cultural forms and contexts in which technologies are used (Dewdney & Ride, 2006).

Teleconferencing

Teleconferencing means the conferencing made possible among the participants even by staying at a large distance from each other. Since, face to face interaction (FTF) interaction is the traditional standard for holding conferences (or interactive group communication). However, holding of such conferences becomes a tiresome or a long task when the people involved in theseconferences are located at a very far distance. The time, money and energy spent in bringing people together for these conferences create various problems. The alternative lies in the changing to teleconferencing leaving behind the traditional face to face method of conferencing.

Therefore, teleconferencing can be defined as an interactive group communication or a real time interaction between two or more people in two or more locations through an electronic medium.

Teleconferencing was introduced for the first time in 1960s with American Telephone and Telegraph's picture. Teleconferencing brings people together under one roof even though they are separated by thousands of miles for the exchange of information and opinion.

Types of Teleconferencing Used in Education

Today, Teleconferencing has vast use with the great advances made in the field of communication through modern software and hardware technologies. It is of three basic types, which as follows:

1. Audio Conferencing Technologies

These technologies can be further classified depending on medium used as audio andaudio graphic as shown in the following figure.

Audio Conferencing

It is basically natural extension of the person to person telephone call done for enabling communication and conversion among more than two persons at a time. Distance learning can beconducted by audio conference. In fact, it is one of the most underutilized, yet cost effective methods available to education. Instructors should receive training on how to best utilize audio conferences to augment other forms of distance learning.

Audio graphics

Uses narrowband telecommunications channels to transmit visual information such as graphics, alpha – numeric, documents, and video pictures as an adjunct to voice communication. Other terms are desk – top computer conferencing and enhanced audio. Devices include electronic tablets / boards, freeze – frame video terminals, integrated graphics systems (as part ofpersonal computers), Fax, remote – access microfiche and slide projectors, optical graphic scanners, and voice / data terminals.Audio graphics can be used for meetings and distance learning.

2. Video conferencing

Combines audio and video to provide voice communications and video images. Can be one – way video / two – way audio. It can display anything that can be captured by a TV camera.The advantage is the capability to display moving images. In two – way audio / video systems, a common application is to show people which create a social presence that resembles face – to –face meetings and classes and enables participants to see the facial expressions and physical demeanor of participants at remote sites. Graphics are used to enhance understanding. There are three basic systems: freeze frame, compressed, and full – motion video.

Video conferencing is an effective way to use one teacher who teaches to a number of sites. It is very cost effective for classes which may have a small number of students enrolled at each

site. In many cases, video conferencing enables the institution or a group of institutions to provide courses which would be canceled due to low enrollment or which could not be supportedotherwise because of the cost of providing an instructor in an unusual subject area. Rural areas benefit particularly from classes provided through video conferencing when they work with a larger metropolitan institution that has full – time faculty. Through teleconferencing, institutions are able to serve all students equitably. This learning was carried out using the Zoom platform, Google Meet, etc.

3. Computer conferencing

Uses telephone lines to connect two or more computers and modems. Anything that can be done on a computer can be sent over the lines. It can be synchronous or asynchronous. An example of an asynchronous mode is electronic mail. Using electronic mail (E – mail), memos, reports, updates, newsletters can be sent to anyone on the local area network (LAN) or wide area network (WAN). Items generated on computer which are normally printed and then sent by facsimile can be sent by E-Mail.

Computer conferencing is an emerging area for distance education. Some institutions offer credit programs completely by computer. Students receive texts and workbooks via mail. Through common files assigned to a class which each student can assess, teachers upload syllabi,lectures, grades and remarks. Students download these files, compose their assignment and remarks off – line, then upload them to the common files.

Computer conference can be structured so that each student must interact with peers in solving problems. Because this interaction is tangible and visible, the learning may be even more "active" than it is non – computer cooperative learning situations. It can be an avenue for students to experience success. The response time for questions is provided and the

student isn't intimated by others who are faster. This develops confidence and will make the experiences more enjoyable rather than something to be feared.

Advantages of Teleconferencing

The educational benefit of teleconferencing is enlisted in points, which are as follows:

1. It saves time, money and energy of the participants by allowing them to participate in the conference from their own places, instead of travelling to a long distance.

2. It helps the students and teachers in getting up to date to information and experiences relatedto their topics and areas of interest by communicating with the people and sources of authenticity.

3. It provides good sources of communication in the form of exchange of ideas and knowledge, sharing of experiences, execution of common projects, doing surveys and investigations, writing of a report, working in team, etc. for a number of students or

institutions scattered in a worldwide.

4. It reduces the wastage of time and other resources that usually occurs in fulfilling social formalities during the face to face traditional conferencing. Here, the contacts are shorter and purpose is oriented primarily.

5. The members can participate more freely and equally with their adequate preparation as compared to the traditional face to face conferencing.

6. The advanced technology available through audio – plus teleconferencing, video conferencingsupported by computer technology helps the learners and teachers in gaining useful experiences in the form of audio – instructions and auto – training that works according to their learning paceor learning speed, availability of time and diversities in the interests, specially through e – mail transaction and web – conferencing.

7. Teleconferencing has made it possible a unique collaboration and cooperation among differentsubject experts, teachers and students of different capabilities and interests for fulfilling their thirst of knowledge and sharing their thirst of knowledge and sharing their contribution in the field of education. The barrier of distances and timings have been eliminated through on – line chatting and video display of the information available on websites, for the useful interaction among the people who want to acquire knowledge or discuss something related to information.

Disadvantages of Teleconferencing

Teleconferencing has certain inherent limitations, due to which it is not in frequent use in education. Some of these are as follows:

1. Teleconferencing requires a huge and very efficient telephonic, radio and television networkthroughout the country.

2. The chances of technical breakdown are quite high.

3. The telephone charges are very high, which all the educational institutions cannot afford.

4. Teleconferencing is a costly technique of instruction. It requires sophisticated technology andexpert human power.

5. Teleconferencing is a mode of group communication, so the willingness of each participant isan essential requirement, but this is generally lacking especially among distance learners.

6. It takes time to organize.

Communication Satellite

A communications satellite is a wireless communication device in Earth's orbit that usesa transponder to send and receive data from Earth. It is primarily used to redirect communication data from one Earth – based communication station to another station. Typically, a communications satellite works when it receives data from terrestrial stations in the form of electromagnetic waves. The data is usually sent via large satellite dishes. Based on the intended destination, the communications satellite redirects the waves to the corresponding station.

The communication satellite was Echo 1 launched in 1960. Relay 1 and Telstar 1, both launched in 1962, were the first active communication satellites. INSAT – 4A was India's first communication satellite.

Communications satellites are vital for remote areas that do not have access to traditional landlines for telephone or Internet services.

Satellite Instructional Television Experiment (SITE)

SITE was the largest communication experiment in the use of satellite in support of developmental programmes in modern times. SITE covered four different language regions but children of other regions also watched these programmes on school days. Though the programmes were meant for children, other also viewed the programmes within the school. These were not based on school syllabi but intended to provide general enrichment.

Governments of each state receiving SITE programmes were responsible for electrifying theschool, which housed the television receiver.

An important highlight for SITE was teacher training through multimedia. Nearly, 50,000 teachers were exposed to this training in two installments. Experts planned the lessons. SITE experiment drew attention of the world. Two international teams,one sponsored by United Nations and other by Common wealth Broadcasting Association toured the SITE areas and gave favorable reactions.

INSAT

The Indian National Satellite system is one of the largest communication satellite systemsin the Asia Pacific Region. It is the multipurpose and Geo- stationary communication system. It is launched by ISRO. Commissioned in 1983. INSAT is being used for education and development. Institution such as NCERT, UGC, IGNOU produce educational TV programmes for broadcast on the national channel through INSAT.

The major objectives of INSAT were:

- To produce and transmit varied programmes designed to awaken, inform, enlighten, educate, entertain and enrich all sections of the people in different parts of the country.
- To promote alternative approaches to education for children, youth and adults.
- To stimulate interest and involvement of people in economic development.

EDUSAT

With the success of the INSAT – based educational services, a need was felt to launch a satellite dedicated for educational service and ISRO conceived the EDUSAT project. EDUSATis the first exclusive satellite for serving the educational sector. It is known as GSAT-3. Its first operational flight took place on 20th September 2004 from the Satish Dhawan Space center Sriharikottah. EDUSAT had manifold objectives – to supplement the curriculum based teaching, imparting effective teacher training, providing access to quality resource persons and new technologies, thus finally resulting in taking education to every nook and corner to India. EDUSAT provided connectivity to schools, colleges and higher levels of education and also supported non – formal education including development communication. It was the first dedicated "Educational Satellite" that provides the country with satellite – based – two –way communication to the classroom for delivering educational materials.

For Example, one program allows students to send video questions to any teacher in any teacher in any connected classroom, anywhere in India, using a streaming video card over the EDUSAT satellite. The teacher then responds to these questions through EDUSAT. The satellite also will be used in teacher training.

Objectives of EDUSAT

- Providing support to formal and non – formal education

- Teachers understanding program

- Increasing access to quality resource persons

- Enhancing community participation

- Taking education to remotest corner of the country.

Uses of EDUSAT

- Conventional Radio and Television broadcasting

- Interactive Radio and Television

- Exchange of data

- Teleconferencing both one way and two way, Audio conferencing & computer conferencing
- Web based education

Characteristics of Communication Satellites

The characteristics of all communication satellites are similar. These are:

i)   Power: A live satellite does not require conventional power to maintain its position in space, except tiny amounts of energy necessary to correct its position occasionally. The power for receiving and transmitting signals comes from the solar batteries built into the satellite. These batteries are recharged. Solar panels, which convert sunlight into electrical energy, are used for the functioning of the satellite system.

ii)   Large coverage: Satellite-based communication is independent of distances and serves the rural and urban, central and far flung areas simultaneously. It can cater to very widely dispersed populations at a time. This characteristic of the satellite is particularly useful for education at a distance. Space scientists claim that three satellites in the geo-synchronous altitude orbit can provide communication services to the entire earth on a full time basis, except for the Polar Regions, which are not visible from this orbit (Nicholson, 1976).

Multi-purpose uses: Satellites can be used simultaneously for the radio, telephone, television and data traffic. Multi-purpose satellites offer a wide variety of combinations. Besides serving communication purposes, the satellites are also used for remote sensing, such as is required in soil surveys, flood (assessment of area under water, etc.), forestry (tree resources, treediseases, etc.), oceanography, etc.

iii)   Cost: The initial investment in the development and launching of a satellite is very high, especially for the third world countries. A multipurpose satellite such as INSAT needed a huge financial allocation in its fabrication and launching. But when INSAT-IB was launched and became operational, all demands for communication were met without adding new investment. On the other hand, the terrestrial system, including the microwave, needed additional infrastructure to meet the increasing information needs of a country. Expanding telecommunication infrastructure to provide communication services to different parts of the country is not always an economically rational thing to do. Because telecommunication for educational purposes cannot produce sufficient revenue to cover capital and operational costs, the costs in this case should be counted in terms of social and economic benefits, such as roads, water supply systems, schools, etc.

iv)   Planning: The implementation of satellite-based communication requires advance planning. Itneeds more lead time than terrestrial communication does. Therefore, the use of satellites should be linked to the overall socioeconomic and educational development of the country. Since it (satellite based communication) is closely linked with the educational development and economic growth of the country, it should have a base in long term planning.

v)   National and area specific communication: Satellite-based communication has the capability to cater to both the national and the area specific needs of a country. It can be regionalized as well which can provide area-specific service.

vi)   Life of a satellite: The use of solar panels/cells describes the life of a satellite. The electrical energy output from a solar cell will decrease with age: after 8 to 10 years, the electrical output from a solar cell will decrease by about 20 per cent. The communication satellite is generally replaced after about 10 to 12 years of continuous service. For example the life span of Indian satellite- INSAT-1A and IB was seven years. Launched in August, 1983, INSAT-IB completed over 108 months of operational service in August, 1992.

Advantages of Communication Satellite

1. The communication satellite services are very helpful for the people staying in a remote area.
2. It is used for mobile as well as wireless communication applications find at independentof location.
3. It is enhanced the business and education sector due to the silent advantages of a satellite communication system.
4. Television and radio signals are the most important part of the communication system
5. Data communication can be done with the help of satellite communication.
6. It is very helpful for the department of defence.
7. It covers wide area of the earth hence entire country or region can be covered with justone satellite.
8. It is being so portable and is very easy to install and also have user – friendly.

Disadvantages of Communication Satellite

1. The satellite has a life which is about 12 – 15 years. Due to this fact, another launch hasto be planned before it becomes un – operational.
2. Satellite manufacturing requires more time. Moreover, satellite design and development requires a higher cost.
3. Satellite once launched requires to be monitored and controlled on regular periods so thatit remains in the orbit.
4. The redundant component is used in the network design. This ensures more cost in the installation phase.

Computer Networking

Computer Network is an interconnection between computers or we can say computer network is group of computers linked to each other which enables one computer to communicate with another computer. It acts as basis of communication in Information Technology. It is systemof connected computing devices and shares information and resources between them. The devices in network are connected by communication links and share data by data communication system.

An example of computer network includes let us think about classroom and in class, two friends are there with their own laptops, but communication between two processes is establishedeven if the two laptops are physically separated means they are in computer network.

Types of Computer Networking

There are five main types of computer Networks:

1. LAN (Local Area Network)

Systems connected in a small network like in a building or a small office. It is inexpensive. Two or more personal computers can be connected through wires or cables actingas nodes. Transfer of data is fast and highly scores.

2. PAN (Personal Area Network)

The smallest computer network. Devices may be connected through Bluetooth or other infrared enables devices. It has a connectivity range of up to 10 meters. It covers an area of up to 30 feet. Personal devices belonging to a single person can be connected to each other using PAN.

3. MAN (Metropolitan Area Network)

A network that can be connected within a city, for example, cable TV connection. It has ahigher range. This type of network can be used to connect citizens with the various organizations.

4. WAN (Wide Area Network)

A network which covers over a country or a large range of people. Telephonic lines are also connected through WAN. Internet is the biggest WAN in the world. Mostly used by Government organizations to manage data and information.

5. VPN (Virtual Private Network)

A Network which is constructed by using public wires to connect to a private network. There are a number of systems which enable you to create networks using the internet as a medium for transporting data.

Advantages of Computer Networking

1. Ease of accessibility

Modern computer networks are easy to explore. So, even if you are a kid or a person new to technology, you'll find it easy to connect.

2. Flexibility

It means that different people will be able to explore different things as per their requirements. For this purpose, computer networks provide you a wide array of choice to share a particular piece of information. For example, e – mail or messaging apps like whatsapp. So, thereis flexibility for different users.

3. Convenient resources sharing

The main aim of a computer network is to enable sharing of resources among its users. You can use resources such as printers, scanners and photocopy machines that can be shared across multiple users. This resource sharing is important for big companies as they can use one single common network for connecting with their employees.

4. Connectivity

Computer networks improve connectivity irrespective of a person's location. In these testing times, we can see live examples as we use video call apps or Google documents to connect with our friends and colleagues.

5. Security

Computer networks provide security through authorization. Authorization is done via user id and password. So, it ensures that when we log in, we are only able to do it when there is a perfect match between our details and the details stored in the database.

6. Great storage capacity

Organization has an abundance of data that needs to be stored. For that purpose, they are required to store them in a central server. A central server is a remote server that is accessible to each and every employee. So, if in case one loses the data, others have it.

7. Reduced cost

Cost is one of the crucial factors that one needs to consider while evaluating the pros and cons of a particular technology. In networking, a central server is used that enables companies to store files in one place and thus reducing file storage expenses.

Disadvantages of Computer networks

1. Lack of robustness

Computer networks rely on the main server called the central server. If the central server malfunctions or there is an issue in the central server, then the entire network would stop functioning. So, this is a major disadvantage due to dependency on a single server.

2. Spread of Computer Virus

As computers in a network are interconnected, there is a high probability that if one of the computers is affected by the virus, others too can get affected. This spread can actually damage the entire system. Also, if the central server gets corrupted, then it's quite dangerous as the network depends on the central server.

3. Independence issues

The entire networking system is based on a centralized server, so it lacks independence. So, individual users lack the freedom to use the computer as per their wish.

4. Lack of productivity

Since a network has a lot of advantages and applications, it is certain that it results in simultaneous use of many services that cause distraction. Thus, due to employees focusing on a myriad of tasks, productivity issues are quite common.

Word Processor

A word processor is a type of software application used for composing, editing, formatting and printing documents. Word processors have a variety of uses and applications within the business environment, at home and in educational contexts. It is an important tool to document something that to write about some information on the topic. It is a great alternative to pen and

paper.

One example of a Word Processor is Microsoft Word, but other word processing applications are also widely used. Examples include : Microsoft work word processor, open office writer, Word Perfect and Google Drive Document.

In addition to typing text, the word processor allows you to add content such as pictures, tables, and charts to your documents as well as decorative items including borders and clipart. The editing and formatting capabilities of the word processor demonstrate the applications true power. Text can be inserted, edited, moved, copied or deleted within your document and the appearance of the text can be modified in numerous ways. Most word processor also give you're the ability to check your spelling and grammar and many have built in dictionaries and other tools to assist you in your writing.

Features of Word Processor

Insert text : Allows you to insert text anywhere in the document.

Delete text : Allows you to erase characters, words, lines or pages.

Cut and paste: Allows you to remove a section of text form one place in a document and insert (paste) it somewhere else.

Copy : Allows you to duplicate a section of text.

Page size and margins: Allows you to define various page sizes and margins, and the word processor will automatically readjust the text so that it fits.

Search and replace : Allows you to direct the word processor to search for a particular word or phrase.

Word wrap: Automatically moves to the next line when you have filled one line with text, and itwill readjust text if you change the margins.

Print: Allows you to send a document to a printer to get a hard copy.

File management: Provides file management capabilities that allow you to create, delete, move and search for files.

Font specification: Allows you to change fonts within a document. For example, you can specify bold, italics and underlining. Most word processors also let you change the font size and even the typeface.

Windows : Allows you to edit two or more documents at the same time. Each document appearsin a separate window. This is particularly valuable when working on a large project that consists of several different files.

Spell checking: Identifies words that don't appear in a standard dictionary.

Footnotes and cross – references : Automates the numbering and placement of footnotes and enables you to easily cross – reference other sections of the document.

Automated lists : Automatically creates bulleted or number lists, including multi –level outlines.

Graphics : Allows you to implant illustrations, graphs, and possibly even videos into a document. Some word processors let you create the illustrations within the word processors let you create the illustrations within the wordprocessor; others let you insert an illustration produced by a different program.

Internet features: Allows you to implant web links into their documents and format their documents for the web. Some also link to web services that can help users create their documents.

Word Processor

Word Processor can be used to write journals in which students make entries such as explaining and justifying problem solutions relating their understanding of a concept or preparing a project report.

Advantages of Word Processor

1. Time Saving - people can generally type words faster than they can write using a pen. This means they take less time to create a document when typing.
2. Clarity - Word processors have fonts that help make the document clear or easy to read as compared to different handwriting.
3. Synchronization - people in two different locations can create a document through

synchronization. This means both can edit and add content almost simultaneously.

4. Spell checking - word processors have automatic spell checking features that help in error elimination. They also allow for grammar correction in certain instances.

Disadvantages of Word Processor

1. Expensive - not everyone can afford a computer which is essential in using wordprocessors
2. Need for powered computer – when there is a power blackout, word processors cannot be used since computers require power to function.
3. Too many options – some word processors have too many options which make them difficult to use for those who do not have experience.

Blended Learning

Blended learning is a planned combination of online learning and face-to-face instruction using variety of learning resources. It is a flexible learning strategy that integrates innovative and technological advances of online learning with interaction and participation of traditional face-to- face classroom learning. Blended learning as a way of meeting the challenges of tailoring learning and development to the needs of individuals by integrating the innovative and technological advances offered in the best of traditional learning.

Blended learning strategies vary according to the discipline, the year level, student characteristics and learning outcomes, and have a student-centered approach to the learning design. Blended learning can promote learner s access and flexibility, increase the level of active learning, and achieve better student experiences and outcomes.
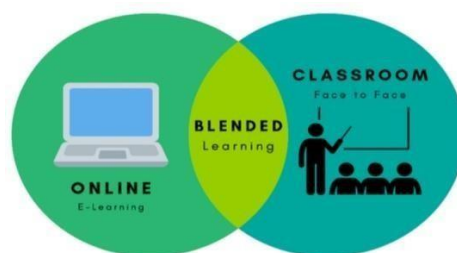
For teachers, blended learning can improve teaching and class management practices. A blend might include:
• Face-to-face and online learning activities and formats

- Traditional classes with different modalities, such as regular, weekend, evening, part time,semester
- Use of technology interfaces like social media, wikis and various web sources
- Group work, Simulation, debate, Online Assignments, Practical etc.
- Both usual classroom human factors and digital learning resources of the web
- Psychological concerns are addressed in the face to face interaction and technological
- Concerns are addressed in the online learning

So incorporating all these aspects in the learning environment, "Blended learning should be viewed as a pedagogical approach that combines the effectiveness and socialization opportunities ofthe classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities. In other words, blended learning should be approached not merely as a temporal construct, but rather as a fundamental redesign of the instructional model with the following characteristics:

1. A shift from lecture- to student-centered instruction in which students become active and interactive learners (this shift should apply to the entire course, including face-to-face contact sessions).
2. Increases in interaction between student-instructor, student-student, student-content, and student-outside resources
3. Integrated formative and summative assessment mechanisms for students and instructor.

Components of Blended Learning

There are five components of blended learning. They are:

Live events

Self-paced learning
Collaboration
Assessment
Performance Support

Live events

Synchronous, teacher initiated learning environment in which all learners participate at die same time. Teacher may use lecture, demonstration, discussion or computer-based instruction to all the students in live. For many learners, nothing can replace the ability to tap the expertise of a live teacher. It can be in real classroom or can be in virtual learning environment.

Self-paced learning

Learning experiences that the learner completes individually at his own pace and on his time such as recorded live events, Internet-based or CD-ROM-based: it implies on demand learning at a pace is managed or controlled by the learner.

Collaboration

It implies a more dynamic communication and interaction among many learners that brings about knowledge sharing. Collaborative learning has more advantages which are not available from traditional instruction because a group can accomplish meaningful learning and solve problems better than any individual. It can be extended from discussion in the live classroom to synchronous communications in chat room or in open discussion forums and asynchronous communication by e- mail and threaded discussion.

Assessment

It is both live and online measure of learners knowledge to determine prior knowledge as well as tomeasure learning transfer.

Performance support

These are the reference materials that enhance learning, retention and transfer. It may be printable references, downloaded multimedia learning objects, documentation etc.

Flipped Learning

Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides studentsas they apply concepts and engage creatively in the subject matter.

The flipped classroom is a pedagogical model in which the typical lecture and homework elements of a course are reversed. Short video lectures are viewed by students at home before the class session, while in-class time is devoted to exercises, projects, or discussions. The flipped classroom describes a reversal of traditional teaching where students gain first exposure to new material outside of class, usually via reading or lecture videos, and then class time is used to do the harder work of assimilating that knowledge through strategies such as problem solving.

Four Pillars in Flipped Learning

1. Flexible Environment

Flipped Learning allows for a variety of learning modes; educators often physically rearrangetheir learning spaces to accommodate a lesson or unit, to support either group work or independent study. They create flexible spaces in which students choose when and where they learn. Furthermore, educators who flip their classes are flexible in their expectations of student timelines for learning and in their assessments of student learning.

2. Learning Culture

In the traditional teacher-centered model, the teacher is the primary source of information. By contrast, the Flipped Learning model deliberately shifts instruction to a learner- centered approach, where in-class time is dedicated to exploring topics in greater depth and creating rich learning opportunities. As a result, students are actively involved in knowledge

construction as they participate in and evaluate their learning in a manner that is personallymeaningful.

3. Intentional Content

Flipped Learning Educators continually think about how they can use the Flipped Learning modelto help students develop conceptual understanding, as well as procedural fluency.They determine what they need to teach and what materials students should explore on their own. Educators use Intentional Content to maximize classroom time in order to adopt methods of student-centered, active learning strategies, depending on grade level and subject matter.

4. Professional Educator

The role of a Professional Educator is even more important, and often more demanding, in a Flipped Classroom than in a traditional one. During class time, they continually observe their students, providing them with feedback relevant in the moment, and assessing their work. Professional Educators are reflective in their practice, connect with each other to improve their instruction, accept constructive criticism, and tolerate controlled chaos in their classrooms. WhileProfessional Educators take on less visibly prominent roles in a flipped classroom, they

remain the essential ingredient that enables Flipped Learning to occur.

Advantages of Flipped Learning

1. Encourages students to utilize digital content to explore knowledge beyond textbooks.

2. Improves personalized learning and teaching methods.

3. Gives rise to student centered teaching

4. Improves visualization and understanding capacity.

5. Smoothens student – teacher and student – student collaboration and interaction.

6. Enables students to learn at their own time and pace.

7. Provides a good platform for students to ask questions

8. Online tutorials and lectures supply basic and essential knowledge and allow students to review the topics and again as many times as possible.

Disadvantages of Flipped Learning

1. Many argue that flipped board divides students digitally.

2. The technology required (computers, smart gadgets, internet, etc.) are not accessible to many individuals.

3. Flipped classrooms that utilize videos to deliver instruction sometimes suffer technical challenges / difficulties.

4. Increases the time spent by students on computer screens.

5. The additional time spent by students at home preparing for topics is highly debated.

6. Threatens the traditional classroom teaching method.

Artificial Intelligence : (AI)

The Computers of 1990s are said to be Fifth Generation Computers and are going to use the concept of Artificial Intelligence (AI). Their speed is extremely high. An AI computer can think, talk and take decision like human being of consulting its huge knowledge data base. This generation is expected to function on the concept of " Parallel Processing" as against the "serial processing done" by today's computers. These will act as " reservoirs of human knowledge" and act diligently at par with human intelligence.

It is when machines engage in high – level pattern matching and learning in the process. It is

the cognitive science and the history of its evolution suggests that it has grown out of the knowledge derived from disciplines such as Science, Mathematics, Philosophy, Sociology, Computing and others.

Artificial Intelligence uses in Education

Artificial Intelligence has recently attracted attention for its potential in improving various fields, in teachers and students have a wide range of tools available, ranging from Google searches, in which alternate search terms are instantly suggested, citation generators, plagiarism checkers. An astounding amount of information generated instantly, far more advanced from thirty years ago and society's reliance on card catalogs, calculators and books.

AI enhances the personalization of student learning programs and courses, promotes tutoring by helping students improve their weak spots and sharpen their skills, ensures quick responses between teachers and students, and enhances universal 24/7 learning access.

Advantages of Artificial Intelligence

1. It defines a more powerful and more useful computers It introduces a new and improved interface for human interaction.
2. It introduces a new technique to solve new problems.

3. It handles the information better than humans.

4. It is very helpful for the conversion of information into knowledge.

5. It improves work efficiency so reduce the duration of time to accomplish a task in comparison to humans.

Disadvantages of Artificial Intelligence

1. The implementation cost of AI is very high.

2. The difficulties with software development for AI implementation are that the development of software is slow and expensive. Few efficient programmers are available to develop software to implement artificial intelligence.
3. Another concern regarding the widespread use of this technology pertains specifically to education students who do not learn how machines work will find themselves at asignificant disadvantage if their field relies heavily on computer science skills going forward because they would lack the necessary knowledge.

Augmented Reality

Augmented reality has quickly become one of the most popular trends among software and hardware developers. There are two terms which are very common in this generation such as VR and AR.

VR refers to virtual Reality which deals with simulated or virtual world. It ignores the real world around us completely. Once the person wears the VR device, he / she feels that they have moved physically though they have not moved actually.

AR refers to Augmented Reality which is combination of actual reality, virtual reality andreal world surroundings. As the name suggests AR adds or augments additional stuff to the real world around us. It makes surrounding world more interactive which can also be manipulated digitally.

AR is used in various domains for wide variety of applications. The common sectors where it is used are education, Gaming industry, Engineering, Medical, military etc.The above figure is Augmented reality concept. Augmented reality system consists of sensors, user input devices, CPU and display / output devices. Example of AR device is Micr Augmented Reality in Education

Augmented reality (AR) technology is introduced to support educators in their teaching-learning process especially when classes are conducted fully online. Feedback was being obtained from educators and students regarding the AR interface, understanding through visualization and inspiration in learning.

Using augmented reality apps like Quiver, Elements 4D, and Aurasma, you can engage students with learning materials that spring to life in three-dimensional overlays.

Quiver : Students go beyond the pictures in their textbooks to interact with three-dimensional figures.

Elements 4D: Elementary, Middle, and High school students.

Blipper : Completely transform a child's reading experience by pushing him or her to think more deeply and explore a topic in a new way.

Aurasama: Users can upload trigger images of their choice and add videos to make theirvery own augmented reality experience.

Advantages of augmented reality

Access to learning materials. Educational institutions often lack up-to-date teaching materials; many students have to study outdated information or search for information on their own at home. In an AR application, you can download the latest data and display it in an interactive format.

Access to virtual equipment. In cases where it is necessary to explore specific equipment and learn how to use it, an augmented reality application can present the required 3D model and helpful explanations. This adds practical value to the traditional learning materials.

Higher student engagement. Students study the material more deeply through immersion, which makes it feel more real and relevant. This is a substantial change of pace and an exciting experience for many.

Faster learning. A new way of presenting information helps reduce the overall learning time. Subsequently, there is more time for practice and in-depth examination of niche topics.

Safer practice. In such cases as anatomy lessons, students no longer need to dissect real animals; this can be accurately simulated through software. Students get the same level of practice without harming anything or working with dangerous tools.

Disadvantages of augmented reality

1. It is expensive to develop the AR technology based projects and to maintain it. Moreover production of AR based devices is costly.
2. Lack of privacy is a concern in AR based applications.

3. In AR, people are missing out an important moments.

4. Low performance level is a concern which needs to be addressed during testing process.
5. Some educators do not embrace modern technologies, or even know how to use them. Thiscan be a problem when the teacher is obligated to show how the device works and help students in case of difficulties.

ICT RESOURCES:

Radio: Radio is a powerful mass medium used in education for disseminating information, imparting instruction and giving entertainment. It serves with equal ease in both developed and developing countries. It spreads information to a greater group of population thereby saving time, energy, money and man-power in an effective way. Radio is a simple and cheap medium readily available as a small toy. Now small and handy transistors are available with even poorest of people. A small transistor can carry the message to any place on - the earth. It needs very little for maintenance and cheaper production can be taken up with more and more resources. Radio speaks to an individual so also to millions at a time. Hence, any listener can think the broadcast is meant for him whereas when listened in group all think the massage directed towards them. Each student takes the broadcast as very intimate to him. Due to its portability and easy accessibility radio could found its place everywhere whether it was a field, a school, a kitchen or a study room. Radio is a blind man's medium and is meant for ears only. It plays with sound and silence where the sound can be anything like voice or word, music and effect. When one hears radio, simultaneously one can imagine happenings in his/her mind. So it is called as theatre of blind or a stage for the mind. Radio can be listened to simultaneously along with another work like reading also.

Television: Television or Learning show is the use of television programs in the field of distance education. It may be in the form of individual television programs or dedicated specialty channels that is often associated with cable television in the United States as Public, educational, and government access (PEG) channel providers. There are also adult education programs for an older audience; many of these are instructional television or "tele course" services that can be taken for college credit Many children's television series are educational, ranging from dedicated learning programs to those that indirectly teach the viewers. Some series are written to have a specific moral behind every episode, often explained at the end by the character that learned the lesson. In the social aspects of television, several studies have found that educational television has many advantages.

Internet: Teachers whose lesson plans were discussed here engage students in meaningful learning activities that are of high relevance to students. The Internet is serving as a solution to engage students and teachers as equal partners in an educational journey in these electronic settings. Computers and the Internet are a great resource for classroom teachers! Teachers can find suggestions, lesson plans, practical support, information, and materials through the Internet. In fact, using a computer can make a teacher's life easier and more efficient. The LEADERS website provides an extensive list of Internet links designed to help teachers of reading and writing. This list of links covers most of the types of websites discussed below. Here are some of the many ways in which teachers can make computer and Internet technology work for them.

Multimedia: Multimedia is content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content. Multimedia contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand-produced material. Multimedia can be recorded and played, displayed, interacted with or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. Multimedia devices are electronic media devices used to store and experience multimedia content. Multimedia is distinguished from mixed media in fine art; by including audio, for example, it has a broader scope. The term "rich media" is synonymous for multimedia. Hypermedia scales up the amount of media content in multimedia application.

Interactive whiteboard : An interactive whiteboard is a large interactive display in the form factor of a whiteboard. It can either be a standalone touch screen computer used independently to perform tasks and operations, or a connectable apparatus used as a touchpad to control computers from a projector. They are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work groups, in training rooms for professional sports coaching, in broadcasting studios, and others. The first interactive whiteboards were designed and manufactured for use in the office. This board was used in small group meetings and round-tables.

COMMUNITY RESOURCES

Zoological gardens: A zoo (short for zoological garden or zoological park, and also called an animal park or menagerie) is a facility in which animals are confined within enclosures, displayed to the public, and in which they may also breed. The term "zoological garden" refers to zoology, the study of animals, and a term deriving from the Greek word. . The abbreviation 'zoo' was first used of the London Zoological Gardens, which was opened for scientific study in 1828 and to the public in 1857.

Botanical garden: A botanical garden or botanic garden is a garden dedicated to the collection, cultivation and display of a wide range of plants labeled with their botanical names. It may contain specialist plant collections such as cacti and other plants, herb, plants from particular parts of the world, and so on; there may be greenhouses, shade houses, again with special collections such as tropical plants, alpine plants, or other exotic plants. Visitor services at a botanical garden might include tours, educational displays, art exhibitions, book rooms, open-air theatrical and musical performances, and other entertainment. Botanical gardens are often run by universities or other scientific research organizations, and often have associated herbaria and research programmes in plant taxonomy or some other aspect of botanical science. In principle, their role is to maintain documented collections of living plants for the purposes of scientific research, conservation, display, and education, although this will depend on the resources available and the special interests pursued at each particular garden.

Eco-Park: Eco-park is an eco-industrial park or estate is a community of manufacturing and service businesses located together on a common property. Member businesses seek enhanced environmental, economic, and social performance through collaboration in managing environmental and resource issues. By working together, the community of businesses seeks a collective benefit that is greater than the sum of individual benefits each company would realize by only optimizing its individual performance. The goal of an EIP is to improve the economic performance of the participating companies while minimizing their environmental impacts. Components of this approach include green design of park infrastructure and plants cleaner production, pollution prevention; energy efficiency; and inter-company partnering.

Aquarium: An aquarium (plural: aquariums or aquaria) is a vivarium of any size having at least one transparent side in which water-dwelling plants or animals are kept and displayed. Fish keepers use aquaria to keep fish, invertebrates, amphibians, aquatic reptiles such as turtles, and aquatic plants. The term, coined by English naturalist Philip Henry Gosse, combines the Latin root aqua, meaning water, with the suffix -arium, meaning "a place for relating to". An aquarist owns fish or maintains an aquarium, typically constructed of glass or high-strength acrylic. Cuboid aquaria are also known as fish tanks or simply tanks, while bowl-shaped aquaria are also known as fish bowls. Size can range from a small glass bowl to immense public aquaria. Specialized equipment maintains appropriate water quality and other characteristics suitable for the aquarium's residents.

Science exhibition/fair: A science fair experiment is generally a competition where contestants present their science project, results in the form of a report, display board, and/or models that they have created. Science fairs allow students in elementary, middle and high schools to compete in science and/or technology activities. A science fair experiment is generally a competition where contestants present their science project, results in the form of a report, display board, and/or models that they have created. Science fairs allow students in elementary, middle and high schools to compete in science and or technology activities. The main motive of a science fair is for students to answer a question or task, not from a textbook but found out themselves by conducting a range of experiments and ongoing research in the short amount of time allocated to them. In order that the questions or tasks spark a true interest in the student they should be able to have an interesting, eye catching project. Science fairs also provide a mechanism for students with intense interest in the sciences to be paired with mentors from nearby colleges and universities, so that they can access to instruction and equipment that the local schools cannot provide.

Fieldtrip: A field trip or excursion is a journey by a group of people to a place away from their normal environment. The purpose of the trip is usually observation for education, non-experimental research or to provide students with experiences outside their everyday activities, such as going camping with teachers and their classmates. The aim of this research is to observe the subject in its natural state and possibly collect samples. Field trips are also used to produce civilized

young men and women who appreciate culture and the arts. It is seen that more-advantaged children may have already experienced cultural institutions outside of school, and field trips provide a common ground with more-advantaged and less-advantaged children to have some of the same cultural experiences in the arts.

Qualities of a good biology textbook: Text books are the most widely used of all instructional materials. Now a day's text book has become a course of study. A set of unit plans and a learning guide as well. A text book should really design for the pupils rather than the teacher. Text book should stimulate reflective thinking and cultivate in students the scientific attitude. In the teaching-learning process, the text-book occupies an important place. There is a saying "As is the text-book, so is the teaching and learning". A good text-book can even replace class-room teaching. The science text-book should aim at aiding the pupils in the development of their personalities, in developing open mindedness, developing appreciation and understanding of nature and not merely stuffing their minds with facts.

The opportunity of this analysis has been offered to students, future teachers of biology, around the time when they will directly use the textbooks for preparing and teaching the lessons. The main objective of this coordinated exercise of exploring the quality of the alternative biology textbooks is the development of the students' abilities to critically analyze the textbooks which they will use in the near future and for which they will have to express alternative options. The interests of the authors are also focused on the role of the textbooks in the learning process, on the analysis of their contribution to the students' progress in the scientific knowledge but also to their personal development. The textbook, as a source of the basic knowledge of biology as a school subject, but also as a collector of methodological ideas, is a „territory" that is insufficiently explored by students in the initial teaching preparation.

Qualities of a Biology teacher: Biology teachers need characteristics that are common to all good teachers, but, in addition, they need additional qualities specific to their chosen subject area. General Characteristics. Good teachers are dynamic, patient, understanding and caring. Knowledge, Personality and Physical Attributes.

Teaching Style/Approach:

An excellent Biology teacher:

1. Enthusiastic about teaching students the subject matter

2. Treats students with respect and designs curricula to meet the needs of all

students, regardless of level of instruction

3. Relates subject matter to students' lives, explaining how they are an integral part of the entire ecosystem

4. Sets an example of integrity inside and outside the classroom and teaches students responsibility and high standards

5. Plans lessons well in advance, gives adequate time for each topic, and integrates subjects

6. Teaches well organized concepts in a conceptually concise fashion

7. Stresses concept learning rather than rote memory

8. Continually reassesses approaches, lectures and tests to insure a fresh, relevant curriculum

9. Exhibits inquiring behavior typical of scientists.

Subject Expertise/Teaching Techniques

An excellent teacher:

1. Teaches students how to learn, analyze and think critically, emphasizing good

scientific methodology and problem solving skills

2. Prepares lessons that will enhance problem solving ability

3. Develops hands-on activities to illustrate concepts and uses a variety of approaches to assist the

learning processes lectures, discussions, laboratories, demonstrations, field trips, guest speakers,

student presentations, films and slide shows

4. keeps up-to-date in the subject matter

5. Maintains competence in the life science fields

6. Teaches useful lab techniques and lab safety

7. Stresses the fragility of life on the planet and the importance of maintaining well

managed ecosystems.

Teaching Environment

An excellent teacher:

1. Creates an exciting classroom atmosphere with as many living things as possible to enhance

learning (e.g. well maintained plants and animals, which may include fish tanks, gerbils/mice, and

reptiles/amphibians)

2. Acquires up-to-date equipment for laboratory work

3. Joins committees to improve the school, department, himself/herself

4. Generates new and exciting ideas for students to think about

5. Encourages students to ask questions about the lesson

6. Maintains a safe and clean classroom laboratory

7. Knows how to administer first aid in case of accidents.

Community Involvement

An excellent teacher:

1. Will use the community resources by inviting guest speakers from nearby institutions

And conduct field trips to laboratories, nature reserves, museums, local water plants, etc.

2. Develops and promotes advanced and/or continuing education courses in the school district, if

possible

3. Attends other activities in which students are involved such as musicals, sports, art exhibits, etc.

4. Takes an interest in and gets involved in community activities

5. Solicits support from community businesses to improve facilities and programs in the schools.

Professional Development

An excellent teacher:

1. Continually updates his/her knowledge by

 Reading the literature (e.g. journals such as The American Biology Teacher,

Scientific American, Science, Science News, etc.)

 Attending conferences, conventions, workshops and seminars

 Taking college or in-service courses

 Visiting local laboratories, nature reserves, etc.

2. Becomes active in a professional organization and encourages colleagues to join as well

3. Seeks grant support to purchase equipment, to organize or attend meetings or conferences, and to fund special educational projects.

Conclusion

Instructional Media have provided to help in classifying concepts, stimulating group and individual activities, developing a collective critical awareness, changing attitudes, imposing anew structure or organization on certain subjects and encouraging originality and creativeness.Therefore, teachers have to be properly motivated and made interested in the use of such materials. And they have also to be trained and oriented in the adequate use and maintenance of the materials.As we know, good teachers are not born, they are made. Training in the methods, techniques, use of various means and media help a teacher to be good and efficient. All illustrative materials will be "aids" to his / her teaching. His / Her educational outputs will be optimized through judicious uses of modern methods, techniques and mass media.