

## Critical Understanding of ICT

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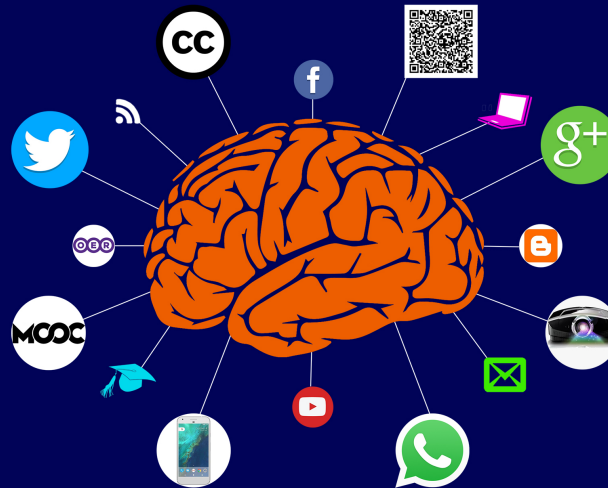
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# BACHELOR OF EDUCATION

## CRITICAL UNDERSTANDING OF ICT

EPC 3-CRITICAL UNDERSTANDING OF ICT  
BLOCK: 1 & 2



COMMONWEALTH OF LEARNING  
CANADA



KARNATAKA STATE OPEN UNIVERSITY  
MYSORE

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Bachelor of Education

# COURSE ON CRITICAL UNDERSTANDING OF ICT

Through Blended Learning Approach

COMMONWEALTH OF LEARNING  
CANADA  
&  
KARNATAKA STATE OPEN UNIVERSITY  
MYSORE

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## INTRODUCTION

Knowledge is expanding rapidly and technological inventions and advances are unimaginable. A range of Information and Communication Technology (ICT) options from audio and video conferencing through multimedia delivery to digital material are available for the use of teachers. Today ICT has become an essential and indispensable tool for teaching and learning. It is a well-known fact that ICT can provide more flexible and effective ways for improving pre-service and in-service teacher training programmes and promote professional development of teachers. To use these tools effectively and efficiently teachers need to have knowledge and skills about them. Critical Understanding of ICT is one of the courses of NCTE two year B.Ed., programme for enhancing the professional capacities of student teachers. This course is meant for preparing teachers to use ICT in their classrooms. ICT will help B.Ed., Student Teachers in developing understanding about ICT and also to learn integration of technology tools for teaching and learning, material development, developing collaborative networks for sharing and learning. This course consists of two blocks with 6 units in each block and in all 12 units. The first block titled Basics in ICT and Computer Applications explains the basic concepts and related aspects of ICT. In Unit 1 you will study the meaning, nature and evolution of ICT and ICT in Education. Unit 2 describes the anatomy of computers and types of computers, hardware trouble shooting and diagnosis. In Unit 3 you will learn about Computer software, meaning and types, free open source software, MS Windows, MS Office, Open Office etc. Unit 4 explains about application software, utility tools and computer security. Unit 5 describes the network and internet concepts and architecture. In Unit 6 you will learn about multimedia and its types and use of different multimedia devices for creating and using multimedia resources. Second block of this course is titled as ICT Integration in Teaching and Learning Process which deals with the application of ICTs in education. In unit 7 you will learn about e-learning concept, types, characteristics and Learning Management System (LMS). Unit 8 describes about ICT integrated unit plan and lesson plan, Web 2.0 for creating constructivist learning environment, problem based learning, virtual field trips etc. In Unit 9 you will study about ICT in assessment such as computer assisted assessment, computer adapted testing, online assessment tools and techniques etc., Unit 10 explains about ICT for educational management, role of ICT in record keeping, time table and assistive technology for special educational needs. In Unit 11 ICT for professional development, electronic teaching, portfolio and its types, tools etc. are explained. Unit 12 deals with e-content, its design and development, open educational resources and creative commons licensing. Every unit has a common structure with sections as introduction, objectives, major content sections with inbuilt

activities, self-check exercise, and links, let us sum up, and answers to check your progress, unit end exercises and references.

## HOW TO USE THIS COURSE MATERIAL

This course material is developed in tune with NCTE regulations and syllabus 2014 and primarily developed for the ODL teacher trainees of Karnataka State Open University. However this course material can also be used by any teacher education institutions for their pre-service and in-service teacher training programmes. In an ODL mode the course materials is made available as an online platform where the learners can access the resources anywhere anytime and involve in reading, viewing other online resources, take up the self-check exercises, collaborate with other learners and evaluate themselves. The course material will also be provided in a printed format with digital version of the same in a CD. However this will have the limitation in using other linked online resources. Those interested can also convert/export the course in to SCORM or an IMS package and deliver it through the LMS platform as an e-learning course. In order to facilitate this, CD will have the source file developed using an open source authoring tool eXeLearning. This software can be downloaded and installed from exelearning.net and using this, users can export each module in to SCORM/IMS package to deliver through LMS. Throughout the modules there are many activities, exercises, check your progress, and unit end evaluation exercises which require an active involvement of the learners in the learning process. There are also many video tutorials links to make the process clear to the learners. It is expected that courses providers ensure that the learners maintain an online portfolio either as a blog or as a standalone e-portfolio system to showcase and reflect on their learning process. It is also important that they have an online interactive forum either as a Google group or standalone online forum to facilitate interaction among the fellow learners. All this could also be achieved through a fully loaded eLearning LMS platform. Though the learners are expected to have hands-on practices at their own place of learning using the video tutorials, they need to be provided with practical activities during the contact programmes. The details of how to implement this during the distance learning phase and contact programme phase is given in the table below. Traditional teacher education programmes can also use this material as self-learning resources for their learners and provide them hands on experiences in the computer laboratory during the scheduled periods.

### Practical activities during the Distance Learning Phase and Contact Programme and their Assessment

No.	Phases and Location	Activities	Assessment
1	Study Centre Orientation Phase	Orientation Programme Trainees need to be oriented on the following aspects s that they will continue this activities during the distance learning phase <ul style="list-style-type: none"> <li>• Introduction to portfolio and demonstration on using blog for e-portfolio</li> <li>• Discussion on e-portfolio artefacts, reflections and rubrics</li> <li>• Creating online groups (Google Groups) and sharing ideas/discussion</li> <li>• Evaluating web resources and creating social bookmarks related to their subject for a particular class and sharing</li> </ul>	
2	Respective Institutions Distance Learning Phase	Online e-Portfolio <ul style="list-style-type: none"> <li>• Artefacts of continuous Learning (develop the list of artefacts to be included in the portfolio and also the portfolio evaluation rubric)</li> </ul>	20
3	Study Centres	Workshop Activities: 1. Hands on practice in using projector, interactive white board, printer etc.	15

	Contact Programme Phase -I	<ol style="list-style-type: none"> <li>2. Worksheet using word processor in their own pedagogic subject</li> <li>3. Presentation on any unit using PowerPoint/Libre office impress</li> <li>4. Concept map on any unit using freemind/VUE</li> <li>5. Developing a ICT integrated Unit Plan</li> <li>6. Shooting a video related to the lesson, upload to youtube, perform simple editing using youtube editor</li> <li>7. Developing a grade sheet using spread sheet</li> <li>8. Identifying and using a webquest in their subject in the school</li> <li>9. Creating a webquest using zunal.com and using it in their teaching</li> </ol>	
4	Study Centre Contact Programme Phase -II	<p>Workshop Activities:</p> <ol style="list-style-type: none"> <li>1. Enrolling for a mooc course related to their subject or school education from----- or on ICT for professional development</li> <li>2. Developing online assessment items and testing the students using the same (hot potato/google form)</li> <li>3. Creating a digital rubrics using online/offline tools for a particular topic/assignment/project/lab activity and implementing in the school</li> <li>4. Using google calendar scheduling the activities of one academic year</li> <li>5. Developing a professional development group/ or joining in a group and taking an active part in it by sharing resources and discussions in facebook/whatsup/Google group</li> <li>6. Contributing an article/editing an existing article on school education/pedagogy in wikieducator/KOER</li> <li>7. Creating reusable learning object and share it in KOER/NROER also choose the license from creative commons</li> </ol>	15
			<b>50 marks</b>

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# Unit - 1 : Information and Communication Technology

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1.10 References

### 1.1 INTRODUCTION

Prathibha is a trained graduate mathematics teacher working in a village in Chamarajanagara. Recently Prathibha organized a "Mathematics Day" on the eve of Ramanujan's birthday. She organized a video show on Ramanujan's life and his contributions. She had identified this video from YouTube. Based on the learning from the video, students took a quiz in the afternoon. Since the quiz was online, she could announce the winner immediately. Prathibha used google form for this purpose. Prathibha shared pictures of the event in the subject teachers' group via WhatsApp messenger. One of her friends suggested her to open a blog on her experiences. She has a blog now, in which she regularly posts her teaching experiences and reflections. Prathibha uses web tools and technology in her class regularly. She finds that technology

integration in teaching has made the learning experience very engaging. Prathibha is excited about the potentials of technology use in the classroom.

This is only an example to show how information and communication technologies have started influencing the classroom practices. With the world becoming more and more digital with time, our classrooms are also headed in this direction. This unit would introduce to you the basic concepts and ideas related to the field of Information and Communication Technologies.

In this unit we are going to explore the concept of Information and Communication Technologies (ICT), its evolution and its nature. We will also understand the scope of ICT in our daily life in general and education in particular. We discuss the features of ICT that makes it widely applicable. We also learn about few concerns regarding safe use of ICT.

## 1.2 OBJECTIVES

After studying this unit, you will be able to:

- explain the meaning of Information and Communication Technology (ICT)
- give an overview of applications of ICT in general and educational context in specific
- Identify possible information tasks that can be done with technology
- identify major landmarks in ICT evolution
- analyze the strengths and concerns associated with ICT use

## 1.3 WHAT IS ICT?

We are in a digital era. It is difficult to think of any event in our daily life that is not using Information and Communication Technology. Our schools and classrooms are no exceptions. This course is meant for introducing you with these technologies with the intension that you meaningfully integrate technology in your practices related to teaching and learning.

As an ordinary citizen as well as a teacher, you handle enormous data all the time. Data refers to facts, events, activities and transactions which have been recorded. Data is the raw material from which information is produced. Number of boys and girls in your class is a factual description of your classroom. This is an example of data related to the students in the class. In this sense, data is a description of the world. Information is making meaning from the data. Based on the data, you can conclude if girls are more in number in your class. This conclusion is information. In other words, information is processed data. Most of the decisions taken in and around the world by and large are based on the data and information. Information is the key guiding force of the world today.

For a wider use of the information, the information must be communicated to people. It is only when the information reaches the intended audience, the purpose of creation of information as well as its communication would be served .

Let us take an example. As a teacher, you are organizing a teacher parent meeting. Details of the same need to be communicated to the concerned parents. This should happen within a time frame. As you know, it is neither easy to physically reach every parent within a given time, nor desired. With the availability of technology, it is possible that a teacher now not only can reach the parents but also interact with them in real time. A simple WhatsApp group would serve this purpose. This is only an illustration to say how technology has simplified many complexities of our life.

The tasks you as a teacher engage in during the school time and outside require you to generate information very frequently. For example, you need to create a worksheet for a class. You designed a worksheet template. Since the worksheet is for the class use, you need multiple copies of the worksheet. You have to take printout of the worksheets. You transfer the worksheet template to your mail or carry it in a pen drive. In other words, you have stored the information either in a cloud storage service (mail cloud) or in a storage device (pen drive).

You have successfully done the worksheet activity. You would like to see how the students progressed through the activities. For this purpose, you transfer the information of student responses into a spreadsheet to analyze. You would also communicate the students' progress to their parents through mail, before recording these developments in the students' e-portfolio. The students' e-portfolios are digital display of students' progress as well as your teaching.

You would have noticed that the information created, stored, processed, transmitted, displayed and shared is in digital form and through electronic media. The technologies used in these processes are Information and Communication Technologies.

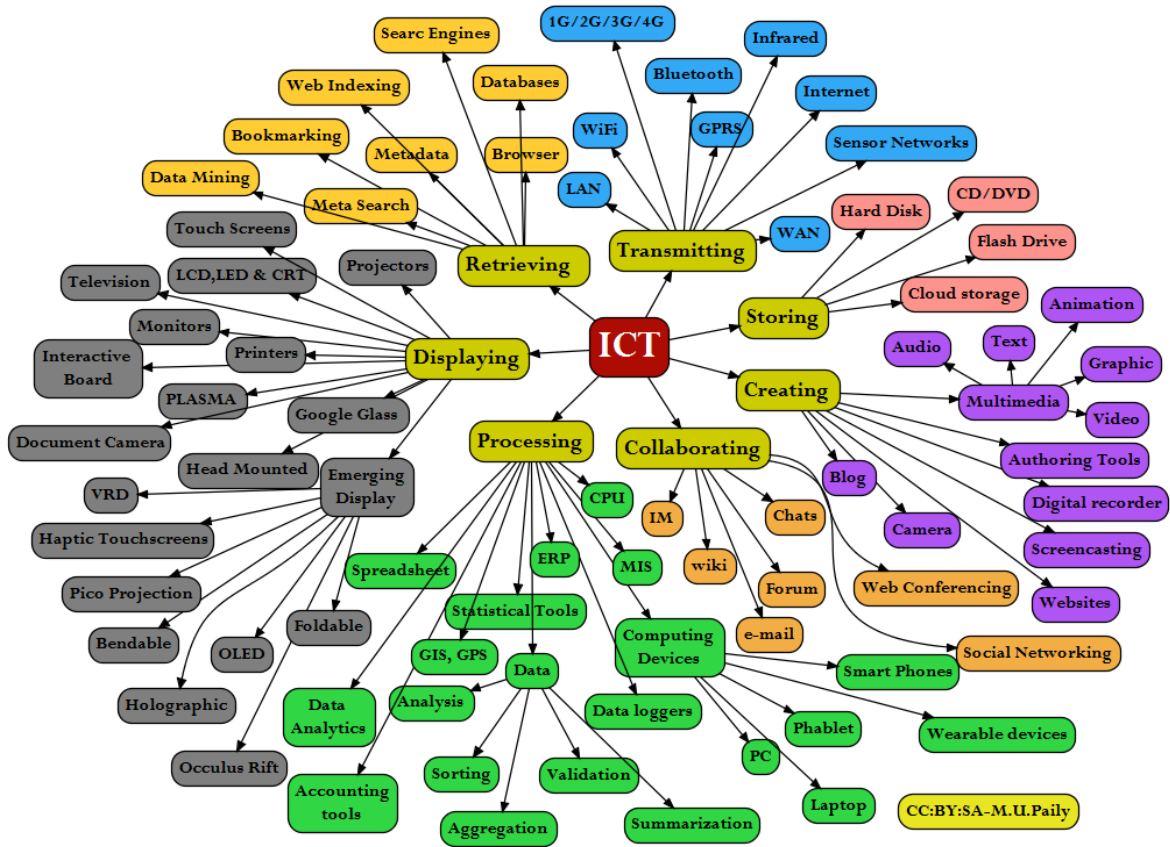
Traditionally also radio, television, and print media were the widespread technologies used for communication. The digital revolution has changed the way these traditional technologies function. The analog television has become digital television. In addition to the printed newspaper we also have electronic versions. Along with traditional radio, we also have online radio. All these have started appearing in the classroom to make the learning experiences rich.

With this example, let us try to arrive at a definition of ICT. UNESCO has defined ICT as forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means. It includes not only traditional technologies like radio and television, but also modern ones like cellular phones, computer and network, hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing.

Look at the following table to get an understanding of range of technologies that fall under the category of ICT.

<b>Information</b>	<b>Technologies</b>
Creation	Personal Computers, Digital camera, Scanner, Smartphone
Processing	Calculator, PC, Smartphone
Storage	CD, DVD, Pen drive, Microchip, Cloud
Display	PC, TV, Projector, Smartphone,
Transmission	Internet, Teleconference, Video conferencing, Mobile technology, Radio
Exchange	e-mail, Cellphone,

A graphical representation of what is ICT is represented in more details in the figure below (*Graphic courtesy: Dr.M.U.Paily, RIE, Mysore*)



**Check Your Progress-1**

Identify, by ticking, all possible information tasks that can be done with the following tools/technology. The case of internet has been done for illustration.

Tools	Store	Process	Display	Transmission	Exchange
Internet	√	√	X	√	√
Radio	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teleconferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Printed News Paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Click here to view the answers](#)

**1.4 ICT IN EVERYDAY LIFE**

The widespread use of ICT in Education is not just a coincidence. It is observed in all aspects our life. Let us take a look at the extent to which ICT has permeated our life.



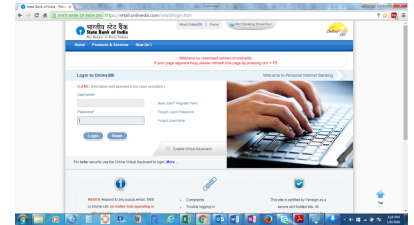
### ICT in Business

Today a lot of business transactions happen through internet and hence called e-commerce. ICT facilitates marketing, customer visit, product browsing, shopping basket checkout, tax and shopping, receipt and process order. Through e-commerce one can also offer services pertaining to processing transactions, documentation, presentations, inventory management and gathering product information. In other words, every business activity can be done being at home.



### ICT in Financial Services

Every service a traditional bank provides is available these days through online service. Starting from transferring money from one account to other up to running the day-to-day transactions of the bank are provided through internet. Through the networking of banks, this has become a reality. Capital market transactions, financial analysis and related services are available on the online platforms.



### ICT in Entertainment

Internet is a major source of entertainment. Internet is a hub of movies, games, books, and social networking. Due to digital broadcasting, the television experience itself is changing. We can easily record the television programs and view it. Digital broadcasting has changed the way we experience television, with more interactive programming and participation. Digital cameras, printers and scanners have enabled more people to experiment with image production.

### ICT in Public Service

Both Central and State Governments are actively encouraging e-governance practices. Digital India initiative of Government of India and e-governance initiative of Government of Karnataka are best examples of this. With these, and even before many government services are available online. We can enroll ourselves in the electoral roll of the local assembly constituency through the State Election Commission portal. We can book an LPG cylinder through the website of the gas supplier, pay electricity bills online through an online bill desk. Land related RTC can be viewed through internet being at home. ICT is also providing a platform for a conversation between the public and the government through various social networking services.

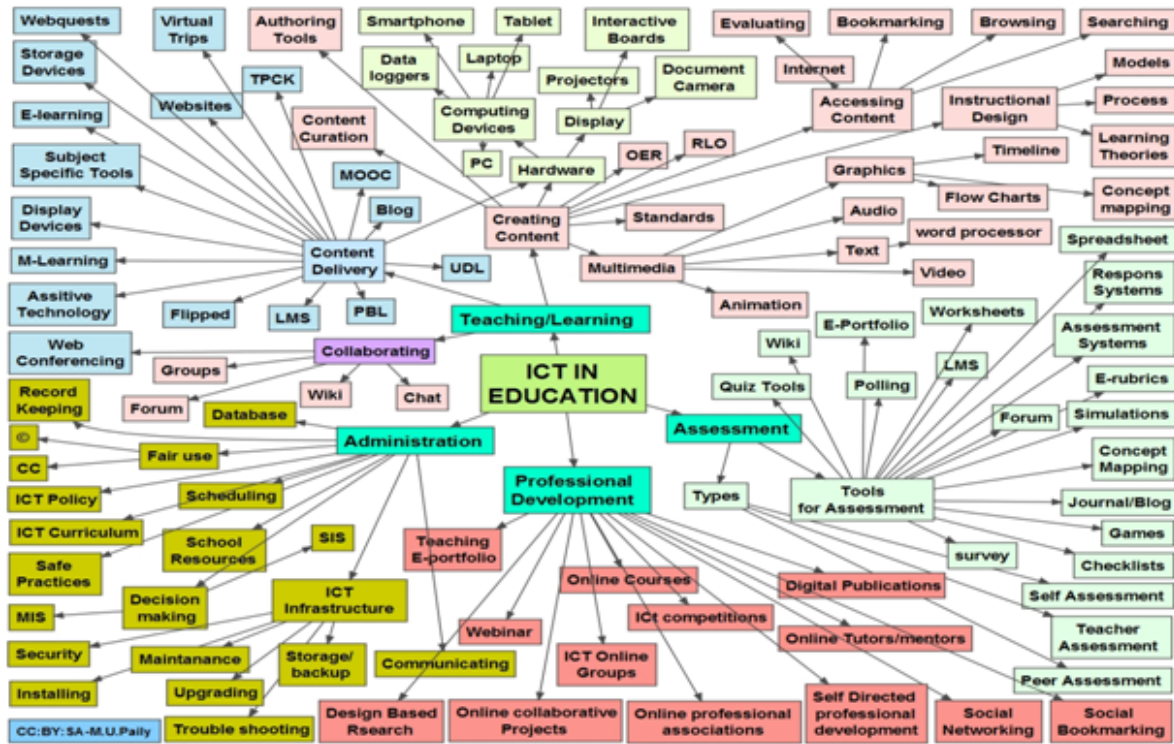


### ICT in Education

Education is one major sector which has undergone the influence of innovations in ICT. Starting from providing online content service, platform for organizing learning experiences to managing learning and assessment has been changed greatly by ICT developments. Students, teachers and educational administrators and every stakeholder in education have been benefitted by the integration of ICT in education. Rest of the Units in this course are going to deal with these issues at a greater length.

The graphic below represent the applications of ICT in various areas of education. *(Graphic Courtesy: Prof.M.U.Paily, RIE, Mysore)*





The concept map given here illustrates how ICTs have the potential to be used in various practices of education, including teaching and learning, assessment, administration and teacher professional development. For example, the teaching and learning dimension of education can integrate ICTs in content creation, content delivery and collaboration. Let us see one of them in detail, content development for example. ICT provides us with many tools, including hardware and content. The hardware encompasses computing devices as well as display devices. The content sources can be Open Education Resources (OER), and Reusable Learning Objects (RLO). Similar detailed exploration of ICT use can be taken up for other aspects of educational practice. Professional development of teachers is another such example. ICT tools provide various opportunities in the form of Webinars, online courses, online collaborative projects, online tutorials, social networking, and so on. Look at other components presented in the graphic and see how ICTs contribute for educational practice. Rest of the Units in this course is going to deal with these topics at a greater length.

### Activity

What we have mentioned so far are only a few examples. Here is a YouTube link of a video giving additional information on the impact of ICT in day-to-day affairs.

## ? Check your progress - 2

1 . Match the following

Sector	Example
Business	<input type="text"/>
Financial Services	<input type="text"/>
Entertainment	<input type="text"/>
Public service	<input type="text"/>
Education	<input type="text"/>

Check

2 Give an example each for ICT use in the following classroom practices of a teacher. Avoid the examples already discussed in the sections above.

Teacher Practice	Example
Classroom content transaction	<input type="text"/>
Assessment of students	<input type="text"/>
Library management	<input type="text"/>
Student record management	<input type="text"/>

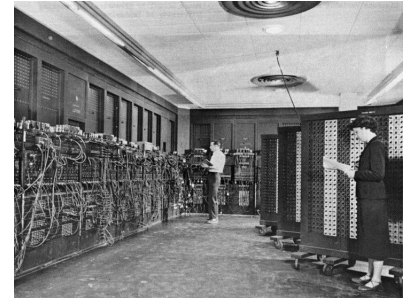
### 1.5 EVOLUTION OF ICT

ICT is evolving in a very fast pace. Our grandparents grew up in a society with no telephone; our parents in a society in which the radio was the first and television was the last source of information. We live in a world of internet. And the new generation in in the wireless world. As a result the world around us also has changed dramatically over the years. This dramatic change in the field of ICT is a result of innovations in the field of science, defense and business. These innovations have reduced the sizes of the technological tools and increased the speed in which they operate to process data and communicate information.

We can identify five phases of ICT evolution. They are evolution in computer, PC, microprocessor, internet and wireless links.

### Phase I

The first phase related to evolution of ICT is identified with the creation of electromagnetic calculator during World War II, weighing about 5 tons. Invention of transistors in 1947 led to development of smaller but versatile computers. With the input-output technology changing from punch cards to magnetic tapes, "Computer" became a catch word.



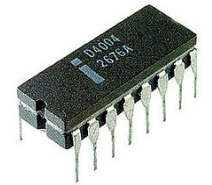
### Phase II

The second phase of ICT evolution is associated with the development of personal computers during 1970's. Development of chip technology and manufacturing magnetic discs transformed huge computers into desktops, which are called personal computers. Word processing, accounting and graphics became very accessible.



### Phase III

Third phase of ICT evolution is related to development of microprocessors. Microprocessor, a multipurpose, programmable device that accepts digital data as input, processes it according to instructions stored in its memory, and provides results as output. Microprocessors reduced the cost of processing power.



### Phase IV

The fourth phase of ICT evolution is around networking. Starting from connecting computers within a small geographic area for the field of Defense and Education to connecting the computers worldwide resulting in internet is the landmark development in the field of ICT. This resulted in breaking the distance barrier across the geographies and world being called a global village. Social networking is a byproduct of this. Introduction of broadband has accelerated this evolution.



### Phase V

The fifth phase of ICT evolution is related to the development of wireless, which refers to the present phase. This phase began with the invention of the mobile phone. The initial mobile phones were large and bulky. Reduction in size has been accompanied by a greatly expanded range of functions. Now mobile phones are used for talking, transmitting messages, pictures and music, browsing, navigating. Satellite phones have allowed us to get connected even in the absence of telephone and cell phones.

For a more detailed visual description of the evolution of ICT please visit the following sites:

[Timeline of ICT and Technology](#)

[The History of ICT](#)



#### Activity

For a more detailed visual description of the evolution of ICT please visit the following sites:

- [http://www.ictlounge.com/html/timeline\\_of\\_ict.htm](http://www.ictlounge.com/html/timeline_of_ict.htm)
- <https://www.timetoast.com/timelines/27704>

## ? Check Your Progress-3

List the major landmark development in the five phases of ICT development

Phase	Land Mark Development
I	<input type="text"/>
II	<input type="text"/>
	<input type="text"/>
III	<input type="text"/>
	<input type="text"/>
IV	<input type="text"/>
V	<input type="text"/>

Submit

### 1.6 EVOLUTION OF ICT IN EDUCATION

Application of ICT in Education has precedence of development of Educational Technology. Since the present day ICTs have all the strengths of erstwhile, education technology, even the field of educational technology has renamed itself as ICT. In this sense, ICT includes both traditional as well as modern educational technology.

This integration of ICT in the field of education has been due to two major reasons. The first one is the paradigmatic change in the way we started looking at the process of learning and consequently the teaching practices. The second one is the evolution of new technology which could meet the needs from the first change. Let us look at each of them in detail.

#### a. The paradigm shift

The major part of the 20th century was dominated by behaviourism as a central theory which governed the principles practised in educational practice. The result of practices guided by behaviorist principles lead to educational practices which could be broadly termed as "instructivism". In this form of practice, teaching models predominantly believed in "information transfer".

The last decade of 20th century onwards educational practices started getting influenced highly by a theoretical position namely "constructivism". Constructivist paradigm of educational practice believed in knowledge creation by the learner. This necessitated the active involvement in the knowledge re-creation process i.e., learning. One of the variants of constructivism, social constructivism positioned that knowledge creation while learning is a social process. Social interaction was identified as a necessity for learning to happen. This theoretical position took learning beyond the walls of the classroom. All these together opened up new pedagogic possibilities in and outside the classroom. The pedagogical practices changed from lecture mode to interaction mode.

## b. Convergence of technology and telecommunications

Parallel developments in the field of technology lead to convergence of technology and telecommunications. We saw, as mentioned earlier, the way we got connected with each other. Social networking became a virtual reality. Interacting with people who are hundreds of thousands of kilometers away, especially, in real time became a reality. The barrier of distance to communicate dissolved. There were new avenues to express oneself in the form of blog and microblog. Digital revolution made data processing very easy to handle. In other words, ICT provided an ideal platform for learning in the new paradigm.

The following figure traces a trajectory of evolution of various technology tools that are popularly used in the educational practice.

Display	Television	Radio	Projectors	Storage Devices	Communication	Computer
Balckboard	Monochrome CRT	Radio	Handmade Slide projector	Paper/Books	Face to face	Mainframe Computer
Flannel Board	Colour CRT	HAM Radio	Photographic Slide Projector	Magnetic Tape	Postal mail	Desktop Computer
Peg Board	Plasma TV	FM Radio	Opaque Projector/ Epidiascope	Magnetic Drum	Telegram	Laptop
Magnetic Board	LCD TV	Community radio	Film Projector	Floppy Disc	Telephone	Palmtop
White Board	LED TV	Mobile radio	Micro projection	Compact Disc	Mobile Phones	Netbook
Interactive White Board	3D/HD TV	Internet Radio	Overhead Projector	DVD	e-mail	Tablet
Collaborative virtual boards	UHD TV	Podcast	Digital Projection Panel	Hard Disks	Forum/ online groups	Phablet
Wearable Display	Interactive TV		Multimedia Projector	Optical Devices/Pen drive	Chat	Wearable Computing
Bendable Display	IPTV		Document Camera Projection	SD Card	Instant Messaging	Nanobots
Foldable Display	OLED TV		LED/Pico projector	Data Centres	Web conferencing	
Holographic Display			Wearable Projector	Cloud Storage		

*Figure displaying evolution of various technology tools (Graphic courtesy:Dr. M. U. Paily, RIE, Mysore)*

You would notice, from the above figure, that the evolution of technology is parallely resulted in increase in speed, reduction of size, less expensive, and also more versatile. For example, mainframe computers occupied a room, but modern computers are as small as our palms. The speed of computers has increased exponentially. Earliest televisions were exorbitantly expensive but present ones are affordable. Earliest display boards were only output devices but modern display boards are input as well as output devices.

Further units are going to introduce you to use and integration of these ICTs in your practice in greater detail.

## ? Check Your Progress-4



Identify any one trend in the trajectory of each of the technological devices. One such trend has been identified for one of the devices as an illustration.

Device	Evolution	Trend
Display boards	Black boards to bendable displays	Multi-media display (still to dynamic visuals)
Television	Black and White TV to Internet Protocol TV	
Radio	Radio to Podcast	
Projectors	Handmade slide projector to Pico projector	
Storage Device	Textbook to cloud storage	
Communication	Face-to-face to online	
Computers	Mainframe computers to wearable computers	

Submit



### 1.7 NATURE OF ICT

Having learnt that ICT has penetrated every walk of our life, it is important to understand why ICT has such a penetration? Some features of ICT have facilitated this widespread use. Let us see some of them.

- **Speed:** The innovations in internet and broadband have made the communication instantaneous. Modern mobile applications have allowed people to communicate with each other in real time. There is no time lag between two places which are thousands of kilometers apart.
- **Precision:** The information that is communicated through ICT is very precise. Since there is no time lag in the communication, there is less chances of miscommunications.
- **Versatile:** ICT can help in doing multiple tasks. Data can be gathered, verified, processed, and managed. Information can be communicated. ICT provides a multi-media platform for such communication.
- **Cost:** ICT tools seem very expensive. But when we account for their reach, they come out to be very cheap. For example, the cost involved in printing text books is very high economically as well as environmentally. On the other hand preparing and using digital form of the book need high one time investment in creating. But once created, it can be used by any number of users without incurring additional cost.

Though, ICT provides us with so many options of utilizing it, there is also growing concerns associated with it. Some concerns are listed here.

- **Digital divide:** Digital divide refers to a large difference between two or more groups in a population in the distribution and effective use of ICT resources. For example, the internet penetration in urban and rural India is quite different. From one perspective, ICTs are considered to bridge the gap between subgroups of a population. But of late, it has been said that ICT is contributing towards widening the gaps.
- **Hacking:** The access to our various accounts is through user ids, and these services are provided through internet. Through internet people steal and gather security passwords of others, get access to others' accounts. This is termed as hacking. Hackers also get into users' banking accounts and inflict financial losses. Not sharing password with others and frequent change of password has become a necessity for safe internet usage.
- **Unauthorized content use:** Internet and digital form of the data has allowed easy duplication of the content without attributing/acknowledging the source of the content. High speed internet and high capacity storage devices have made it easy. Appropriate attribution needs to be done as an ethical ICT use.
- **Trolls and abuses:** Internet is also a platform to express personal enmity in the form of trolling and abusing people online. Since it is easy to conceal identity in internet, people resort to this practice more frequently.
- **Pornography:** A lot of adult content is accessible through the Internet. This is in digital form in various media that can be easily stored in storage devices. Child pornography is a criminal activity mainly happening through the internet medium. There is a pressure on government from religious and parent groups to ban all pornographic material available in the internet. Alternatively, there are also many who claim that banning such materials is against the spirit of internet freedom and democracy.
- **Viruses:** Viruses are relatively simple program written by people and designed to cause nuisance or damage to computers or their files. They are also responsible for corrupting data and data loss.
- **Privacy concerns:** Internet is also a hub of lot of personal data. It is possible to track individual activities in the internet. Such data on user behavior can be misused for the marketing purposes. Many civil rights activists fear the danger of authoritarian governments to monitor and manipulate freedom of movement, speech, political activism and social and personal behaviors. Similarly consumer-rights advocates fear that close monitoring of data of an individual's buying habits will allow businesses to share market information on spending preferences and capacities.
- **Health:** Internet and social networking addiction is a popular and identified side effect of emergence of ICT. Excessive internet usage is also associated with low attention problems.

ICT, as any other technology, is only a tool to be utilized. How it is to be used is in our control. Rest of units in this Block, will take a look at how to make best use of ICT in the educational practice so that every stakeholder involved will make informed choices.

## Check Your Progress-5 -

1. Why is ICT all pervasive in various fields?

ICT is all pervasive due to its following characteristics:

- 
- 
- 
- 



2. What precautions are required to ensure that ICT use is safe?



ICT usage safeguards and ethical use:

- 
- 
- 
- 

Submit



## 1.8 LET US SUM UP

- This unit has attempted to unpack the concept of ICT. UNESCO has defined ICT as forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means.
- ICTs have evolved over a period of time. The size of ICTs has evolved starting from room sized computers to small tools like handheld devices. The speed has evolved from dial up connections to data packets through high speed broad bands. The media used in ICT has evolved from mono-medium to multimedia.
- ICT has interspersed every walk of our life. From business, banking, entertainment, public service to education. In education, the ICT use has changed the landscape of educational practice. Every aspect of classroom, i.e., teaching, learning, assessment, student data management, library services and so on have become ICT integrated.
- The two major reasons for the extensive use of ICT in educational practices are paradigm shift in favour of constructivism which put more emphasis in interactivity in learning and emergence of ICT with the features of provision to express oneself freely and synchronous interactivity.
- Major reason for such a widespread use of ICT in various sectors, and various educational practices is the speed, accuracy, versatility and cost involved with ICT.
- There are also few concerns on using ICTs. Some of these are related to safe ICT usage and others are related to ethical ICT use.

## 1.9 UNIT END EXERCISES

1. What do you understand by the term ICT?
2. Prepare a chart to show the evolution of ICT over the years by using diagrams/images available on the web sites mentioned in this chapter.
3. What are the strengths and concerns in using ICT?

## 1.10 REFERENCES

- UNESCO (2006) Introduction to Information, Communication and Technologies: Teacher's Guide - Module 1, Available at [Introduction to information and communication Technology](#) accessed on 4th Jan, 2016.
- ICT in Education - An online course available at [ICT in Education](#) accessed on 4th Jan, 2016.
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## Unit - 2 : Computer Hardware Fundamentals

### Menu

#### CRITICAL UNDERSTANDING OF ICT

Unit - 1 : Information and Communication Technology

**Unit - 2 : Computer Hardware Fundamentals**

Unit - 3 : Computer Software

Unit - 4 : Application Software

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Unit - 10 : ICT for Educational Management

Unit - 11 : ICT for Teacher Professional Development

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#### Structure

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Anatomy of a Computer
- 2.4 Input Devices
  - 2.4.1 Keyboard
  - 2.4.2 Mouse
  - 2.4.3 Other Input Devices
- 2.5 Output/Display Devices
  - 2.5.1 Monitor
  - 2.5.2 Printer
  - 2.5.3 Other Output Devices
- 2.6 Storage Devices
- 2.7 Types of Computers
- 2.8 Computer Troubleshooting
- 2.9 Let us Sum up

## 2.10 Unit End Exercises

## 2.11 References

## 2.1 INTRODUCTION

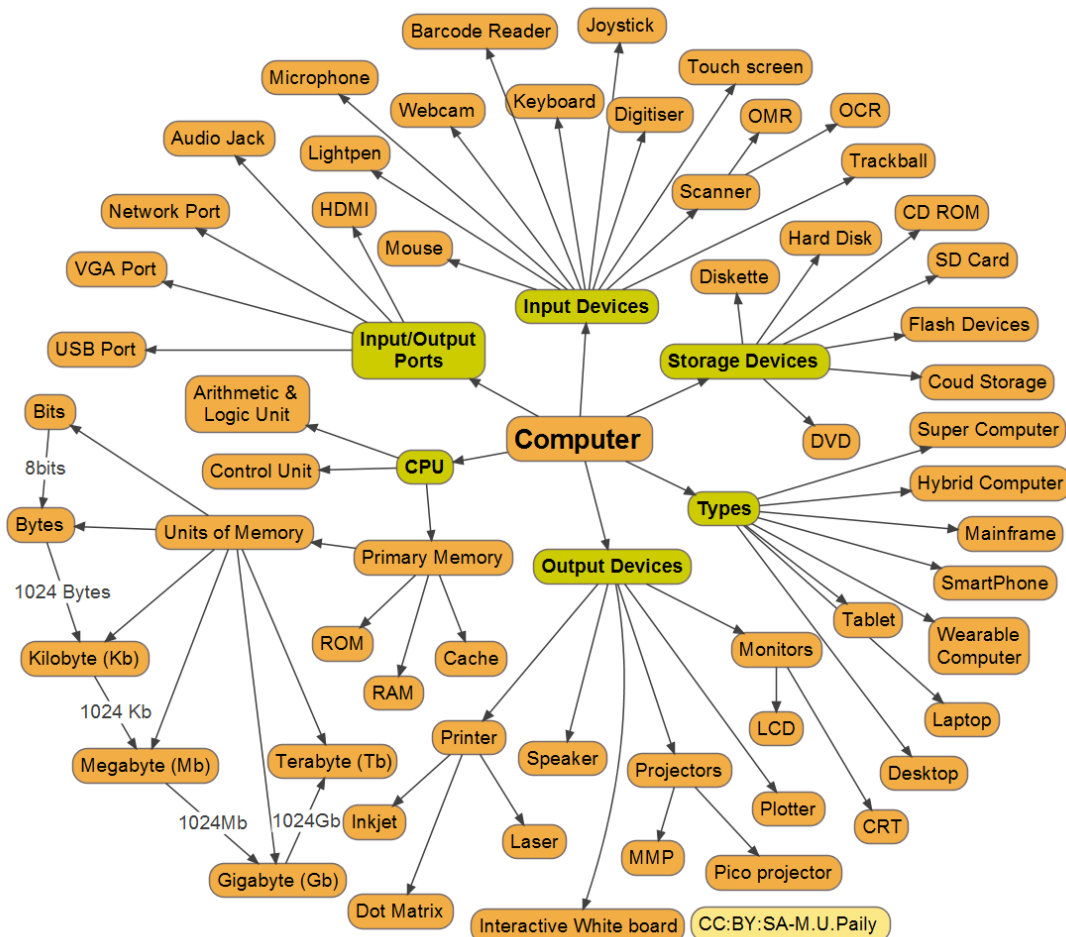
You have studied the major milestones in the evolution of Information and Communication Technology (ICT) in Unit 1. You would agree that in today's modern world, computers have become an essential part of everybody's life. Computers are being used in almost every field and everyday new areas of activities are being discovered. Hardly there is any area in our society, where computers are not being used. For example, computers are used in homes, offices, schools, colleges, universities, hospitals, shops and business establishments, industries, banks, railway stations, bus stations, airports, research centers and many other organizations. As most of the routine activities in today's society are being performed by computers, it has become essential for everybody to acquire some basic knowledge about computers.

A computer is a fast calculating device that can perform arithmetic operations. It is not just a calculating device. It can perform any kind of work involving arithmetic and logical operations on data. It gets the data through an input device, processes it as per the instructions given and gives the information as output.

Hardware refers to any physical component of a computer. In today's computer industry, a wide variety of hardware components are available. Hardware components are classified according to their functional use within a computer system. They can be broadly classified into three categories namely input devices, output devices and storage devices. It is essential for us to be aware of the working and uses of different hardware components of a computer.

This unit deals with anatomy of a computer, meaning and functions of input devices, output devices and storage devices, types of computers and hardware troubleshooting and diagnosis.

Overview of this unit is given below in the form of concept map.



## 2.2 OBJECTIVES

After studying this unit, you will be able to

- explain the anatomy of a computer
- explore various input, output and storage
- describe temporary and permanent storage devices
- explain the different types of computers
- explain various computer troubleshooting

## 2.3 ANATOMY OF A COMPUTER

The internal design of computers differs from one model to another. But the basic components of computer remain the same for all models. To function properly, a computer needs both hardware and software. Hardware consists of the mechanical and electronic devices which we can see and touch. Key Board, Monitor, DVD are some examples for Computer Hardware. The software consists of programs, the operating systems and the data that reside in the memory and storage devices. JAVA, Microsoft Office, Open Office are some examples for Computer Software.

A computer mainly performs the following four functions.

1. **Receive input** – accept information from outside through various input devices like keyboard, mouse etc.
2. **Process information** – perform arithmetic or logical operations on the information.
3. **Produce output** – communicate information to the outside world through output devices like monitor, printer etc.
4. **Store information** – store the information in storage devices like hard disk, compact disk etc.

A computer has the following three main components.

- a. Input/ Output Unit
- b. Central Processing Unit
- c. Memory Unit

**a) Input/ Output Unit:** Computer is a machine that processes the input data according to a given set of instructions and gives the output. The unit used for getting the data and instructions into the computer and displaying or printing output is known as input/ output unit. Keyboard is the main input device while the monitor is the main output device.

**b) Central Processing Unit:** Central processing Unit (CPU) is the main component or 'brain' of the computer which performs all the processing of input data. In micro computers, the CPU is built on a single chip or Integrated Circuit (IC) and is called Microprocessor. The CPU consists of the following distinct parts:

- i. Arithmetic Logic Unit (ALU)
- ii. Control Unit (CU)
- iii. Registers
- iv. Buses
- v. Clock

(i) **Arithmetic Logic Unit:** The arithmetic logic unit is responsible for all arithmetic operations like addition, subtraction, multiplication and divisions as well as logical operations such as less than, equal to and greater than.

(ii) **Control Unit:** The control unit is responsible for controlling the transfer of data and instructions among other units of a computer. It is considered as the 'Central Nervous System' of computer as it manages and coordinates all the units of the computer. It obtains the instructions from the memory, interprets them and directs the operation of the computer.

(iii) **Registers:** Registers are small high speed circuits which are used to store data, instructions and memory addresses, when ALU performs arithmetic and logical operations. Depending on the processor's capability, the number and type of registers vary from one CPU to another.

(iv) **Buses:** Data is stored as a unit of eight bits in a register. Each bit is transferred from one register to another by means of a separate wire. This group of eight wires which is used as a common way to transfer data between registers is known as a bus. Bus is a connection between two components to transmit signal between them. Bus is of three major types namely data bus, control bus and address bus.

(v) **Clock:** Clock is an important component of CPU which measures and allocates a fixed time slot for processing each and every micro-operation. CPU executes the instructions in synchronization with the clock pulse. The clock speed of CPU is measured in terms of Mega Hertz or millions of cycles per second. The clock speed of CPU varies from one model to another.

c) **Memory Unit:** Memory unit is used to store the data, instructions and information before, during and after the processing by ALU. It is actually a work area (physically a collection of integrated circuits) within the computer where the CPU stores the data and instructions. Memory is of two types:

- i. Read Only Memory (ROM)
- ii. Random Access Memory (RAM)

(i) **Read Only Memory:** Read Only Memory is an essential component of the memory unit. The memory which has essential instructions is known as Read Only Memory. This memory is permanent and is not erased when the system is switched off. The memory capacity of ROM varies from 64 KB to 256 KB depending on the model of computer.

(ii) **Random Access Memory:** Random Access Memory is used to store data and instructions during the execution of programs. Contrary to ROM, RAM is temporary and is erased when the computer is switched off. RAM is a read/ write type of memory and thus can be read and written by the user. As it is possible to randomly use any location of this memory, it is known as random access memory. The memory capacity of RAM varies from 640 KB to several mega bytes with different models of computer.

Hardware and software are two broad categories of computer components. Hardware refers to physical component while software to the programs required to operate computers.

Watch this video on “Anatomy of a Computer” available at [https://www.youtube.com/watch?v=g9fB5\\_0W6CA](https://www.youtube.com/watch?v=g9fB5_0W6CA)

## 2.4 INPUT DEVICES

An input device is any machine that feeds data, information and instructions into a computer. We may classify input devices into the following two broad categories.

- i. Basic input devices
- ii. Special input devices

**Basic Input Devices:** The input devices which are essential to operate a PC are called basic input devices. These devices are always required for basic input operations. These devices include keyboard and mouse.

**Special Input Devices:** The input devices which are not essential to operate a PC are called special input devices. These devices are used for various special purposes and are generally required for basic input operations. These devices include Trackball, Light Pen, Touch Screen, Joystick, Digitizer, Scanner, Optical Mark Reader (OMR), Bar Code Reader (BCR), Optical Character Reader (OCR), Magnetic Ink Character Recognition (MICR) and Voice-Input Devices.

### 2.4.1 Keyboard

Keyboard is the most common input device used for manual data entry. Computer keyboards are similar to electric typewriter keyboards but contain additional keys. Keyboard has been standardized for use in all types of computers such as a PC, a workstation or a notebook computer. The keys on computer keyboards are classified as follows:



1. **Letter Keys:** These are the 26 letters of English alphabet arranged as in a typewriter.
2. **Digit Keys:** There are two sets of digit keys; one on the second row from the top of the keys just as in a typewriter and the other is a numeric key pad at the bottom right which allows quick entry of numbers with the fingers of one hand.
3. **Special character keys:** These are characters such as <, >, ?, /, {, }, [, ], (, ), ., ", @, #, \$, %, &, \*, etc
4. **Non-printable control keys:** These are used for backspacing, going to the next line, tabulation, moving the cursor up or down, insert, delete characters etc. There is also a space bar at the bottom for leaving a space.
5. **Function keys:** These are labeled F1, F2 up to F15 and when pressed invoke programs stored in the computer.

You can understand the function of each and every key actually by working on a PC. When any key is pressed, an electric signal is produced. This signal is detected by a keyboard encoder that sends a binary code corresponding to the key pressed to the CPU. There are many types of keyboards but 101 keys board is the most popular one.

### 2.4.2 Mouse



Mouse is a device that controls the movement of the cursor on the display screen. It is a small object you can roll along a hard, flat surface. Its name is derived from its shape which looks like a mouse. As you move the mouse, the pointer on the display screen moves in the same direction. Mice contain at least one button and sometimes as many as three which have different functions depending on what program is running. There are three basic types of mice. They are mechanical, opto mechanical and optical. Wireless mice are also being manufactured. They transmit the motion of the mouse to the computer wirelessly and is convenient to use. Recently touch panel displays are manufactured which do not need a mouse as a locator. An appropriate icon on the screen may be touched either by finger or a pointing device such as a ballpoint pen to invoke the corresponding program.

### 2.4.3 Other Input Devices

#### Trackball:



Trackball is an input device which is mostly used in notebook or laptop computer instead of a mouse. This is a ball which is half inserted and moving fingers on the ball, pointer can be moved. Trackball is considered better than mouse because it requires little arm movement and less desktop space.

#### Light Pen:



Light pen is a pointing device which is similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube. When the tip of a light pen is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.

### Touch Screen:



Some special VDU devices have touch sensitive screens. These screens are sensitive to human fingers and act as tactile devices. Using touch screen, the user can point to a selection on the screen instead of pressing keys. Touch screen helps the user in getting the information quickly.

### Joystick:



Joystick is a pointing device which is used to move cursor position on a monitor screen. Joystick is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket. Joystick can be moved in all four directions. The function of joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing (CAD) and playing computer games.

### Digitizer:



Digitizer is an input device which converts analog information into digital form. Digitizer can convert a signal from the television or camera into a series of numbers that could be stored in a computer. They can be used by the computer to create a picture of whatever the camera had been pointed at. Digitizer is also known as Tablet or Graphics Tablet because it converts graphics and pictorial data into binary inputs. A graphic tablet as digitizer is used for doing fine works of drawing.

### Scanner:



Scanner works more like a photocopy machine. It is used when some information is available on a paper and it is to be transferred to the hard disk of the computer for further manipulation. Scanner captures images from the source which are then converted into the digital form that can be stored on the disc. These images can be edited before they are printed.

### Optical Mark Reader (OMR):



OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked. It is specially used for checking the answer sheets of examinations having multiple choice questions.

### Bar Code Reader (BCR):





BCR is an optical scanner used for reading bar-coded data (data in the form of light and dark lines) Bar coded data is generally used in labeling goods, numbering of books etc. Bar Code Reader scans a bar code image, converts it into an alphanumeric value which is then fed to the computer to which the Bar Code Reader is connected.

### Optical Character Reader (OCR):

OCR is an optical scanner used to read a printed text. OCR scans text optically character by character, converts them into a machine readable code and stores the text on the system memory. It is used for reading of passenger tickets, computer printed bills of credit card companies and reading of ZIP codes in postal services.

### Magnetic Ink Character Reader (MICR):

MICR is generally used in banks because of a large number of cheques to be processed every day. The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine readable. This reading process is called Magnetic Ink Character Recognition.

### Voice-Input Devices:



Voice-input devices are the latest input devices that can recognize the human voice. Microphone is a voice input device to input sound which is then stored in digital form. It is used for various applications like adding sound to a multimedia presentation or for mixing music.

(Source of images in this section:<http://www.tutorialspoint.com>)

## ? Check Your Progress – 1



### A. Fill in the blanks with suitable words.

- Two Main components of a computer are  and
- is considered as Central Nervous System of the computer.
- Basic input devices include  and
- When a key on the keyboard is pressed  is produced.
- Mouse controls the movement of  on the display screen
- Scanner works like a  machine.

## ? B.

Write the expansion of the following acronyms used in ICT

- CPU stands for
- ALU stands for
- ROM stands for
- RAM stands for

## ? C True-False Questions

State whether the following statements are true or false.

1. Hardware consists of mechanical and electronic devices which we can see and touch.

True  False

**True**

2. In a micro computer the CPU is built on a single chip called Microprocessor.

True  False

**True**

3. Data is stored as a unit of ten bits in a register.

True  False

**False**

4. The clock speed of CPU is measured in terms of millions of cycles per second.

True  False

**True**

5. Random Access Memory is temporary and is erased when the computer is switched off.

True  False

**True**

6. Digit keys are used to invoke programs stored in the computer.

True  False

**False**

7. Light pen is a pointing device.

True  False

**True**

8. Joystick can be moved in all four directions.

True  False

**True**

9. Optical Mark Reader is extensively used in Banks to process a large number of cheques.

True  False

**False**

10. Bar coded data is generally used in labeling goods.

True  False

**True**



## 2.5 OUTPUT/DISPLAY DEVICES

Output devices are hardware components which are used to display or print the processed information. Output devices include monitor (display screen), printer, plotter, speaker, computer output microfilm etc.

### 2.5.1 Monitor



Monitor is commonly known as Visual Display Unit (VDU) and it is the main output device of a computer. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.

There are different kinds of monitors depending upon the number of pixels. Depending upon the resolution monitors can be classified as follows:

1. CGA (Colour Graphics Adapter)
2. MDA (Monochrome Display Adapter)
3. HGA (Hercules Graphics Adapter)
4. EGA (Enhanced Graphics Adapter)
5. VGA (Video Graphics Adapter)
6. SVGA (Super Video Graphics Adapter)

Depending upon the colour of display, monitors can be classified as Monochrome (with single colour black/white display) and colour (with all colours display) monitors.

### 2.5.2 Printer

Printer is the most important output device which is used to print information on paper.

There are two types of printers.

1. Impact Printers
2. Non-Impact Printers

**a) Impact Printers:** The printers that print the characters by striking against the ribbon and onto the paper are called impact printers.

#### Impact printers are of two types

1. Character Printers
2. Line Printers

i) **Character Printers:** These printers print one character at a time. These printers are of two types – Daisy Wheel Printers and Dot Matrix Printers.

**Daisy Wheel Printers:** These printers print the characters by a mechanism that uses a plastic or metal hub with spokes called daisy wheel.

**Dot Matrix Printers:** These printers print the characters by putting dots onto the paper.

**ii) Line Printers:** These printers print one line at a time. Their printing speed is much more than character printers. They are of two types – Drum Printers and Chain Printers.

**Drum Printers:** These printers print the line by rotating drum having a ring of characters for each print position.

**Chain Printers:** These printers print the line by rotating chain having ring characters for each print position.

**b) Non-Impact Printers:** The printers that print the characters without striking against the ribbon and onto the paper are called Non-Impact Printers. These printers print a complete page at a time. Hence they are also called Page Printers.

Non-Impact Printers are of two types

1. Laser Printers
2. Inkjet Printers

**(i) Laser Printers:** These printers look and work like photocopier. They are based on laser technology. In these printers, a laser beam is used to write the image on a paper. There are many models of laser printers depending upon the speed and number of dots printed.

**(ii) Inkjet printers:** These printers print the characters by spraying the paper with electrically charged ink. These printers give better quality than character printers but not better than laser printers. They have an option of using colour cartridges for multi-colour printing.

### 2.5.3 Other Output Devices

**Plotter:** Plotter is used to print high quality graphics and drawings. It is generally used for printing/drawing graphical images such as charts, drawings, maps etc. of engineering and scientific applications. Some important types of plotters are:

a) **Flat Bed Plotters:** These plotters print the graphical images by moving the pen on stationary flat surface material.

b) **Drum Plotters:** These plotters print graphical images by moving both the pen and the drum having paper.

c) **Inkjet Plotters:** These plotters use inkjet in place of pen. They are faster than flat bed plotters and can print multi-coloured large drawings.

**Speaker:** Speakers are popular output devices used with computer systems. They receive audio input from the computer's sound card and produce audio output in the form of sound waves. Most computer speakers are active speakers i.e. they have an internal amplifier which allows you to increase the volume, or amplitude of the sound. Speakers usually come in pairs which allows them to produce stereo sound from two separate audio channels.

**Computer Output Microfilm:** COM is a technique to produce output on a microfilm media. A microfilm is a continuous film strip that can store several thousands of document pages. A microfilm card is a 4x6 inch film sheet which can store several hundred pages. The process of producing microfilm or microfiche takes place on a special COM unit. The information recorded on the microfilm is read with the help of a microfilm viewing system.



## 2.6 STORAGE DEVICES

Memory units are the internal storage areas of a computer. The term “memory” refers to data storage that comes in the form of chips and the word “storage” is used for memory that exists on tapes or disks. The term memory is usually used as a short form for physical memory which refers to the actual chips capable of holding data. Every computer comes with a certain amount of physical memory usually referred to as the main (primary) memory or the Random Access Memory (RAM). The term RAM refers to read and write memory, that is, you can both write data into RAM and read data from RAM. Most RAM is volatile, which means that it requires a steady flow of electricity to maintain its contents. As soon as the power is turned off, whatever data was in RAM is lost. Read-only memory (ROM) refers to computer memory on which data has been prerecorded. Once data has been written onto a ROM chip, it cannot be removed and can only be read. Unlike the main memory (RAM), ROM retains its contents even when the computer is turned off. Hence it is nonvolatile. Most personal computers contain a small amount of ROM that holds instructions for starting up the computer.

There are different storage devices which are known as secondary memory devices. These devices are helpful in storing data, information and software permanently and they can be retrieved whenever required. They are also useful in transferring data or programs from one computer to another. Many storage devices are used with micro computers. Some of the common storage devices are explained below.

**Hard Disk:** Hard disk is a magnetic disk on which you can store computer data. The term hard is used to distinguish it from a soft or floppy disk. Hard disks hold more data and are faster than floppy disks. Hard disk is fixed inside the computer and is not easily removable.

Hard disk consists of one or more disk platters, an access mechanism and read/ write heads which are sealed in a case. Hard disk size depends upon the disk platter’s diameter. There are many different platter sizes (5½, 3½, 2½ inch etc.) The 3½ inch size platter is common with PCs and 2½ inch with laptop/ portable computers.

There are different types of hard disks depending upon their storage capacities. Storage capacities of hard disks range from 10 MB to several GBs.

**Floppy Disk:** Floppy Disk (FD) is a storage device which is small, flexible and easily removable. It is made of plastic disk coated with magnetic material which is sealed inside a square plastic jacket. It is called “Floppy” because it is soft having flexible physical property. Data can be written on or read from this floppy by a drive called Floppy Disk Drive (FDD) which is fixed inside the computer.

There are different types of floppies depending upon their sizes and storage capacities. Floppies come in two basic sizes namely 5¼" and 3½". The storage capacity of floppies varies from 360 KB to 1.44 MB. The floppies can store data on both sides (double-sided floppies) or on single side (single-sided floppies) depending on the floppy drive. Double sided floppy drives are most commonly used.

**Compact Disk:** Compact Disk (CD) is a storage device used to store data, information and software which can be read only and not be changed or erased. It is an optical read only memory made up of resin. Therefore it is actually called Compact Disk Read Only Memory (CD-ROM). The information is stored on CDs by using an expensive drive called CD-ROM drive. CD-ROM drives can be either internal or external.



A single CD-ROM has the storage capacity of 700 floppy disks, enough memory to store about 3,00,000 text pages. Compact disks are very popular storage devices for micro computers because a large number of software including

multimedia, audio and graphics software are available on these disks. They can store a large volume of data (upto 680 MB) which is almost the same as a storage capacity of a 640 MB hard disk.

WORM (Write-once Read-many) is a type of compact disk which can be recorded only once and not erased. It can store more data than a CD-ROM, generally measured in gigabytes.

**Digital Versatile Disk:** Digital versatile disk read only memory (DVD-ROM) is a read only digital versatile disk commonly used for storing large software applications. It is similar to compact disk read only memory (CD-ROM) but has a large capacity. A DVD-ROM stores around 4.38 GB of data whereas a CD-ROM usually stores 650 MB of data. A DVD-ROM permanently stores data files that cannot be changed, written over or erased. A personal computer with a DVD-ROM or a DVD-RAM drive is designed to read a DVD-ROM disk. Generally a DVD-ROM disk is not equipped to be used with a DVD drive connected to a home theatre system or television. But many DVD-ROM drives can generally read a DVD movie disk.

Compared to a CD-ROM, a DVD-ROM has the same 5 inch diameter and 1.2 millimeter thickness. But because a DVD-ROM uses a shorter wave length laser with tighter compacted pits, the disk capacity is increased. The smallest DVD-ROM can store approximately 7 times more data than a CD-ROM.

**Pen Drive:** Pen drive is a portable device which allows user to transfer data (text, images, videos etc) to and from computer quickly. Users can easily read and write the data in the pen drive by plugging it into USB port on the computer. Pen drives are quite compact and fit easily into the pocket. They run without battery and draw power from the USB connection itself. Both floppy disks and compact disks are now being gradually replaced by pen drive as preferred means of data storage. It offers mass data transfer and storage capability and at a much faster rate.



Storage capacity of Pen Drive can vary from few megabytes to over 100 megabytes. Pen Drive consists of an electronic circuit board and a USB connection that connects the drive to the computer. It is a memory chip which holds the data. Most Pen Drives are covered with plastic, metal or rubber casing for insulation. They are robust and scratch free thus ensuring maximum security for the data as compared to other traditional means of data storage.

(Source of images in this section: <http://www.tutorialspoint.com>)

#### Activity

Watch this video on "Input, Output and Storage Devices" available on YouTube at

<https://www.youtube.com/watch?v=74YuS4luywQ>



**Activity**

Drag the images and drop in the suitable column.

Input Devices	Storage Devices	output Devices





## ? Check Your Progress – 2

### A. Fill in the blanks with suitable words.

1. The sharpness of the image depends upon the number of
2. Depending upon the colour of display, monitors can be classified as  and
3. Two types of printers are  and
4. Printers that print the characters by striking against the ribbon and onto the paper are called
5. Printers that print the characters without striking against the ribbon and onto the paper are called
6.  is used to print high quality graphics and drawings.

Submit

## ? B

### Write the expansion of the following acronyms used in ICT

- VDU stands for
- VGA stands for
- WORM stands for
- DVD-ROM stands for

Submit

## ? True-False Questions

### C. State whether the following statements are true or false.

1 MDA stands for Monitor Display Adapter.

True  False

**False**

2 Daisy wheel printer is an example for character printer.

True  False

**True**

3 Non-Impact Printers are also called Page Printers.

True  False

**True**

4 Laser Printers and Inkjet Printers are the two types of Non-Impact Printers

True  False

**True**

5 Speakers produce audio output in the form of sound card.

True  False

**False**

6 ROM is non-volatile.

True  False

**True**

7 Storage devices are known as secondary memory devices.

True  False

**True**

8 Hard disks hold more data and are faster than floppy disks.

True  False

**True**

9 Data stored in a Compact Disk can be changed or erased.

True  False

**False**

10 A Pen Drive needs battery to function.

True  False

**False**

—

## 2.7 TYPES OF COMPUTERS

We can classify computers based on the following criteria.

1. According to purpose
2. According to technology used
3. According to size and storage capacity

### a) According to Purpose

According to purpose, computers can be classified into two types.

**(i) General Purpose Computers:** Computers that follow instructions for general requirements such as sales analysis, financial accounting, invoicing, management information etc. are called general purpose computers. Almost all computers used in offices for commercial, educational and other applications are general purpose computers.

**(ii) Special Purpose Computers:** Computers that are designed to perform special tasks like scientific applications and research, weather forecasting, space applications etc. are called special purpose computers.

### b) According to Technology Used

According to technology used, computers can be classified into three types.

**(i) Analog Computers:** Analog computers are special purpose computers that represent and store data in continuously varying physical quantities such as current, voltage or frequency. These computers are programmed for measuring physical quantities like pressure, temperature, speed etc. and to perform computation on these measurements. Examples for analog computers are thermometer and speedometer.



**(ii) Digital Computers:** Digital computers are mainly general purpose computers that represent and store data in discrete quantities and numbers. In these computers all processing is done in terms of numeric representation (binary digits) of data and information.



(iii) **Hybrid Computers:** Hybrid computers incorporate the technology of both analog and digital computers. These computers store and process analog signals which have been converted into discrete numbers using analog-to-digital converters. They can also convert the digital numbers into analog signals or physical properties using digital-to-analog converters. Hybrid computers are mainly used in artificial intelligence.



### c) According to Size and Storage Capacity

According to size and storage capacity, computers can be classified into four types.

(i) **Super Computers:** Super computer is the biggest and fastest computer designed mainly for complex scientific applications. It has many central processing units (CPUs) which operate in parallel to make it as a fastest computer. It is typically used for weather information, energy management, defense, nuclear energy research, electronic design, medicine, real-time animation etc. Some examples for super computers are CRAY3, CRAY-XMP-14, NEC-500, PARAM 9000 and PARAM 10000.



(ii) **Mainframe Computers:** Mainframe computers are also large and fast computers but smaller and slower than super computers. They are used in a centralized location where many terminals (input and output devices) are connected with one CPU and thus allow different users to share the single CPU. They have very high memory and can support thousands of users. They are mainly used for Railway and Airline reservations, Banking Applications and Commercial Applications of large industries. Some examples for mainframe computers are IBM 3090, IBM 4381, IBM 4300 and IBM ES-9000.

(iii) **Mini Computers:** Mini computers are medium-scale, smaller and generally slower than mainframe computers. Like mainframe they have many terminals which are connected with one CPU and can support many users. They are used in applications where processing can be distributed among several mini computers rather than using a mainframe computer. Some examples for mini computers are PDD-1, DEC Micro VAX and IBM AS/400.

**(iv) Micro Computers:** A micro computer is the smallest digital computer which uses a microprocessor as its CPU. Micro processor is a single chip CPU. Micro computer is popularly known as personal computer (PC). It can be used both as a stand-alone machine and a terminal in a multiuser environment. A powerful micro computer may be used as a substitute for mini or mainframe computer.



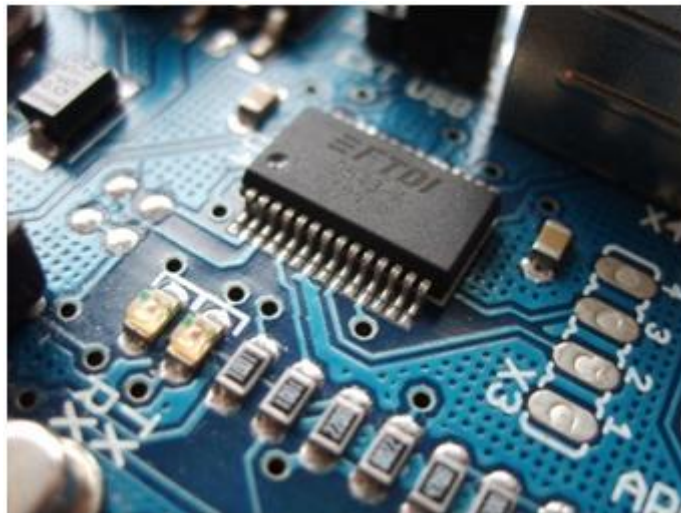
Micro computers are either of desktop model or portable model. Portable computers can be carried from one place to another. Examples for portable computers are laptops and notebook computers. Note book computers are smaller and lighter than laptop computers. Desktop computers fit on a desktop and are widely used in offices and homes.

#### Activity

Watch video on YouTube on "Types of Computers" available at

<https://www.youtube.com/watch?v=ceqBD3TCheg>

## 2.8 Computer Troubleshooting



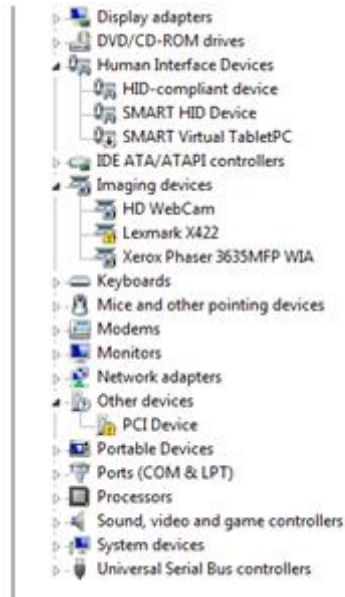
Computer Troubleshooting include troubleshooting hardware and software. Troubleshooting is needed once there is any trouble to work with the hardware and software. As most of us have experienced, there are some errors that can pop up or shown as a message. Hardware trouble shooting uses a systematic approach.

Some of the errors that generally we come across are:

- **Compiler Error:** The error occurring when the command runs in the software. One example of such kind is bad instruction; source/file.s:8: Error: bad instruction 'sdd r0,r1', This error occurs when you use a command that doesn't exist. First of all, check that you haven't mistyped the command.
- **Load Errors:** Load errors are errors that occur that prevent your Operating System from giving any output. This can be the hardest to diagnose and fix. Unfortunately, by their nature, they give off no indication of what is wrong.
- **Run Time Errors:** Behind load errors, runtime errors are the hardest to diagnose and fix. These occur when your Operating System just doesn't do what you want. Run time errors include hanging, alignment etc.

Once you find that there is some error in software, then first you need to observe what exactly the message is, then try to identify the error and if there is an option for troubleshooting message given by the system itself, you can try that. But care should be taken in order to avoid deleting the system files.

Hardware troubleshooting also comes in picture once there is any malfunctioning or dis-functioning of any of the hardware. It could be easily rectified once you observe for the system message and continue with the suggestions provided in the help menu. Otherwise you can click on the control panel and click the option of find and fix problem. The following snapshot give the window that you can get while using these steps.



The other option for troubleshooting is that, you can search for the device manager from start menu

You can type 'device manager' in the search option from the start menu, then click on the device manager from the pop up menu. You will be directed to device manager window (you may have the administrator log in), as shown below. From the device manager you can check the devices by clicking on the devices which are connected, whether they are functioning or not.

Other than this, the basic trouble shooting steps involves the following:

1. Close all the programs which are opened in the active window
2. Make sure about the connectivity of the devices (checking the status of the cords)
3. Check the message given by the computer
4. You can search for the help from the Help Menu
5. Try to restart the system after checking all the connections
6. If the problem exist further, then you may have to approach hardware support

### Activity

You can watch the following video for more details about computer hardware troubleshooting.

<https://www.youtube.com/watch?v=fCoXWfBATKA>

## ? Check Your Progress – 3

A Fill in the blanks with suitable words.

1. Analog computers are programmed for measuring
2. Speedometer is an example for  computer.
3. Hybrid computers incorporate the technology of both  and  computers.
4.  is the biggest and fastest computer designed for complex scientific applications.
5. IBM 3090 is an example for  computer.
6. A micro computer uses  as its Central Processing Unit.
7. Micro computers are either of  model or  model.
8. Note book computer is an example for  computer.
9. Desktop computers are widely used in  and
10. Hardware troubleshooting uses a  approach.

Submit

## ? B.

**B. State whether the following statements are true or false.**

1. Computers used in educational institutions are special purpose computers.

True  False

**False**

2. Thermometer is an example for analog computer.

True  False

**True**

3. In digital computers processing is done in terms of numeric representation of data and information.

True  False

**True**

4. Hybrid computers are mainly used in artificial intelligence.

True  False

**True**

5. Super computer has one Central Processing Unit.

True  False

**False**

6. Mainframe computers are used in a centralized location where many terminals are connected with one CPU.

True  False

**True**

7. Minicomputer can support one user only.

True  False

**False**

8. Micro computer is popularly known as personal computer.

True  False

**True**

9. A micro computer cannot be used as a substitute for mini or mainframe computer.

True  False



**False**

10 Note book computers are smaller and lighter than laptop computers.

True  False

**True**

## 2.9 LET US SUM UP

- The internal design of computers differs from one model to another. But the basic components of a computer remain the same for all models. A computer needs both hardware and software to function. Three main components of a computer are input/ output unit, central processing unit and memory unit.
- Input device is any machine that feeds data, information and instructions into a computer. Basic input devices include keyboard and mouse. Special input devices include Trackball, Light Pen, Touch Screen, Joystick, Digitizer, Scanner, OMR, BCR, OCR, MICR and Voice-input devices.
- Output devices are hardware components which are used to display or print the processed information. Monitor and printer are the two most important output devices. Printers are of two types namely Impact Printers and Non-Impact Printers. Other output devices include Plotter, Speaker, Computer Output Microfilm etc.
- Memory refers to data storage which is in the form of chips and the word 'storage' is used for memory that exists on tapes and disks. Primary memory of the computer is referred to as Random Access Memory. There are different storage devices known as secondary memory devices. They are helpful in storing data permanently. Some of the common storage devices are Hard Disk, Floppy Disk, Compact Disk, Digital Versatile Disk and Pen Drive.
- Computers can be classified based on purpose, technology used and according to size and storage capacity. According to purpose, computers are classified into general purpose computers and special purpose computers. According to technology used, computers are classified into analog computers, digital computers and hybrid computers. According to size and storage capacity, computers are classified into super computers, mainframe computers, mini computers and micro computers.
- Hardware troubleshooting is the process of reviewing, diagnosing and identifying operational or technical problems within a hardware device. It uses a systematic approach to identify the problem, causes of the problem and finally leading to implementation of the solution.

## 2.10 UNIT-END EXERCISES

1. Explain the anatomy of a computer.
2. Explain various types of input and output devices.
3. Describe temporary and permanent storage devices.
4. Develop a time line of evolution of computers.
5. Identify different parts of a PC indicating the parts of CPU.
6. Explain the different types of computers giving examples.
7. Explain how you would diagnose and troubleshoot common computer problems.

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## Unit - 3 : Computer Software

### Menu

#### CRITICAL UNDERSTANDING OF ICT

Unit - 1 : Information and Communication Technology

Unit - 2 : Computer Hardware Fundamentals

**Unit - 3 : Computer Software**

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unit - 6 : Multimedia

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Unit - 8 : ICT Integrated lesson

Unit - 9 : ICT in assessment

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#### STRUCTURE

3.1 Introduction

3.2 Objectives

3.3 Computer Software-Meaning and Types

3.4 Free Open Source Software (FOSS)

3.5 Introduction to MS Windows/Linux Ubuntu

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3.8 Let us Sum Up

3.9 Unit End Exercises

3.10 References

#### 3.1 INTRODUCTION

Two teachers, who were planning to buy a laptop, could see the brochure along with the newspaper. While going through the same, they could observe that under each laptop it was mentioned at the bottom 'Non OS and 'Windows 10 Home'. After reaching the shop, the customer executive asked them about the software they would like to have. But the teachers got confused about the question. They asked about 'Non OS and 'Windows 10 Home', and could see that the price varies between these two. The teachers still had confusion. They decided to ask with the computer teacher of the school. The teacher could explain about the computer software and related details. Now with

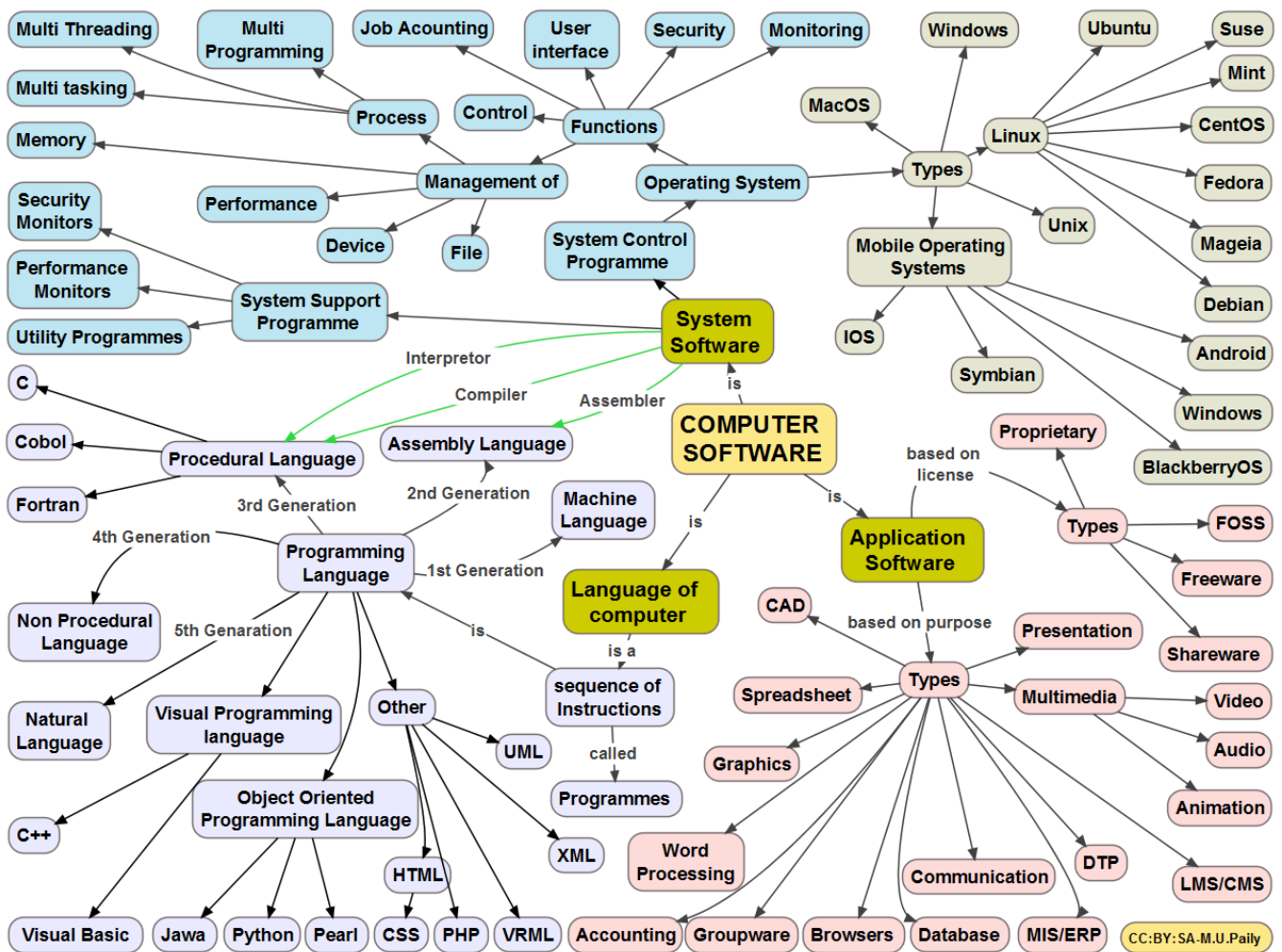
confidence the teachers could approach the shop and go for an economic and meaningful purchase.

From this anecdote you may be able to connect yourself, thinking that how each one of us might be confused because of the lack of some basic knowledge about computers.

You have already learnt in earlier chapter about computer and its anatomy. This unit focuses on the computer software - meaning and types. Examples of computer software with recent terminologies are discussed. It also focuses on some of the basic skills for using different operating systems (windows/Linux- Ubuntu).



An overview of computer software is given in the graphics below. It explains three basic aspects of computer software which are system software, application software and the language of computer. The graphic is expected to give a quick overview of the first part of this unit.



### 3.2 OBJECTIVES

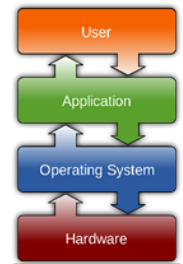
After studying this Unit, you will be able to

- state the meaning of computer software
- distinguish between types of computer software
- list examples for different types of computer software
- distinguish between MS Windows and Linux
- manage files and folders in MS-Windows/Linux-Ubuntu
- write an overview on MS-Office/Open Office

- create and locate files and folders in Windows/Ubuntu
- identify the menu in Microsoft office suite components

### 3.3 COMPUTER SOFTWARE-MEANING AND TYPES

Software could be considered as the language of a computer. It is the combination of programmes/commands used by products containing processors. That is, software is a set of programmes/commands designed to perform a well-defined task. You have already learnt about the components of a computer, whether it is desktop/laptop/palmtop; which has both hardware and software. The tangible part is the hardware and the instructions that can make the processors to work is the software. As we know computers do not think for themselves, so they need software, which is made to manipulate its hardware in such a way that you, the user, can understand. In short, Software is the set of instructions that tell a computer what it needs to do or the non-physical part of a computer; programs and documentation that play a part in a computer system's operation. JAVA, C++, Microsoft Office, Open Office etc. are examples for computer software.

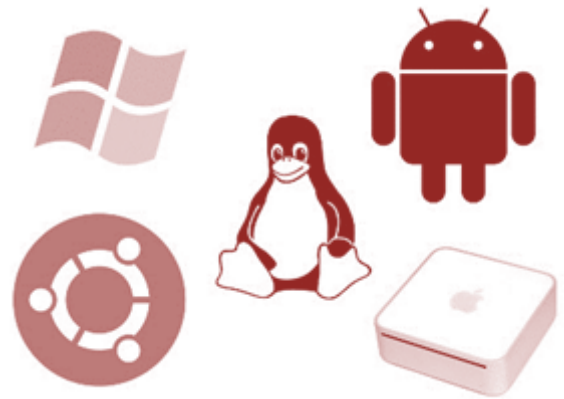


(Picture Source:  
[https://upload.wikimedia.org/wikipedia/commons/thumb/0/e/1/Operating\\_system\\_placement.svg/200px-Operating\\_system\\_placement.svg.png](https://upload.wikimedia.org/wikipedia/commons/thumb/0/e/1/Operating_system_placement.svg/200px-Operating_system_placement.svg.png))

Software can be classified into different types such as *system software*, *application software*, *proprietary software*, *open software*, *shareware* and *freeware*, which will be discussed in the following sections.

#### System Software

Now, we know that software is the language in which the user can interact with the computer. The basic interaction of the user with the computer is through input devices (you have already learnt different input devices in earlier chapter). For example if you use a key board to input, there are only some key strokes going into the computer, with which we would like to get the task done. This is possible when there is an interface which converts our inputs to be meaningful to the system, which is called **system software**. System software is a collection of programmes or commands designed to operate, control, and extend the processing capabilities of the computer. Examples of system software are *Operating system*, *Compilers*, *Interpreter*, and *Assemblers*.



One needs to have a thorough knowledge about the grammar which the system can understand. The syntax and semantics are very important. The system software is found to be bit tough and complex for a common man and is dealt with by technically qualified persons.

Systems software are further subdivided into operating systems and utilities. The operating system is the program that actually makes the computer operates. Utilities are programs which either improves the functioning of the operating system or supply missing or additional functionality.

An **Operating System (OS)** is system software that manages computer hardware and software resources and provides common services for computer programs. The operating system is a component of the system software in a computer system. Application programs usually require an operating system for them to function. Examples include: Microsoft Windows (XP, Vista, or 7), any flavor of Linux, and Mac OS X (An apple version of UNIX).

The following is a list of some of the functions of the operating system:

- boot-up the computer
- control the hard drives: this includes such features as formatting as well as saving files to and retrieving files from disk
- control the input/output ports
- control input devices such as keyboard, mouse and scanner
- control output devices such as the video display and printer
- provide the functionality for computers to be linked in a network

- provide the foundation for application software to be launched
- enable application software to access and use the hardware

A **compiler** is a computer program (or a set of programs) that transforms source code written in a programming language (the source language) into another computer language (the target language), with the latter often having a binary form known as object code.

An **interpreter** is a computer program that directly executes, i.e. performs, instructions written in a programming or scripting language, without previously compiling them into a machine language program.

An **assembler** is a program that takes basic computer instructions and converts them into a pattern of bits that the computer's processor can use to perform its basic operations. Some people call these instructions assembler language and others use the term assembly language.

**Utilities** are programs that manage, repair, and optimize data on a computer. A basic set of utilities is provided with every OS.



## Check Your Progress-1



Answer the following

1. Define a software

2. List different types of software

3. What is system software?

4. What are the different types of system software?

5. Describe the functions of system software.

### Application Software

Application Software is designed to run a particular application such as word processing, presentation, drawing, communicating etc. It may be single software or a combination in order to perform a particular application. Examples include payroll software, reservation software, Microsoft Word, Libre Office Writer etc. Ease of use, ease in manipulating and interactivity are some of the benefits of such software.

Application software does the specific things you want the computer to do, whereas the Operating System gives general instructions to the computer for controlling the hardware.

Table below gives the list of different type application software, brand and functions:



Application	Brand Name	Function
Word Processor	Open Office.org writer Libre Office writer Microsoft Word	Create, store, format and edit documents, letters and articles. Word processors are used where the emphasis is on manipulation of text.
Spreadsheet	Open Office.org Calc Libre office Calc Microsoft Excel	Create financial statements, balance sheets, perform statistical and numerical analysis of data and make forecasts based on numeric data. Spreadsheets are used where the emphasis is on arithmetic.
Presentation	Open Office.org Libre Office Impress Microsoft PowerPoint	Create slide show, lecture, seminar and other types of presentation.
Data Base	Sybase	Store and convert data into information. Databases are particularly useful in working with large quantities of data.



	MySQL Microsoft ACCESS	
Web Browser	Mozilla Chrome Netscape Internet Explorer	Surf the Internet and view web sites.
Desktop Publishing (DTP)	Page Maker Microsoft Publisher	DTP is similar to word processing except that there is more emphasis on page layout and the integration of diagrams.
Graphics and Imaging	Adobe Photoshop GIMP	Create and manipulate graphics images and store images in a variety of formats.

## ? Check Your Progress-2



State whether the following statements are True or False

1. Windows 7 is an application software

True  False

**False**

2. Internet explorer is a system software

True  False

**False**

3. Google chrome is an application software

True  False

**True**

4. Android is an application software

True  False



False



## Proprietary Software

Proprietary software is software that is owned by an individual or a company (usually the one that developed it). There are almost always major restrictions on its use, and its source code is almost always kept secret (source code is the version of the software as it is originally written by a developer in a plain text, readable in plain or alphanumeric characters). Sometimes these are called 'closed code software' which means, the source code is not for open access. Most software is covered by copyright which, along with contract law, patents, and trade secrets, provides legal basis for its owner to establish exclusive rights.



The owner of proprietary software exercises certain exclusive rights over the software. The owner can restrict use, inspection of source code, modification of source code, and redistribution. Proprietary software may also have licensing terms that limit the usage of that software to a specific set of hardware. Apple has such a licensing model for Mac OS X, an operating system which is limited to Apple hardware, both by licensing and various design decisions. Examples of proprietary software include Microsoft Windows, Adobe Flash Player, PS3 OS, iTunes, Adobe Photoshop, Google Earth, Mac OS X, Skype, WinRAR, Oracle's version of Java and some versions of UNIX.

***To emphasize that "free software" refers to freedom and not to price, we sometimes write or say "free/libre software," adding the French or Spanish word that means free in the sense of freedom. In some contexts, it works to use just "libre software" - Richard Stallman***

## Open Source Software

The term "open source" refers to something that can be modified and shared because its design is publicly accessible. Open source software is software whose source code is available for modification or enhancement by anyone. Open source software is different. Its authors make its source code available to others who would like to view that code, copy it, learn from it, alter it, or share it. Libre Office and the GNU Image Manipulation Program are examples of open source software. As they do with proprietary software, users must accept the terms of a license when they use open source software—but the legal terms of open source licenses differ dramatically from those of proprietary licenses. Open source software licenses promote collaboration and sharing because they allow other people to make modifications to source code and incorporate those changes into their own projects. Some open source licenses ensure that anyone who alters and then shares a program with others must also share that program's source code without charging a licensing fee for it.



**? Check your progress - 3**



Answer the following

1. What are the differences between proprietary and open source software?

2. List different open source software with their category

3. List different proprietary software with their category

Submit



## Shareware

Shareware is software, generally downloaded from the Internet, which can be freely used and distributed. However, it does require that if users would like to continue using it, they pay the developer a fee. This is nearly always done by means of a credit card transfer across the Internet. When payment is received, users get a serial number with which they can continue to use the software.

Shareware is not a totally free software but you usually get a certain days trial depending on the software or the company. After you have passed those days the software expires and works no more. If the user would like to continue using that software they have to pay a certain fee to get the original product.

Shareware is not free software, or even semi free. There are two reasons it is not:

- For most shareware, source code is not available; thus, you cannot modify the program at all.
- Shareware does not come with permission to make a copy and install it without paying a license fee, not even for individuals engaging in nonprofit activity. (In practice, people often disregard the distribution terms and do this anyway, but the terms don't permit it.)

Shareware is inexpensive because it is usually produced by a single programmer and is offered directly to customers. Thus, there is practically no packaging or advertising expenses. Those Sharewares can be shared in any website as long as they are for trial purposes or to attract customers.

### Freeware

Freeware is software which can be freely copied and distributed. Usually there are certain restrictions such as it may not be resold or its source should be acknowledged. Examples of free ware include PDF edit (Software that allows you to edit PDF files), YouTube Downloader (Downloads & converts videos from YouTube), 3.GOM media player (Play video files of multiple video formats)

## ? Check Your Progress-4

Fill in the blanks with appropriate words/phrase

1. Shareware is software generally downloaded from the Internet, which can be  and distributed.
2. For most shareware,  is not available
3. Freeware is software which can be  and distributed.
4. Usually there are certain restrictions such as it may not be resold or its source should be  in case of freeware.

Submit

### 3.4 FREE OPEN SOURCE SOFTWARE(FOSS)

We have discussed about different software. The software developer has all the rights to decide whether the source code needs to be shared or not. This decision makes the change that the software is free or proprietary. The paradigm shift in the intellectual property and knowledge management paves the roots for democratization of knowledge. This results in free and open movement and also *copy left* movement (as against copy right). These basically focus on the freedom of the user to access, modify, and redistribute the software.

#### Concept

**Free and Open-Source Software (FOSS)** is computer software that can be classified as both free software and open-source software. That is, anyone is freely licensed to use, copy, study, and change the software in any way, and the source code is openly shared so that people are encouraged to voluntarily improve the design of the software. This is in contrast to proprietary software, where the software is under restrictive copyright and the source code is usually hidden from the users.

The first known use of the phrase *free open-source software* on Usenet was in a posting on 18 March 1998. The primary license difference between free software and **open source** is one of philosophy. According to the Free Software Foundation, "Nearly all open source software is free software. The two terms describe almost the same category of software, but they stand for views based on fundamentally different values" (Richard Stallman).

"Free software" means software that respects users' freedom and community. Roughly, it means that **the users have the freedom to run, copy, distribute, study, change and improve the software**. Thus, "free software" is a matter of liberty, not price. To understand the concept, you should think of "free" as in "free speech," not as in "free beer". We

sometimes call it “libre software” to show we do not mean it is gratis (from <https://www.gnu.org/philosophy/free-sw.html> retrieved on 3rd Jan 2015).

A program is free software if the program's users have four essential freedoms:

- The freedom to run the program as you wish for any purpose.
- The freedom to study how the program works and change it so that it does your computing as you wishes. Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbor.
- The freedom to distribute copies of your modified versions to others. By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

The GNU General Public License (GNU GPL or GPL) is a widely used free software license, which guarantees end users (individuals, organizations, companies) the freedoms to run, study, share (copy), and modify the software. Software that allows these rights is called free software and, if the software is copyrighted it requires those rights to be retained. The GPL demands both. The license was originally written by Richard Stallman of the Free Software Foundation (FSF) for the GNU Project.

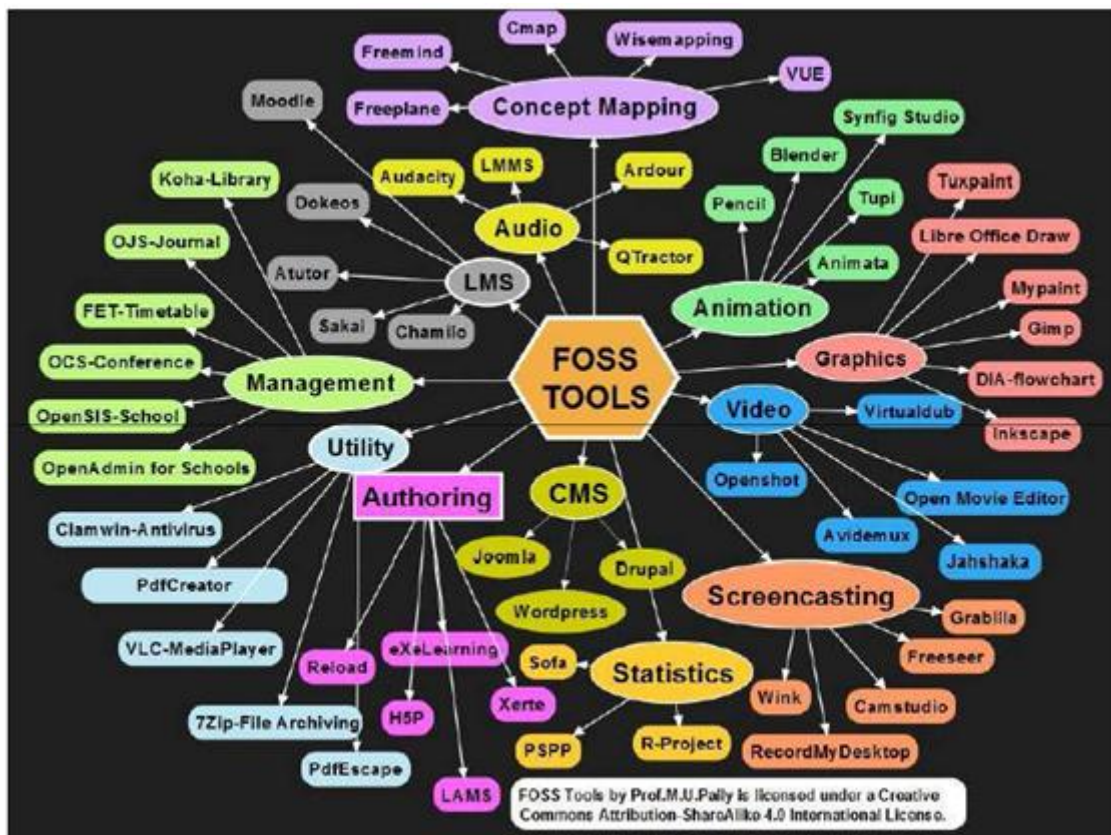
### Categories

You have seen different software in the above section, in terms of system software, application software and all. Also you know about the proprietary software. Alternative to proprietary, free open source software are very much accepted across the globe. Different categories of FOSS are available. Some of the categories are described below:

Category	Examples	References
<b>Office Suit</b>	<ul style="list-style-type: none"> <li>■ <b>Calligra Suite</b> is the continuation of KOffice under a new name.</li> <li>■ <b>Apache OpenOffice</b> (formerly known as OpenOffice.org)</li> <li>■ <b>LibreOffice</b> — independent fork of OpenOffice.org with a number of enhancements.</li> </ul>	<ul style="list-style-type: none"> <li>■ <a href="https://en.wikipedia.org/wiki/Calligra_Suite">https://en.wikipedia.org/wiki/Calligra_Suite</a></li> <li>■ <a href="https://en.wikipedia.org/wiki/Apache_OpenOffice">https://en.wikipedia.org/wiki/Apache_OpenOffice</a></li> <li>■ <a href="https://en.wikipedia.org/wiki/LibreOffice">https://en.wikipedia.org/wiki/LibreOffice</a></li> </ul>
<b>Image editor</b>	<ul style="list-style-type: none"> <li>■ Darktable — Digital image workflow management, including RAW processing.</li> <li>■ DigiKam — Integrated photography toolkit including editing capabilities.</li> <li>■ GIMP — GNU Image Manipulation Program</li> <li>■ Inkscape — an open-source vector graphics editor.</li> </ul>	<ul style="list-style-type: none"> <li>■ <a href="https://en.wikipedia.org/wiki/DigiKam">https://en.wikipedia.org/wiki/DigiKam</a></li> <li>■ <a href="https://en.wikipedia.org/wiki/GIMP">https://en.wikipedia.org/wiki/GIMP</a></li> <li>■ <a href="https://en.wikipedia.org/wiki/Inkscape">https://en.wikipedia.org/wiki/Inkscape</a></li> </ul>
<b>E mail service</b>	<ul style="list-style-type: none"> <li>■ Mozilla Thunderbird</li> <li>■ Inky</li> <li>■ Opera Mail</li> </ul>	<ul style="list-style-type: none"> <li>■ <a href="https://en.wikipedia.org/wiki/Mozilla_Thunderbird">https://en.wikipedia.org/wiki/Mozilla_Thunderbird</a></li> </ul>

	<ul style="list-style-type: none"> <li>https://en.wikipedia.org/wiki/Inky_%28email_client%29</li> <li>https://en.wikipedia.org/wiki/Opera_Mail</li> </ul>	
Typing	<ul style="list-style-type: none"> <li>KTouch</li> <li>Tux Typing</li> <li>(https://en.wikipedia.org/wiki/KTouch)</li> <li>(https://en.wikipedia.org/wiki/Tux_Typing)</li> </ul>	
3D Animation	<ul style="list-style-type: none"> <li>Blender</li> <li>K-3D</li> <li>OpenFX</li> </ul>	<ul style="list-style-type: none"> <li>https://en.wikipedia.org/wiki/Blender_%28software%29</li> <li>https://en.wikipedia.org/wiki/K-3D</li> <li>https://en.wikipedia.org/wiki/OpenFX_%28software%29</li> </ul>
Anti-Virus	<ul style="list-style-type: none"> <li>Calm Antivirus</li> <li>https://en.wikipedia.org/wiki/Clam_AntiVirus</li> </ul>	

The following figure gives the details about FOSS tools. You can notice that FOSS could be utilized in almost all dimensions of teaching, learning and education. Class room teaching learning could be enhanced with appropriate tool which is selected based on the content, context and learners. Judicious and meaningful use of FOSS tools can bring novelty and variety in the learning experiences, which enhances the teacher’s capacity to address the global learners.



**Check Your Progress-5**

Please pick the correct alternative from the given alternatives

1 Free open source software is

- free to use
- free to copy
- free to change
- all of these

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

2. GPL stands for

- Granted Private License
- Granted Public License
- General Public License
- Genuine Public License

Wrong

Wrong

Correct Option

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Correct Option \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

3. Which of the following is not a FOSS office suite?

- Libre Office

- Open Office
- MS-Office
- Calligra Suit

Wrong

Wrong

Correct Option

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Correct Option \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

4. Which of the following is a FOSS concept mapping tool

- Free Mind
- Freeplane
- VUE
- All of these

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

5. Blender is a \_\_\_\_\_ FOSS tool

- Animation
- Video
- Authoring
- Screen Casting



Correct Option

Wrong

Wrong

Wrong

### Solution

1. [Correct Option \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)



### Advantages

Free open source software is very useful in the sense the free availability of source code, such that the user can modify, redistribute, improve and has complete freedom in using the same. Free does not mean absolutely free since there are licensing even in FOSS (you will be learning about creative common licensing in another unit (for more details you may visit [www.creativecommons.org](http://www.creativecommons.org))

By using Open Source software you can:

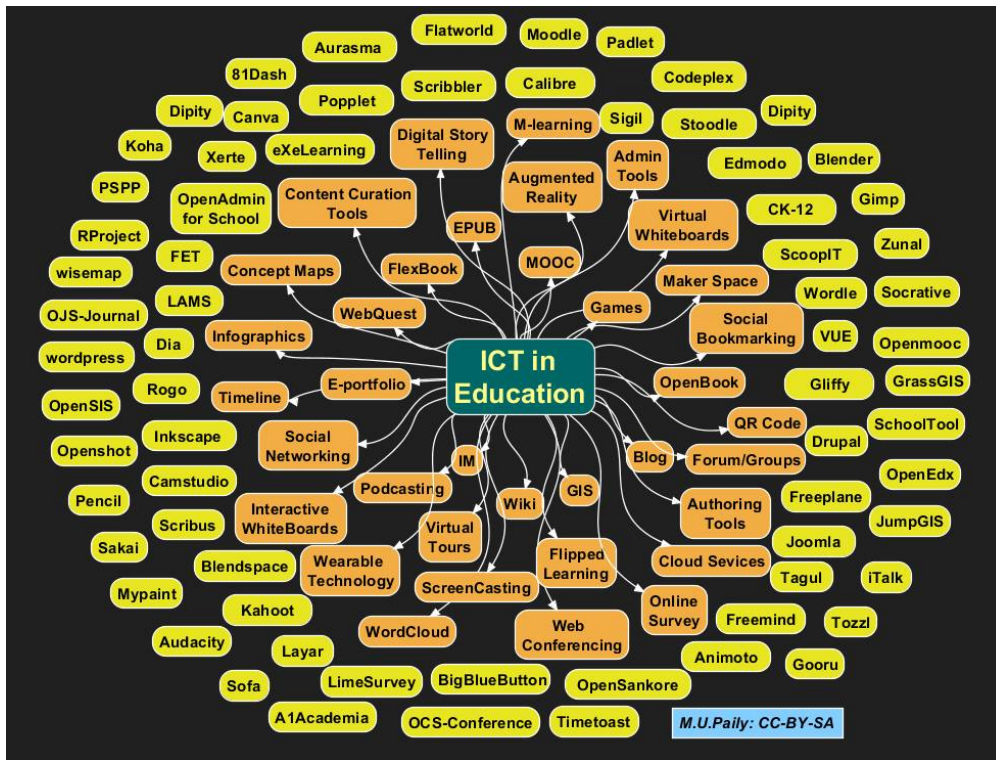
- Save money - all the software is totally free.
- Save time on license administration - you can install it on as many PCs as you want.
- Legally copy and distribute software as many times as you like - you can make copies of it for colleagues.
- Reduce your licensing liabilities - there is *no possibility* of piracy problems when you use open source.
- Save your money - you can take all the software home with them, to install on your home PCs
- Many open source applications are easy for Mac and Windows users to understand – there are over 100,000 open source applications available, including almost all of the common desktop productivity programs, so there is likely to be an application for most needs.
- Upgrades are free and open source software generally has a very long life spans and is rarely ever made obsolete. This helps ensure your data and experience with the software stays meaningful for much longer

### Open Source Educational software

As per our earlier discussions, you could understand that there are greater advantages for using free open source software. As teachers now you may focus on the scope of using FOSS in education. The free open source movement is in greater momentum to empower education with different types of educational software. The open source educational software allows freedom in education in general, and teaching learning in particular. It provides variety of options for teachers to design teaching and learning, motivate the students for personalized and meaningful learning. Teachers and students need to adapt and adjust with different tools/options provided by the educational software.

Content authoring, content curation, concept mapping, digital storytelling, Web quest, social bookmarking, podcasting, infographics, virtual white boards, virtual filed trips, podcasting, screen casting, forums and groups etc. are some of the options and software available in educational software. Mobile learning, augmented reality, e portfolio, blogs, flipped class room etc. are some of the emerging trends in educational software. The following figure here gives an overview of various current and future trends in education and the online and offline tools and technologies available for integrating these trends in education.





**Activity**

Before attending the following **check your progress question 6** you can watch the video from the given link: <https://www.youtube.com/watch?v=a8fHgx9mE5U> - What is Open Source explained in LEGO here

**? Check Your Progress-6**

Match the following

A	B
---	---

Concept Mapping	<input type="text"/>
Content Authoring	<input type="text"/>
Blog	<input type="text"/>
Online Survey	<input type="text"/>
	<input type="text"/>



### 3.5 INTRODUCTION TO MS-WINDOWS/LINUX - UBUNTU

Most computers come pre-installed with an OS called Microsoft® Windows®. Most OS's and programs have the same features whether they use Windows or not, but all computers running Windows will have these features with these names.

The thing that comes up when you turn on your computer is called logging in. The screen you see after logging in is called the Desktop. Most things on a computer are named after things in real life, and they are usually used similarly too. Just like a real desktop the desktop on a computer is where you go to access all your data. However, a real desktop has a flat horizontal surface.

You can replace the Operating System with another whether or not your system gets a virus. The most common replacement Operating System is called Linux. It is free to download and install and software for it is freely available via the Internet.

**Desktop** The desktop is the area that appears right after logging in. It contains a background picture (wallpaper), icons and the taskbar.


On the desktop are pictures with text labels under them, these pictures are called **icons** because they represent something else. If you move or get rid of an icon, all that means is that you have to access what they represent a different way, you haven't gotten rid of the application software the icon is representing. Icons usually represent programs, but sometimes they represent collections of data. Double-clicking (clicking twice in rapid succession) on one of these icons will open whatever it represents, the text tells you what it represents. Icon is a tiny picture that represents a program, folder, or program function.

There is a bar that is usually at the bottom of the desktop, however it may also be on any other side. If you cannot see it, then move the cursor to the edge where it is and it will come up. It is called the **task-bar**. The taskbar is the bar along one side of the desktop. It is used for launching programs or opening the window of an open program. Along the main part of the task-bar is a list of all open programs, clicking on one element of this list will put that program's window (the box that a program is viewed in) on top of all other open windows. Over on one side of the task-bar is a clock; beside the clock are a bunch of icons that represent open 'invisible' programs. These are programs that are always running and do things 'behind the scenes'. This area is called the system tray.

On the main part of the task-bar there is sometimes a small group of icons, this is called the quick-launch bar. Clicking on one of these icons opens whatever it represents. The *system tray* holds icons for programs currently running 'behind-the-scenes'. On the opposite side of the task-bar from the clock and the system tray is a button. A button (or command button) is just like a real button, when it is pushed (clicked) it does something. Some buttons have text on

them that say what they do, and some have icons representing what they do. Some have both. (Command) **Buttons:** Buttons do something when you click on them. They may be labeled by text, an icon, or both.

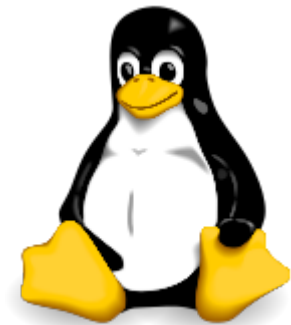
The quick-launch icons are also buttons. Some buttons are raised to look like real buttons and some only raise up when you hover (put the cursor on top of) them. The button on the other side of the start-bar from the clock and system tray is called the start-button. When you click the start-button it opens the start-menu. The start-menu has icons for more programs and data collections, although it is usually programs.

**Start Button** The Start button is a button that opens the start-menu. Start menu The *Start menu* contains icons for all installed programs and data collections, usually for programs. The *icons* that are on the desktop, the quick-launch bar, and the start-menu are usually shortcuts. On the desktop shortcuts are often indicated by a small symbol on top of the icon (  ). Shortcuts are what meant earlier when said 'if you move or get rid of an icon, all that means is that you have to access what they represent a different way, you haven't gotten rid of the actual thing'. Icons represent all data collections and programs even if they are not shortcuts, however normally the ones on the desktop and in the start-menu are shortcuts. Shortcuts Icons that are only links to the things those icons represent. The difference between icons and shortcuts is important so be sure you understand it. An icon is any picture that is meant to convey what something is. The icon on the start-button represents the fact that it is a major part of Windows, which is why it is a Windows logo. Shortcuts are a link to a program or data collection; the icon on a shortcut represents whatever the shortcut opens, however the same icon would be on the real thing as well.



Everything we just talked about is part of the Windows interface. An interface is just anything that goes between two or more things. This interface goes between you and the computer, you could also say that the Operating System is the interface between the hardware and software.

**Interface** An interface, just as the name suggests, is anything that acts as or creates a medium of interaction or communication between multiple things. A user-interface is the means of interaction between (you) the user and the computer. There are some standard things that are on most user-interfaces.



Besides these there are also menus. All Menus operate the same way as the start-menu. Some of them are found at the tops of programs. These are called main-menu or simply menu. Other menus are opened by right-clicking (pushing the right mouse button over something). These are called pop-up-menus.

### Linux/Ubuntu

Linux is a Unix-like computer operating system (OS) assembled under the model of free and open-source software development and distribution. Linux was

originally developed as a free operating system for personal computers based on the Intel x86 architecture, but has since been ported to more computer hardware platforms than any other operating system.

The development of Linux is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified and distributed – commercially or non-commercially – by anyone under the terms of its respective licenses, such as the GNU General Public License. Typically, Linux is packaged in a form known as a Linux distribution, for both desktop and server use. Some of the popular mainstream Linux distributions are Debian, Ubuntu, Linux Mint, Fedora, openSUSE, Arch Linux and Gentoo, together with commercial Red Hat Enterprise Linux and

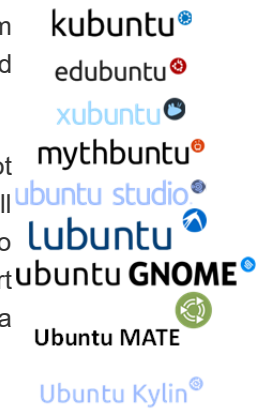
```
chealer@vinci:~/usr/share/doc/bash$ export LC_ALL=C
chealer@vinci:~/usr/share/doc/bash$ cd ~chealer/
chealer@vinci:~$ ls
Cloutier Ido      Musique logs      skolo sources
Desktop Mes images boston ncix.png sb4k vieux
chealer@vinci:~$ #why is there color when calling ls without arguments?
chealer@vinci:~$ which ls
/bin/ls
chealer@vinci:~$ ${!!}
$(which ls)
Cloutier Ido      Musique logs      skolo sources
Desktop Mes images boston ncix.png sb4k vieux
chealer@vinci:~$ type ls # 'ls' doesn't just run /bin/ls
ls is aliased to `ls --color=auto`
chealer@vinci:~$ echo $PS1
${debian_chroot:+($debian_chroot)}\u@h:\w$
chealer@vinci:~$ sh
sh-3.1$ echo $PS1
ls-\w$
sh-3.1$ echo $BASH_VERSION
3.1.17(1)-release
sh-3.1$ ls
Cloutier Ido      Musique logs      skolo sources
Desktop Mes images boston ncix.png sb4k vieux
sh-3.1$ echo $SHELLOPTS # 'ls' isn't an alias in POSIX mode
braceexpand:emacs:hashall:histexpand:history:interactive-comments:monitor:posix
sh-3.1$ kill
kill: usage: kill [-s sigspec | -n signum | -sigspec] pid | jobspec ... or kill -l [sigspec]
sh-3.1$ /bin/kill 6> killerror # collect stdout and stderr of $ /bin/kill: in ki
llerror
sh-3.1$ wc -l !$
wc -l killerror
7 killerror
sh-3.1$ type kill # kill doesn't just run /bin/kill, even in POSIX mode.
kill is a shell builtin
sh-3.1$ !$ -n 9 $$ # OK, kill self
kill -n 9 $$ # OK, kill self
Killed
chealer@vinci:~$
```

SUSE Linux Enterprise Server distributions. Linux distributions include the Linux kernel, supporting utilities and libraries, and usually a large amount of application software to fulfill the distribution's intended use.

The user interface, also known as the shell, is either a command-line interface (CLI), a graphical user interface (GUI), or through controls attached to the associated hardware, which is common for embedded systems. For desktop systems, the default mode is usually a graphical user interface, although the CLI is available through terminal emulator windows or on a separate virtual console.

Ubuntu is an ancient African word meaning 'humanity to others'. It also means 'I am what I am because of who we all are'. The Ubuntu operating system brings the spirit of Ubuntu to the world of computers.

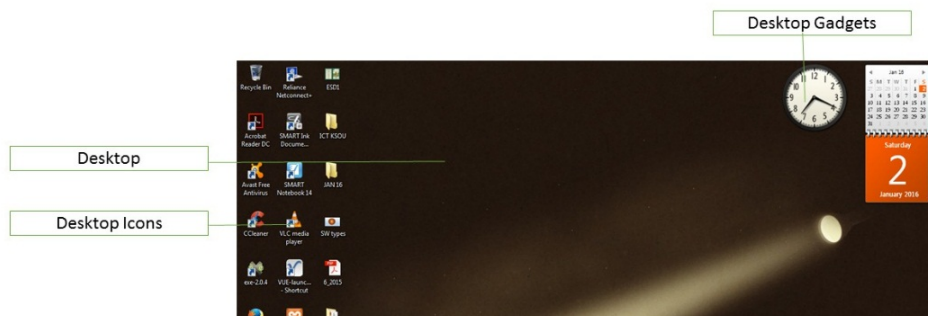
Linux was already established as an enterprise server platform in 2004, but free software was not a part of everyday life for most computer users. That's why Mark Shuttleworth gathered a small team of developers from one of the most established Linux projects — Debian — and set out to create an easy-to-use Linux desktop: Ubuntu. The vision for Ubuntu is part social and part economic: free software, available to everybody on the same terms, and funded through a portfolio of services provided by Canonical.



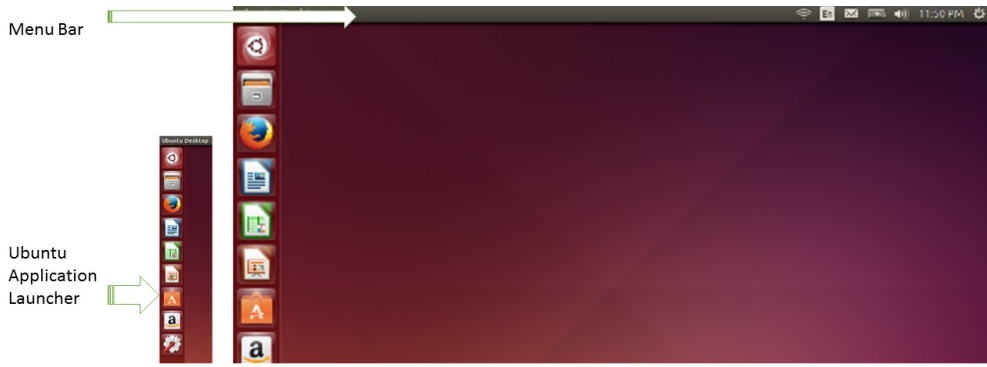
The different Ubuntu offerings or flavors are listed in the image

## Navigating the Desktop

As you have seen what a desktop is, now we will try to navigate the desktop. The following figure indicates the desktop and the different components on a desktop

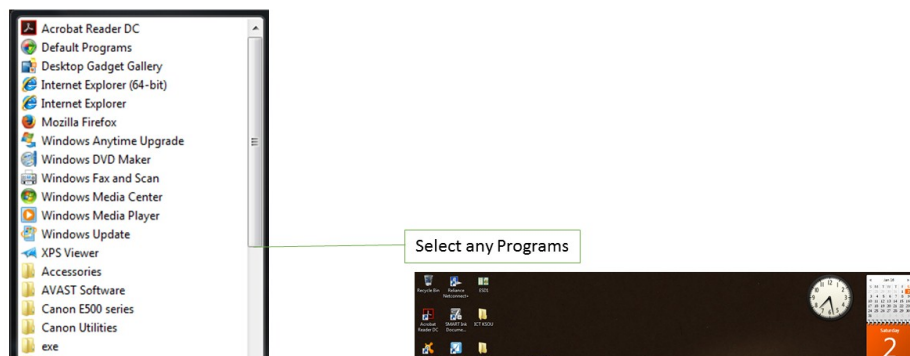
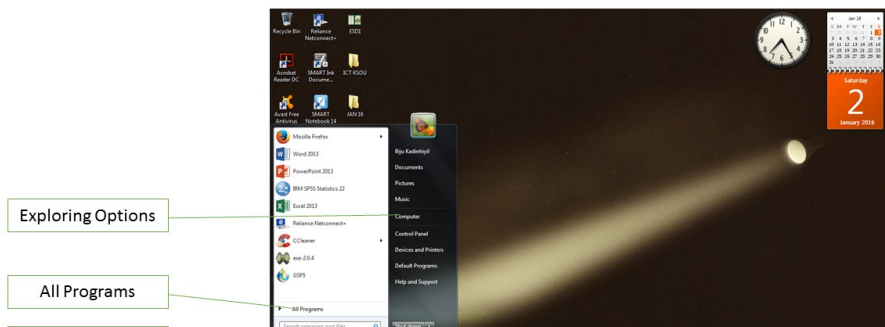


Or in a Linux based machine



**Activity:** Now it's your turn to switch on your laptop or desktop. You can go through the desktop and find out the components on the desktop as discussed.

Now let's see more, what happens when you try to start



From the pop up menu, you can select which ever programme or application software to open and then work on the same. Or in a Ubuntu machine



## Control Panel

Control panel is a panel which provides different options to customize your computer or fine tune your computer. The following image helps you to identify how to access the control panel in your computer

Clicking on start button gets to you the pop up menu, in the right hand side of the pop up menu, under 'compute' you can see 'control panel' option. Clicking on control panel option, you will be directed to a window, which gives the details of control panel. The following figure gives the details in the control panel category view

When you click on the category, on the top right corner in the control panel window it gives you different options for large icon view and small icon view, as shown in the following figures

By clicking on the specific icon you will be able to adjust your computer settings. But care must be taken while changing some of the system settings. Or in an Ubuntu Machine

## File Manager

As we are familiar with the word file, the same you could see is been used in computer also. *File* in its meaning is document. Whichever document you would like to work with, first you have to open from the drop down menu, after clicking in the start button. Then work on the document, after completing your work, you can save the file in the

system. By default it will be saved in my documents. Once you save more files, then it may be difficult or you to locate the same for retrieval. Then you may create necessary folder either in the desktop or in any of the location in the computer.

The following video gives you the details for creating a new folder in the desktop.

<https://www.youtube.com/watch?v=BmarTa22J2Q>

Once you have created any folder, whatever files you have created and saved outside the folder could be dragged and dropped into the folder (dragging and dropping-click and press the left mouse button over the file or folder and move the same to any specific folder icon and release the mouse button)

Or in an Ubuntu Machine

---

## Explorer

File Explorer, previously known as **Windows Explorer**, is a file manager application that is included with releases of the Microsoft Windows operating system from Windows 95 onwards. It provides a graphical user interface for accessing the file systems. It is also the component of the operating system that presents many user interface items on the monitor such as the taskbar and desktop



Explorer could be accessed by double-clicking the new My Computer desktop icon, or launched from the new Start Menu that replaced the earlier Program Manager. There is also a shortcut key combination: Windows key + E. Successive versions of Windows (and in some cases, Internet Explorer) introduced new features and capabilities, removed other features, and generally progressed from being a simple file system navigation tool into a task-based file management system.

An address bar was also added to Windows Explorer, which a user could type in directory paths directly, and be taken to that folder. It also operates as a URL bar for Internet addresses; web pages would open in the main portion of the window.

Another feature that was based on Internet Explorer technology was customized folders. Such folders contained a hidden web page that controlled the way the Windows Explorer displayed the contents of the folder. This feature proved to have security vulnerabilities due to its reliance on ActiveX objects and scripting, and was removed with the introduction of Windows XP.

Other new features:

- The ability to add other toolbars to the task bar, the most visible of these being Quick Launch.
- Active Desktop, which made it possible to turn the desktop background itself into a web page.
- Single-click activation of icons in Windows Explorer, adhering to a web page paradigm.
- Desktop Channels.
- New virtual folders for Scheduled Tasks and Web Folders

According to Microsoft website

"Windows Explorer displays the hierarchical structure of files, folders, and drives on your computer. It also shows any network drives that have been mapped to drive letters on your computer. Using Windows Explorer, you can copy, move, rename, and search for files and folders. For example, you can open a folder that contains a file you want to copy or move, and then drag the file to another folder or drive".

There are other places in Windows where you can view and work with files and folders. My Documents is a convenient place to store documents, graphics, or other files you want to access quickly. You can also view My Network Places, which lists other computers that are connected to your local area network (LAN) When you delete files or folders from your hard disk, Windows places them in the Recycle Bin, where you can retrieve them, until you empty the Recycle Bin. Files or folders deleted from a floppy disk or a network drive are permanently deleted and are not sent to the Recycle Bin".

(Source: [https://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/app\\_win\\_explorer.msp](https://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/app_win_explorer.msp))

Or in an Ubuntu Machine

### Accessories

Accessories are the additional components that could be used by the user. Windows operating system also provide some additional components called accessories.

Accessories could be accessed by clicking on START button--> All programme--> accessories



Examples of accessories include, Calculator, Command prompt, connect to a network projector, Math Input Panel, Notepad, Paint, Snipping tool, Sound Recorder, Sticky notes, Word Pad etc.

### Activity

1. Watch the videos from the given links

1. Windows 7 Total training - Basics (19.35 minutes)

<https://www.youtube.com/watch?v=FCqkBYu6ERk>

2. Ubuntu Tutorial for beginners (5.03 minutes)

<https://www.youtube.com/watch?v=QGhx-u-c5Cg>

2. Open Windows operating system in your system, create a new folder in your name on the desktop. After creating new folder change the name to Computers.

3. Check the appearance of your computer in the control panel.

4. Use the calculator and snipping tool accessory

5. Save a note pad and after saving locate the same using explorer



### Check your progress-7



1 Which of the following is **not** seen in a control panel?

- System and security
- Network and internet
- Hardware and sound

Software and Video

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

2. Which of the following is **not** a part of accessories?

- Getting started
- Snipping tool
- Save
- Remote Desktop connection

Wrong

Wrong

Correct Option

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Correct Option \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

3. Which of the following cannot be seen in a desktop?

- Icon
- Taskbar
- Toolbar
- Start button

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

## 3.6 INTRODUCTION TO MS OFFICE

**Microsoft Office** is an office suite of applications, servers, and services developed by Microsoft. It was first announced by Bill Gates on August 1, 1988, at COMDEX in Las Vegas. Initially a marketing term for a bundled set of applications, the first version of Office contained Microsoft Word, Microsoft Excel, and Microsoft PowerPoint. The desktop version of Office is available for Windows and OS X. A touch-optimized version of Microsoft Office is available pre-installed on Windows RT tablets. A mobile version of Office, Office Mobile, is available for free on Windows Phone, iOS and Android. A web-based version of Office, Office Online, is also available. Microsoft has stated that it plans to create a version of Office for "other popular platforms" as well.

The different product version include, MS Office for Windows XP, for Windows 7, 8, 8.1, 10 and also Office 365 which could be used online (cloud based ) and offline also.

### MS-Word

Microsoft word is a word processing application software from Microsoft. This application software has different options regarding processing word as letter, document etc. The file extension for Microsoft word is .doc or .docx.

Word can import and display images in common bitmap formats such as JPG and GIF. It can also be used to create and display simple line-art. No version of Microsoft Word has support for the common SVG vector image format.

There are different versions of Microsoft word, such as word 97, word 2003, word 2007, word 2010, word 2013 etc. The following screen shot is of Microsoft Word 2013, blank document

The detailed application of Microsoft word will be discussed in coming chapters.

### MS-Excel

Microsoft excel is a spreadsheet application from Microsoft. It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications. It has been a very widely applied spreadsheet for these platforms, especially since version 5 in 1993, and it has replaced Lotus 1-2-3 as the industry standard for spreadsheets. Excel forms part of Microsoft Office.

Microsoft Excel has the basic features of all spreadsheets, using a grid of cells arranged in numbered rows and letter-named columns to organize data manipulations like arithmetic operations. It has a battery of supplied functions to answer statistical, engineering and financial needs. In addition, it can display data as line graphs, histograms and charts, and with a very limited three-dimensional graphical display. It allows sectioning of data to view its dependencies on various factors for different perspectives. As we have seen in Microsoft word, different versions, since excel is a part of Microsoft office ,equivalent to Microsoft word, there are different versions of excel; such as excel 21997, excel 2003, excel 2010, excel 2013 etc.

Below given is a snap shot of excel 2013 blank document, for checking the different menu items.

## MS-Power Point

**Microsoft PowerPoint** is a slide show presentation program currently developed by Microsoft. PowerPoint initially named "Presenter", was created by Forethought Inc.. Microsoft's version of PowerPoint was officially launched on May 22, 1990, as a part of the Microsoft Office suite. PowerPoint is useful for helping develop the slide-based presentation format, and is currently one of the most commonly-used presentation programs available

PowerPoint presentations consist of a number of individual pages or "slides". The "slide" analogy is a reference to the slide projector. Slides may contain text, graphics, sound, movies, and other objects, which may be arranged freely. The presentation can be printed, displayed live on a computer, or navigated through at the command of the presenter. For larger audiences the computer display is often a video projector. Slides can also form the basis of webcasts.

PowerPoint provides three types of movements:

1. Entrance, emphasis, and exit of elements on a slide itself are controlled by what PowerPoint calls Custom Animations.
2. Transitions, on the other hand, are movements between slides. These can be animated in a variety of ways.
3. Custom animation can be used to create small story boards by animating pictures to enter, exit or move.

PowerPoint provides numerous features that offer flexibility and the ability to create a professional presentation. One of the features provides the ability to create a presentation that includes music which plays throughout the entire presentation or sound effects for particular slides. In addition to the ability to add sound files, the presentation can be designed to run, like a movie, on its own. PowerPoint allows the user to record the slide show with narration and a pointer. The user may customize slide shows to show the slides in a different order than originally designed and to have slides appear multiple times. Microsoft also offers the ability to broadcast the presentation to specific users via a link and Windows Live.

As a part of Microsoft office, power point has different versions such as Microsoft Power point 1997, 2003, 2010, 2013 etc.

Below given is a snap shot from Microsoft 2013 blank document.

## Other Office Suits

The other application software available with Microsoft office include,

- Microsoft Access- data base management system application.
- Microsoft Outlook- e-mail configuring application
- Microsoft Publisher- application allows for designing different publication formats
- OneDrive- application connecting with the cloud service, which allows user to save the data in Microsoft's server
- Skype for Business- application allows for online chatting.

These last two options are available with the latest versions of Microsoft office.

## 3.7 INTRODUCTION TO LIBRE OFFICE

As the globe is popularized with the democratization of knowledge, we have seen the importance of free open source software. Libre office is one of the best alternative FOSS for Microsoft office.

- It is an independent self-governing meritocratic entity, created by former leading members of the OpenOffice.org Community, in the form of a charitable Foundation under German law.
- It continues to build on the foundation of ten years' dedicated work by the OpenOffice.org Community.

- It was created in the belief that the culture born of an independent Foundation brings out the best in contributors and will deliver the best software for users.
- It is open to any individual who agrees with our core values and contributes to our activities.
- It welcomes corporate participation, e.g. by sponsoring individuals to work as equals alongside other contributors in the community. (Source: <<https://www.documentfoundation.org/>>)

Libre office, the Document foundation has given the rationale for the development of such office suite. This could be seen as the hallmarks of most of the FOSS tools.

We commit ourselves:	We reject:
to eliminate the digital divide in society by giving everyone access to office productivity tools free of charge to enable them to participate as full citizens in the 21st century	the ownership of office productivity tools by monopoly suppliers which imposes a de-facto tax on global electronic free speech and penalizes the economically disadvantaged
to support the preservation of mother tongues by encouraging all peoples to translate, document, support, and promote our office productivity tools in their mother tongue	the creeping domination of computer desktops by a single language forcing people to learn a foreign language before they can express themselves electronically
to allow users of office productivity software to retain the intellectual property in the documents they create by use of open document formats and open standards	the ownership of file formats by proprietary software companies - documents belong to their creators, not software vendors
to an open and transparent peer-reviewed software development process where technical excellence is valued	a closed software development process where errors can lie hidden and poor quality is accepted

(Source: <<https://www.documentfoundation.org/foundation/>> )

**Libre Office** is a free and open source office suite, developed by The Document Foundation. It was forked from OpenOffice.org in 2010, which was an open-sourced version of the earlier StarOffice. The LibreOffice suite comprises programs for word processing, the creation and editing of spreadsheets, slideshows, diagrams and drawings, working with databases, and composing mathematical formulae. It is available in 110 languages.

LibreOffice uses the international ISO/IEC standard OpenDocument file format as its native format to save documents for all of its applications. The OpenDocument file format is now also supported by all major competing office suite applications (proprietary and open source). LibreOffice is also compatible with other major office suites, including Microsoft Office, through a variety of import/export filters. The file formats of Microsoft Office are well supported, though some layout features and formatting attributes are handled differently in the application or are not entirely supported in the filters.

LibreOffice is available for a variety of computing platforms, including Microsoft Windows, OS X (10.8 or newer), and Linux (including a LibreOffice Viewer for Android). It is the default office suite of most popular Linux distributions. (Source: <<https://en.wikipedia.org/wiki/LibreOffice>> )

The following application software are included in the Libre office suite:

	<b>Writer-</b> A word processor with similar functionality and file support to Microsoft Word. It has extensive word processing capabilities, but can also be used as a basic text editor
	<b>Calc-</b> A spreadsheet program, similar to Microsoft Excel or Lotus 1-2-3. It has a number of unique features, including a system which automatically defines series of graphs, based on information available to the user.
	<b>Impress-</b> A presentation program, similar to Microsoft Power Point. Presentations can be exported as Shock Wave Flash files, allowing them to be viewed on any computer with Adobe Flash Player installed.
	<b>Draw-</b> A vector graphics editor and diagramming tool similar to Microsoft Visio and comparable in features to early versions of CorelDRAW. It provides connectors between shapes, which are available in a range of line styles and facilitate building drawings such as flowcharts. It also includes features similar to desktop publishing software such as Scribus and Microsoft Publisher.
	<b>Math-</b> An application designed for creating and editing mathematical formulae. The application uses a variant of XML for creating formulae, as defined in the Open Document specification. These formulae can be incorporated into other documents in the LibreOffice suite, such as those created by Writer or Calc, by embedding the formulae into the document.
	<b>Base-</b> A database management program, similar to Microsoft Access. LibreOffice Base allows the creation and management of databases, preparation of forms and reports that provide end users easy access to data. Like Access, it can be used to create small embedded databases that are stored with the document files (using Java-based HSQLDB as its storage engine), and for more demanding tasks it can also be used as a front-end for various database systems, including Access databases.

## Check Your Progress-8



Find out the correct alternative from the given alternatives.

1. This is word processing software

- PowerPoint
- Access
- Excel
- MS Word

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. Which of the following is a part of Libre Office Suite

- Access
- Paint
- Base
- Publisher

Correct Option

Wrong

Wrong

Wrong

### Solution

1. Correct Option (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

3. Which of the following is not a part of Microsoft Office

- Excel
- Publisher
- Impress
- PowerPoint

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

4. If anyone would like do graphic editing, which of the following needs to be used?

- Base
- Impress
- Draw
- Writer

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

5. which of the following is a slide show presentation program based on Windows?

- Impress
- Power point
- Beemer
- Slideshare

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)





### 3.8 LET US SUM UP

- Computer software is the non-physical part of a computer. It is a term used to describe the programs and documentation that play a part in a computer system's operation.
- Software is divided into two broad categories: systems software and application software.
  - Systems software is the term used to describe programs that enable the computer to function, improve its performance and access the functionality of the hardware.
  - Application software is the term used for programs that enable the user to achieve specific objectives such as create a document, use a database, produce a spreadsheet or design a building.
  - Proprietary software is software that is owned by an individual or a company (usually the one that developed it).
  - Open source software is software whose source code is available for modification or enhancement by anyone.
  - Shareware is software, generally downloaded from the Internet, which can be freely used and distributed.
  - Free and open-source software (FOSS) is computer software that can be classified as both free software and open-source software. That is, anyone is freely licensed to use, copy, study, and change the software in any way, and the source code is openly shared so that people are encouraged to voluntarily improve the design of the software.

### 3.9 UNIT END EXERCISES

1. Differentiate the types of computer software with examples.
2. List the advantages of FOSS
3. Name any four open educational software
4. Analyse the importance of FOSS in education
5. Compare Windows and Linux Operating systems based on their basic features
6. Watch the videos from the given links

1.Windows 7 Total training - Basics (19.35 minutes)

<https://www.youtube.com/watch?v=FCqkBYu6ERk>

2.Ubuntu Tutorial for beginners (5.03 minutes)

<https://www.youtube.com/watch?v=QGhx-u-c5Cg>

7. Open Windows operating system in your system, create a new folder in your name in the desktop. After creating new folder change the name to Computers.
8. Check the appearance of your computer in the control panel.
9. Use the calculator and snipping tool accessory
10. Save a note pad and after saving locate the same using explorer

### 3.10 REFERENCES

1. [http://eu.conecta.it/paper/Advantages\\_open\\_source\\_soft.html](http://eu.conecta.it/paper/Advantages_open_source_soft.html)
2. <http://oss-watch.ac.uk/resources/ossoptionseducation>
3. <http://www.datamation.com/osrc/article.php/3888901/50-Open-Source-Tools-That-Replace-Popular-Education-Apps.htm>
4. Ubuntu manual [http://files.ubuntu-manual.org/manuals/getting-started-with-ubuntu/14.04e2/en\\_US/screen/Getting%20Started%20with%20Ubuntu%2014.04%20-%20Second%20edition.pdf](http://files.ubuntu-manual.org/manuals/getting-started-with-ubuntu/14.04e2/en_US/screen/Getting%20Started%20with%20Ubuntu%2014.04%20-%20Second%20edition.pdf)
5. <https://wiki.ubuntu.com/UbuntuFlavors>
6. <http://www.edubuntu.org/>
7. <https://www.kubuntu.org/>
8. <http://xubuntu.org/>
9. <http://www.mythbuntu.org/>
10. <https://ubuntustudio.org/>
11. <http://lubuntu.net/>
12. <https://ubuntugnome.org/>

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## Unit - 4 : Application Software

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#### CRITICAL UNDERSTANDING OF ICT

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## 4.1 INTRODUCTION

Drushya is a teacher in a school. Her classes are liked and enjoyed by her students since she uses ICT for teaching. She always uses application software like word processing to prepare notes; spreadsheets; presentation software for effective presentation in her class; and interactive drawing software for drawing diagrams.

She had to teach the working of the heart. That day too she used a word processor to prepare the notes for the class. She also used presentation software and prepared a presentation for her class with a few animations and videos to be shown in the class to make her teaching more interesting. Using a drawing and painting software she had prepared a diagram of the heart. She also had developed an interactive quiz for the assessment of students. She could access materials from internet in PDF formats and for using the same, she was looking for some software which could help her to convert the file.

While preparing she had to download some information from the internet and she saw that some of the files could not be edited since they were in PDF format. She had to convert them into a word file to edit them. After she had finished preparing the notes for the students, she had to see that no one else would be able to make any changes in it by mistake. So she created a pdf file. After finalizing it was added to the archive of the previous files in which she had saved all the presentations of the 10th class by archiving it. When she tried to open the file to revise it on her friend's computer she could not, since the operating system was different and had to use a file converter.

She was enthusiastic of the class and her students too were, as usual, eager to attend her class. Before the class she was discussing about her preparations for the class with her colleague, Kiran. Kiran too was using ICT in his class for effective teaching. But he warned her to be careful, and narrated an incident that had happened to him the previous day.

The previous day when Kiran had to start the class he found that the computer took a lot of time to open and the file he needed could not be accessed. All his preparation went in vain. He somehow managed the class for that day. Later he was shocked to know that all his word files were converted to another type of file and he was not able to access any of the word files he had saved in his computer. All the information and efforts put in for a long time had been lost. Kiran told her that his computer was infected by virus and that this would not have happened if he had installed an antivirus. Drushya was surprised to know that a machine could be infected by virus and worms and it needed to be protected from them. That very day she asked Kiran for information about computer virus and the security measures she had to take. From then on Drushya is more confident and efficient in using ICT for teaching her students.

Do you use word processing, spreadsheets, presentation, drawing software for your work? Have you created a file in PDF, archived the files? You may or may not, either way there is more to it. Let us try to know about them in this unit.

This unit discusses the various application software and how these software can be used for educational purpose. This unit also introduces you to aspects of computer security like hacking, virus, spyware, antivirus, misuse and abuse, antivirus and safety procedures for using a computer.

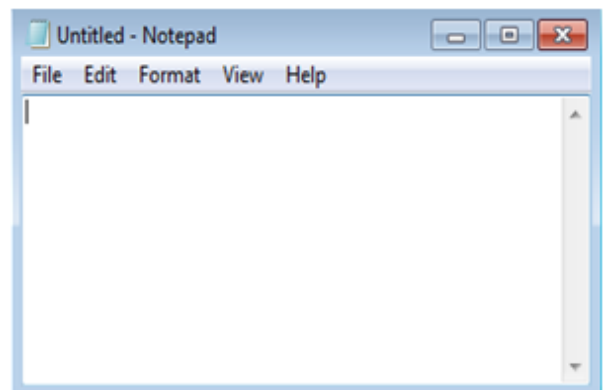
## 4.2 OBJECTIVES

After studying this unit, you will be able to

- create a word file using Word Processing software
- enter and work with data in Spread sheet software
- create a presentation using Presentation software
- design an image using a Drawing software
- list out the educational applications of word processing, spreadsheets, presentation and drawing software
- create a PDF file using PDF Creator
- condense files using File Archiving
- convert various file formats to PDF file using a File Converter
- differentiate between hacking and cracking
- prevent computer being affected by virus
- differentiate between virus and spyware
- enumerate the misuse and abuse of ICT
- download and install antivirus and firewall to remove malware
- adopt safe practices to prevent computer being affected by malware

### 4.3 APPLICATION SOFTWARE AND ITS EDUCATIONAL IMPLICATIONS

In the previous unit we have already discussed about computer software and let us recall a few of them here. Word processing, spreadsheets, presentation and drawing software which we mentioned above are all application software. Application software is a computer program designed to help the user perform a specific activity. The word "application" is used because each program has a specific application for the user. For example, a word processor can assist the user to create notes, write a text, an article, a project paper, while a video game will not. This contrasts with system software, which is mainly concerned with running the computer.



Applications may be bundled with the computer and its system software or published separately. They may be proprietary or open-source. Depending on the activity for which it is developed, an application can manipulate text, numbers, graphics, or a combination of these elements. Some application packages focus, on a single task, like word processing; while integrated software include several applications. An application is different from an operating system (which runs a computer), a utility (which performs maintenance), and a programming tool (which creates programs). While system software is automatically installed with the operating system, you can choose which applications you want to install and run on your computer.

#### 4.3.1 Word processing:

A word processing program, as the name suggests, processes words. It also processes paragraphs, pages, and entire papers. It is one of the earliest and the most popular applications for the personal computer.

A text editor is a type of program used for editing plain text files.

Text editors are provided with operating systems and software development packages, and can be used to change configuration files, documentation files and programming language source code.



<http://www.computerhope.com>

There are important differences between plain text files created by a text editor and document files created by word processors such as Microsoft Word or WordPerfect.

- A plain text file uses a character encoding such as UTF-8 or ASCII to represent numbers, letters, and symbols. The only non-printing characters in the file that can be used to format the text are newline, tab, and formfeed. Plain text files

are often displayed using a mono-space font so horizontal alignment and columnar formatting is sometimes done using space characters.

- Word processor documents are generally stored in a binary format to allow for localization and formatted text, such as boldface, italics and multiple fonts, and to be structured into columns and tables.
- Although they are often viewed with formatting, documents using mark-up languages are stored in plain text files that contain a combination of human-readable text and markup tags. For example, web pages are plain text with HTML tags to achieve formatting when rendered by a web browser. Many web pages also contain embeddedJavaScript that is interpreted by the browser.

Word processors were developed to allow formatting of text for presentation on a printed page, while text produced by text editors is generally used for other purposes, such as input data for a computer program.

When both formats are available, the user must select with care. Saving a plain text file in a word-processor format adds formatting information that can make the text unreadable by a program that expects plain text. Conversely, saving a word-processor document as plain text removes any formatting information.

EditPadLite: A fine text editor with all the necessary basic features. Free for non-commercial use.

TextPad® 8.0 is a powerful, general purpose editor for plain text files. Easy to use, with all the features a power user requires.

Notepad is a generic text editor included with all versions of Microsoft Windows that allows you to open and read plaintext files.

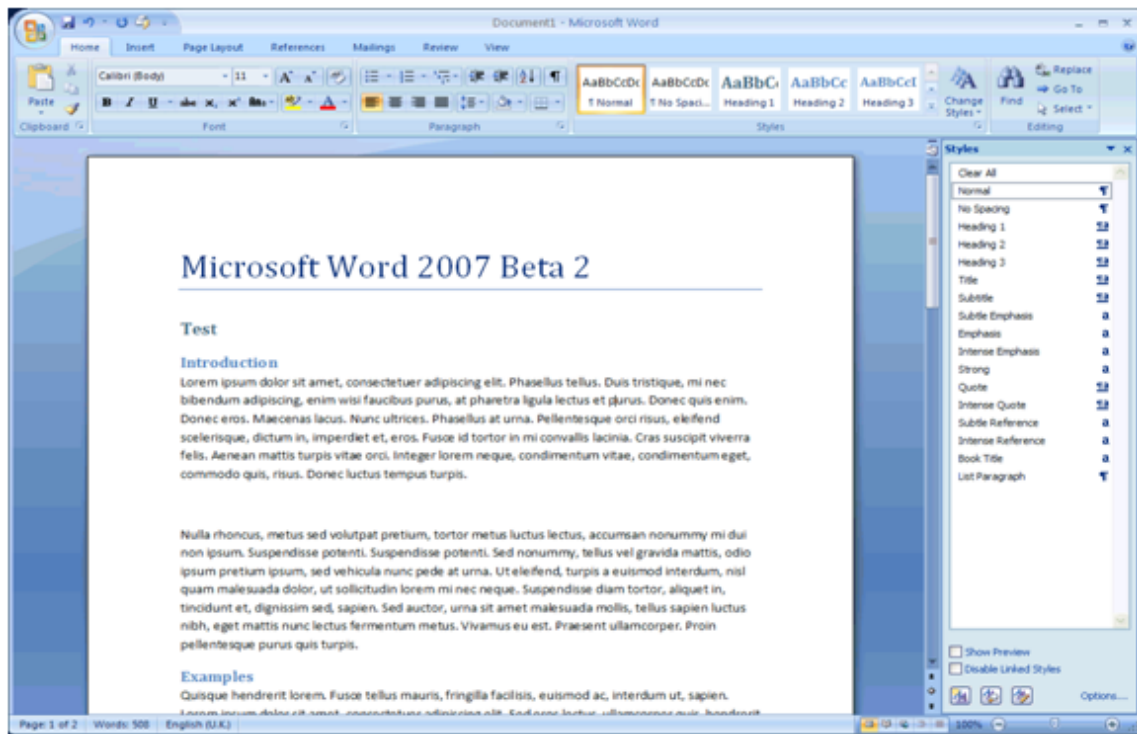
The text editor is great for managing code, writing down quick notes, or just as a distraction-free writing tool. Sublime Text is one of them

Word processing software is a computer software application that performs the task of composition, editing, formatting, and sometimes printing of documents. Sometimes abbreviated as WP, a word processor is a software program capable of creating, storing, and printing documents. It allows you to create a document and make any changes anywhere in the document, store it electronically on a disk, display it on a screen, modify it by entering commands and characters from the keyboard, and print it on a printer.

In its simplest form, a word processor is little more than a Typewriter that makes correcting mistakes possible before printing. Other word processing applications are WordPerfect, and open source applications are OpenOffice.org Writer, LibreOffice Writer, AbiWord, KWord, and LyX.

Basic features supported by Word processors:

- Insert text: Allows you to insert text anywhere in the document.
- Delete text: Allows you to erase characters, words, lines, or pages easily.
- Cut and paste : Allows you to remove (cut) a section of text from 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 set page sizes and margins, so that the text processor will automatically readjust to fit in it.
- Search and replace: Allows you to search for a particular word or phrase. You can also replace one group of characters with another everywhere that the first group appears.



- Word wrap: The word processor automatically moves to the next line when you have filled one line with text, and it will readjust text if you change the margins.
- Print: Allows you to send a document to a printer to get hardcopy.
- Font: Allows you to change fonts within a document. For example, you can specify bold, italics, and underlining. Word processors allow you to change the font size and even the typeface.
- Footnotes and cross-references: Automates the numbering and placement of footnotes and enables you to easily cross-reference other sections of the document.
- Graphics: Allows you to embed illustrations and graphs into a document. Few word processors let you create illustrations; few let you insert an illustration produced by a different program.
- Headers, footers, and page numbering: Allows you to specify customized headers and footers that the word processor will put at the top and bottom of every page. The word processor automatically keeps track and display page numbers and allow you to position it on the page.
- Layout: Allows you to specify different margins within a single document and to specify various methods for indenting paragraphs.
- Spell checker: Allows you to check the spelling of words. It highlights any words that it does not recognize.
- Tables of contents and indexes: Allows you to automatically create a table of contents and index based on special codes that you insert in the document.
- Thesaurus: is built-in and allows you to search for synonyms within the word processor.
- Windows: Allows you to edit two or more documents at the same time. Each document appears in a separate window.
- Word Count: counts the words and characters within a document

#### In text activity:

- Please watch this video to be familiar with various features of MS word <https://www.youtube.com/watch?v=XZX2cYhXsl0>

- Watch the video on YouTube link [www.youtube.com/watch?v=tKntC4AvShY](http://www.youtube.com/watch?v=tKntC4AvShY) and create a word document
- Watch the video on youtube link <https://www.youtube.com/watch?v=TYRI9PpRsmc> and <https://www.youtube.com/watch?v=hzCSghZH6gl> on libre office and create a worksheet

- Watch the video on YouTube link [www.youtube.com/watch?v=NxIBY7oDGWw](http://www.youtube.com/watch?v=NxIBY7oDGWw)
- Please write on your blog how to create a word document in comparison with creating a text using a typewriter and also the experience of creating a document also please share your worksheet/document created

**Web-based word processors**, such as Office Web Apps or Google Docs, have recently become popular. They allow creating, editing, and sharing of documents synchronously online among many geographically remote users.

#### In Text Activity:

- View the Google drive YouTube link: <https://www.youtube.com/watch?v=-HU9Z5gtQVk> and prepare a document on google drive. Share it with your colleagues for editing.

#### Educational Applications Of Word Processing:



Word processors have a variety of uses and applications in education since it has high versatility and flexibility. A teacher can use it to support any kind of directed instruction or constructivist activity.

- WP could be effectively used to prepare letters and letterhead, memos, reference documents, school assignments or work being completed at home or for Creative writing like short stories, poems or personal correspondence.
- Can be used to create resumes and greeting cards
- Word processing helps teachers use preparation time more efficiently by letting them modify materials instead of creating new ones.
- Teachers could make corrections to word processing documents more quickly than they could on a typewriter or by hand.
- Materials created with word processing software look more polished and professional than handwritten or typed materials do. Students seem to like the improved appearance that word processing gives to their work (Harris, 1985).
- Since the release of Google Docs, teachers and students can now create, edit, and share documents synchronously **and thus allows collaboration of documents.**
- Word processing allows materials to be shared easily among teachers on web based word processing so that the document could be edited and refined by all. Teachers can exchange lesson plans, worksheets and modify them to fit their needs.
- For teachers, it affords a easy method of creating resources which can then be saved and reused at will.
- As part of the writing process, the facility of rewriting, inserting and deleting text offered by a word processor gives the pupils more freedom. It helps develop fluency in their writing. Spell check facilities in word processing packages allow the pupils to revise their work and self correct common mistakes.
- Word processing enhances the presentation standards of pupils' work.
- Word processing encourages pupils to refine and present their ideas more effectively and in different ways.
- Teachers may create lesson plans and schemes from a template.
- The teacher can create classroom resources that may be shared with others and customized for individual use.
- Word processing allows digitally printed copies of pupils' work to be created and displayed throughout the school.
- Word processing allows easy publishing of pupils' work which is a highly effective motivational tool.
- Create a rubric for pupils' self assessment.
- Asking pupils to create worksheets in Maths with answer key which their peers could complete
- Word processor can be used to support pupils with SEN using spell and grammar checking to assist pupils to produce high quality documents
- The word processor can benefit learning (writing) disabled student by removing the barriers to writing, thus allowing the student to focus on the content of the paper. Research indicates that student writing does improve when using a word processor over using a pen and paper. Writing process is easier and efficient using a word processor. It is more likely to find a better-quality written product from your students if you do.
- Using large fonts and typefaces makes text easier to read for pupils with visual impairments.
- Allows pupils with poor pencil skills to use a keyboard instead.
- Allows pupils with poor communication skills to use the computer as an intermediary, typing responses to questions asked
- Teachers can use a word processor to create many documents for the classroom, such as lesson plans, worksheets, to develop tests or newsletters for parents.

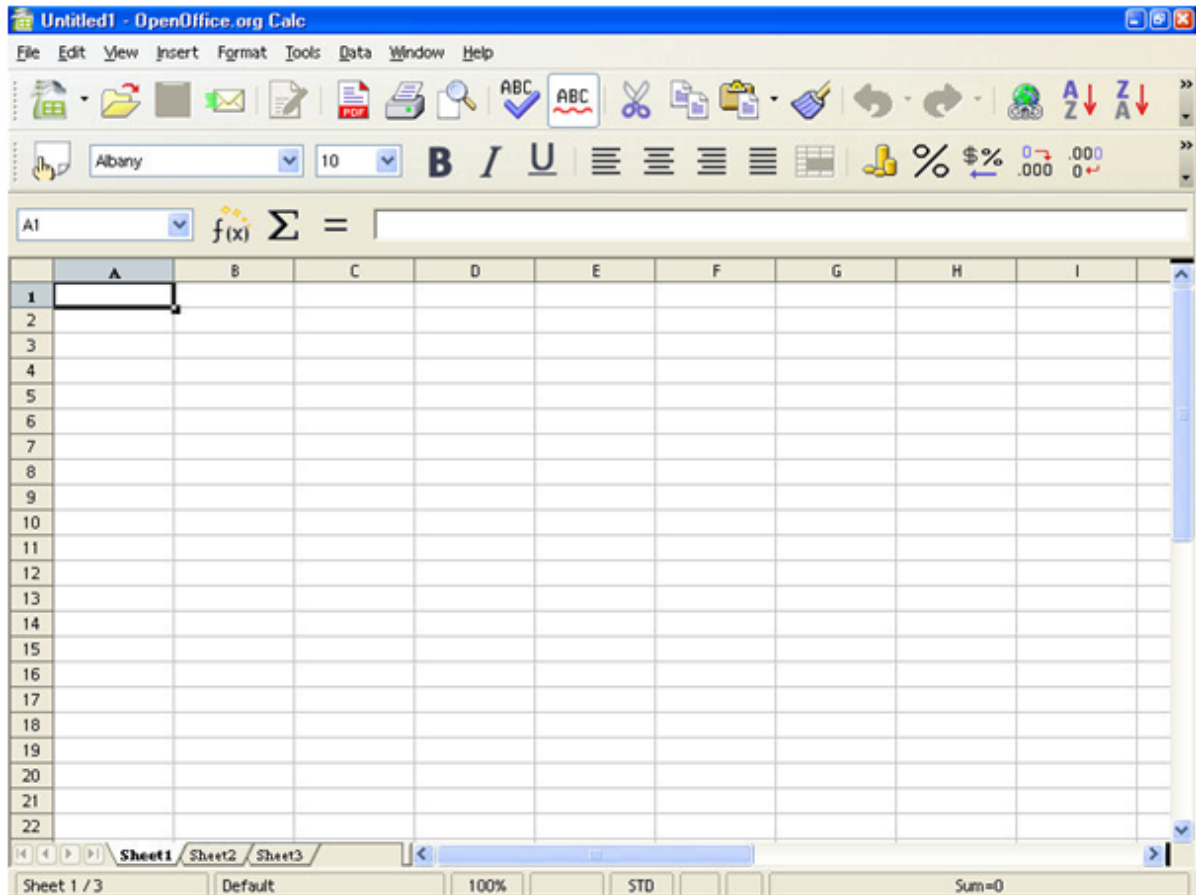
In fact, many of the documents a teacher encounters each day can be created using word processing software. Word processors can produce most of what a classroom teacher will need.

## Activity

1. Type a closed test for pupils to suit a topic you teach using a word processor.

2. Explore the mail merge option in your word processing application. See how it works in the link <http://www.ncte.ie/ICTTraining/VideoTutorials/#21865> and then create a sample letter to parents - blog

### 4.3.2 Spreadsheet Software



A spread sheet is an interactive computer application program for data management like organization, analysis and storage of data in tabular form. A spread sheet simulates a paper accounting worksheets that shows data in rows and columns. It is used for capturing, displaying, and manipulating data arranged in rows and columns.

A spread sheet is a document that stores data in a grid of horizontal rows and vertical columns. Rows are typically labelled using numbers (1, 2, 3, etc.), while columns are labelled with letters (A, B, C, etc). For example, each row of a spread sheet may store information about a student. Each column may store a different aspect of the student's information, such as the name, address, age, gender, marks scored, etc. The spread sheet program can analyse this data by counting the number of students in a certain class, listing all the students who have above average score, by performing other calculations. The scores in one column can be converted to percent by applying the formula and be entered in another column. Once the formula has been created, modifying the value of just the cell will also change the percentage in the corresponding column.

Spread sheet software can have multiple sheets, which can display data either as text and numerals, or in graphical form. It is useful to perform basic arithmetic and mathematical functions, common financial and statistical operations. Such calculations as average or standard deviation can be applied to tabular data with a pre-programmed function in a formula.

OpenOffice.org Calc, LibreOffice Calc and Gnumeric are free and open-source spread sheets.

#### Web based spread sheets

Since the advent of web apps, office suites now also exist in web app form. Advanced web technologies such as Ajax circa 2005, offer online spreadsheets. Some of them are Office Online, ZOHO, Google Spreadsheets, EditGrid, Smartsheet or ZK Spreadsheet. They also have strong multi-user collaboration features and offer real time updates from remote sources.

## Features of Spreadsheet:

### Values

A value can be entered from the computer keyboard by directly typing into the cell itself. Alternatively, a value can be based on a formula, which might perform a calculation, display the current date or time, or retrieve external data such as a stock quote or a database value.

#### Real-time update

This feature refers to updating a cell's contents periodically with a value from an external source—such as a cell in a "remote" spreadsheet. For shared, Web-based spreadsheets, it applies to "immediately" updating cells another user has updated. All dependent cells must be updated also.

#### Locking a cell

Once entered, selected cells (or the entire spreadsheet) can be "locked" to prevent accidental overwriting. Typically this would apply to cells containing formulas but might be applicable to cells containing "constants". The feature should be activated in the file preferences.

#### Data format

A cell or range can optionally be defined to specify how the value is displayed. The default display format is usually set by its initial content if not specifically previously set, so that for example "31/12/2007" or "31 Dec 2007" would default to the cell format of date. Similarly adding a % sign after a numeric value would tag the cell as a percentage cell format. Some cell formats such as "numeric" or "currency" can also specify the number of decimal places.

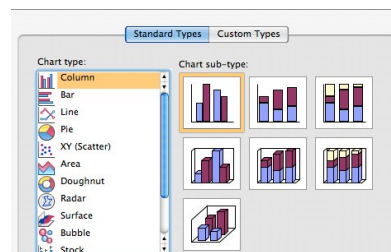
#### Formula

A cell may contain a value or a formula, or it may simply be left empty. A formula identifies the calculation needed to place the result in the cell it is contained within. A cell containing a formula therefore has two display components; the formula itself and the resulting value. The formula is normally only shown when the cell is selected by "clicking" the mouse over a particular cell; otherwise it contains the result of the calculation.

#### Charts

Many spreadsheet applications permit charts, graphs or histograms to be generated from specified groups of cells that are dynamically re-built as cell contents change. The generated graphic component can either be embedded within the current sheet or added as a separate object.

	A	B	C	D
1	student	lab 1	quiz 1	test 1
2	Allen	10	7	84
3	Brindley	8	8	78
4	Buys	8	10	91
5	Durham	9	8	86



### Educational applications:

- 1) Spread sheet software can be used in a variety of ways in classrooms Teachers are using spread sheets for efficient work.
- 2) Using a spread sheet is more beneficial than using a paper grade book.
- 3) Spread sheets can also be used to easily calculate student grades and class averages.
- 4) Teachers can quickly create charts, giving data a visual display (e.g., pie chart, bar chart) for analysis as shown in the figure below.
- 5) Teachers could also create a weekly spread sheet that displays the homework for each student to take home.
- 6) Schools could provide grade-recording software or a website where teachers can enter and store grades.
- 7) A teacher could use a spread sheet with students to track daily temperatures or to help keep the accounting for a school or classroom business. A teacher could use a spread sheet to have students do "what if" scenarios in mathematics. For example, while teaching interest rates to students, they could use a spread sheet to compare total purchase price of a car, depending on years of the loan and various interest rates. In science, a spread sheet could be set up to use a formula to calculate what a student's weight would be on the moon or on another planet.
- 8) Use of formulas in a spread sheet (e.g., average, sum, standard deviation) can help perform complex calculations quickly and effortlessly. A physical education teacher could use a function in a spread sheet to compare daily calorie

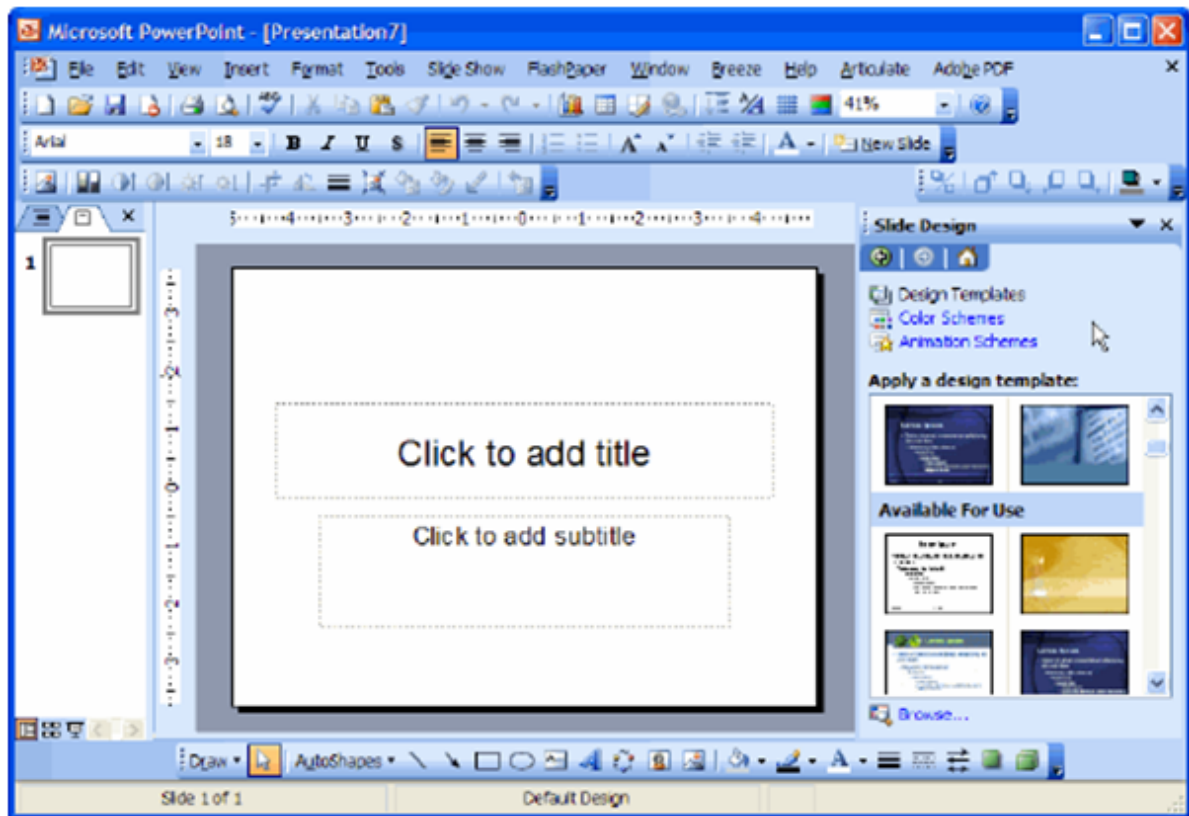
intake with weight gain/loss and how the two are positively related.

9) As a teacher you will be able to find ways to use spreadsheet software once you start using it.

### Activity

- 1) Think of situations in which you could use a spread sheet as a teacher and list them below
- 2) Watch the YouTube video on the link [https://www.youtube.com/watch?v=L7dHA\\_8GzKw](https://www.youtube.com/watch?v=L7dHA_8GzKw) and create a grade sheet for your class and upload this in your blog
- 3) Watch the YouTube video on the link [https://www.youtube.com/watch?v=HdOLxR\\_NlrQ](https://www.youtube.com/watch?v=HdOLxR_NlrQ) and create a nutrition chart for your class and blog
- 4) Create a sample grade book in a spread sheet application and fill in some sample students. Try to use the spread sheet to automatically figure their grades. Create a bar graph chart that illustrates the results. -blog

### 4.3.3. Presentation Software



Presentation software is an application program that supports presentation of information by creating sequences of words and pictures. Presentation software is a tool used to create and display visual presentations which are usually delivered in the form of a slide show. The programs make it possible to combine text and graphic elements to convey information. It can be used to teach a new or complex concept to a group of students, or for presenting a proposal to a group. It has three major functions: an editor that allows text to be inserted and formatted, inserting and manipulating graphic images, and a slide-show system to display the content.

Presentation software includes multimedia authoring tools which enable you to create a more sophisticated presentation that includes audio and video sequences. Some very popular presentation software, are Microsoft's PowerPoint and Lotus's Freelance Graphics. Other popular products include Adobe Persuasion, Astound, Asymetrix Compel, Corel Presentations, and Harvard Graphics. Among the most popular multimedia authoring tools are Macromedia Director and Asymetrix's Multimedia Tool book. Recent new presentation tool are: Web browser and the tools for creating Web pages, such as Microsoft's FrontPage and Adobe's PageMill.

Many presentation programs come with pre-designed images (clip art) and/or have the ability to import graphic images, such as Visio and Edraw Max. Some tools also have the ability to search and import images from Flickr or Google directly from the tool. Custom graphics can also be created in other programs such as Adobe Photoshop or Adobe Illustrator and then exported.

With the growth of digital photography and video, many programs that handle these types of media also include presentation functions for displaying them in a similar "slide show" format. For example, Apple's iPhoto allows groups of digital photos to be displayed in a slide show with options such as selecting transitions, choosing whether or not the show stops at the end or continues to loop, and including music to accompany the photos.

Presentation software programs include -

- **Microsoft Office PowerPoint, OpenOffice.org Impress, Apple Keynote**
- **Windows Movie Maker** - a desktop video program. Windows Movie Maker allows you to create and edit movies to accompany your presentation, although you can also add still photos or graphics and create a slide show, just as in PowerPoint and OpenOffice Impress.
- **Google Docs™ presentation-** is also free as it is part of the Google Docs™ line of services. Google Docs™ presentation allows for presentations to be saved in the PowerPoint® format so the program is not required to create the presentation, but is an option for those who wish to view it.
- **Adobe® Flash®-based presentations-** may be best for slide show presentations that will be viewed online, because most people have the Adobe® Flash® player installed on their computer systems.

When presentation software is used to create a presentation for a web-based seminar, or webinar, users can sign up for a service which allows them to conference with others and share the screen. This means participants in the webinar can watch the presentation on their computer screen while listening to the audio with a telephone call. These webinars can be recorded to show both the presentation and the audio from the phone call for archived viewing purposes.

## Features Of Power Point Presentation

### Slide Layouts

Each page in a PowerPoint presentation is called a slide. PowerPoint presentations run just like the slide shows of old, only they are broadcast through a computer instead of a slide projector.

**Slide Background Colors and Graphics:** Backgrounds can be added to individual slides or all slides in the presentation. Backgrounds for slides can be solid colors, gradient colors, textures or pictures.

### Design Themes in Presentation software:

A really nice feature of the design themes, is that you can immediately see the effect reflected on your slides, before making your decision.

### Add Clip Art or Pictures

PowerPoint offers a number of different ways to add clip art and pictures to a presentation. The easiest way to do so is to select a slide layout that contains a placeholder for content such as clip art and pictures.

### Modify Slides

All slides and slide layouts in PowerPoint can be modified to your specifications.

### Add, Delete or Rearrange Slides

### Slide Transitions

Slide transitions add movement to your slides as they change from one slide to the next.

### Adding Animation

The term animation is used to describe the motions that are applied to the objects on the slides, and not the slides themselves. One object or several objects on a slide can be animated.

**In Text Activity:**

- Watch the YouTube video on the link <https://www.youtube.com/watch?v=ieTmucuATV8> and <https://www.youtube.com/watch?v=wXWboWzEzLE> prepare a presentation of a topic in your subject to your students –upload the same to the blog
- Watch the youtube video on the link <https://www.youtube.com/watch?v=3ZUwFwooMrY> and prepare a powerpoint presentation using MS Powerpoint on any topic and share it in your blog
- Search for open source presentation software available and link this in your blog

**EDUCATIONAL APPLICATION OF PRESENTATION SOFTWARE:**

Earlier teachers used transparency sheets with an overhead projector for their presentations. Presentation software allows teachers to use a computer and projector with many more features.

Teachers can create slides for presentations or student applications that are interactive. Presentations can offer multimedia elements (e.g., audio clips, video clips, photographs, charts) that a regular paper worksheet or textbook cannot.

A teacher can provide the presentation file to students, eliminating the need for them to take notes, and thus allowing them to pay better attention to the content being discussed. This is an accommodation that can benefit many students.

Students can also use presentation software in many different ways. Students can create a presentation rather than write a paper. Students can create slides full of text, images, or other media that can far exceed what a normal word-processed document.

**4.3.4 Graphics Software**

**Graphics Packages** A graphics package is an application that can be used to create and manipulate images on a computer.

There are two main types of graphics package:

- **painting packages**
- **drawing packages**

Drawing software is defined as a computer program for creating art on the computer. It is a graphics program used for creating illustrations. An example of drawing software is the Paint program on many computers. It is a graphics program that enables you to draw pictures, then store the images in files, merge them into documents, and print them. Unlike paint programs, which represent images as bit maps, draw programs use *vector graphics*, which makes it easy to scale images to different sizes. In addition, graphics produced with a draw program have no inherent resolution. Rather, they can be represented at any resolution, which makes them ideal for high-resolution output. Examples of popular drawing programs are Adobe Illustrator, CorelDRAW and Macromedia Freehand.

**Drawing Vs. Painting programs**

Although more painting tools are added to drawing programs and more drawing tools are added to paint programs, their inherent structure is entirely different. Drawing programs (vector graphics) allow for the creation of objects that can be manipulated independently. Paint programs (bitmapped graphics) provide a canvas that can be covered with electronic paint.

A paint program is a software graphics program that allows the user to draw or paint bitmapped images on a computer. Examples include: KolourPaint, XPaint, Deluxe Paint, MacPaint, and Microsoft Paint, which is shown in the picture.



Paint programs also give provisions to draw common shapes such as straight lines, rectangles, circles, and ovals. Sophisticated paint applications are often called image editing programs. These applications support many of the features of draw programs, such as the ability to work with objects. MS Paint is a simple computer graphics program that has been included with all versions of Microsoft Windows. Nonetheless, "painting" and "drawing" elements are often used together to create a finished graphic.

With a "drawing" program, one normally creates images by establishing points that are connected by straight or curved lines, resulting in shapes such as a rectangle or an oval. The shapes can then be filled with colors resulting in, for example, a red heart or a green leaf. . For instance, all versions of Windows come with a program called PaintBrush which can be accessed by going to Start>Programs>Accessories>Paint.

After launching PaintBrush a white "canvas" will appear, along with a variety of drawing tools and a color palette. The lower right corner of the canvas can be mouse-manoeuvred to adjust its shape, while the "paint bucket" tool can be used to fill it with a different background color. A finished graphic can be saved by going to File>Save As, where picture formats such as BMP, GIF or JPG, are available. When you use PaintBrush to open and edit photos, however, JPG is the format used most often. Professional graphic artists generally use programs such as Adobe Illustrator for "drawing" and Adobe PhotoShop for "painting."

In Painting packages bitmapped graphics are used for images such as scanned photographs or pictures taken with a digital camera. Examples of graphics packages that produce bitmapped images include:- MS Paint, PC Paintbrush, Adobe Photoshop and JASC's Paint Shop Pro.

**Drawing Packages** produce images that are made up from coloured lines and shapes such as circles, squares and rectangles. When an image is saved it is stored in a vector graphics file as a series of instructions, which can be used to recreate it.

#### Common features of graphics packages

- Drawing straight lines and 'freehand' lines;
- Drawing regular pre-defined shapes like squares, rectangles and circles using a special 'tool';
- Entering text and changing the style and size of font;
- Changing the size of an object, or scaling;
- Rotating objects in either clockwise or anticlockwise by specifying the direction and angle of rotation;
- Stretching objects either horizontally or vertically. 'Flipping' an object either horizontally or vertically.
- A paint palette from which different colours and patterns can be chosen.



- A fill option for colouring in a shape or area on the screen with a colour or pattern from the paint palette.
- Clipart pictures.
- Zoom or magnify is a feature that allows an area of the screen to be seen close up for detailed work.
- Special brushes such as an airbrush can be used to achieve different paint effects on the screen.

In most graphics these features are chosen from a toolbar or tool palette where they are displayed as icons. Exporting is a special way of saving a file produced using a graphics package so that it can be used in another application package.

- When an exported file is needed in another application it is opened in a special way called importing.

#### In Text Activity:

■ View the video on YouTube link [www.youtube.com/watch?v=QjRi0Mq3G2g](http://www.youtube.com/watch?v=QjRi0Mq3G2g) and draw different shapes

■ View the video on youtube link <https://www.youtube.com/watch?v=NUYmAEuG43Y> and draw a green leaf -  
blog

■ View the video on YouTube link [www.youtube.com/watch?v=b59MvaRm1xA](http://www.youtube.com/watch?v=b59MvaRm1xA) and draw a heart

### Educational Applications

Drawing software is helpful in Spatial concepts understanding: As it is possible to manipulate the height and the width of objects drawn at will, it is also possible to do it in order to illustrate the concept of size, including distinction between narrow and wide.

Quantity concepts understanding: It is possible to change in real time the number of objects that can be seen through drawing software, as well as being possible to change other variables for illustrating a lot/a few, everything/nothing, more/less, full/ empty.

Visual concepts and adaptation to visual profiles: The sensory profile of people with learning difficulties may be very different to the typical one. As it is possible to change the colours, shapes, texture and luminance it is quite helpful in teaching of Geometrical shapes and constructions.



As a teacher, when choosing software for your use for teaching in the classroom or for other purpose, you should always consider the needs and learning styles of your students.

## ? CHECK YOUR PROGRESS 1

Answer the following

1.1. The software programs used to organize, analyse and store data in tabular form is

1.2.  is a computer program for creating art on the computer

1.3. Teachers and students can create, edit, and share documents synchronously on

Submit

## ? 1.4. Match the menu in A with its function in B

A

B

1 Copy

2 Delete

3 cut & paste

4 spell checker

5 Layout

Check

## ? Multi-choice

1.5. Which of the following software simulates an accounting worksheet?

- a) spreadsheet
- b) word processor
- c) presentation
- d) graphic

Correct Option

Wrong

Wrong

Wrong

**Solution**

1. Correct Option (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

1.6. Which of the menu should be selected to add a picture to a presentation?

- a) animation
- b) design themes
- c) slide layout
- d) clip art

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

1.7. Which of the following software helps in creating images in a computer?

- a) spreadsheet
- b) word processor
- c) Presentation
- d) Graphic

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



## 4.4 UTILITY SOFTWARE

**Utility software** is system software designed to help analyze, configure, optimize or maintain a computer. Utility software, along with operating system software, is a type of system software used to support the computer infrastructure, distinguishing it from application software which is aimed at directly performing tasks that benefit ordinary users. **PDF Creator, File Archiving and PDF Converters are commonly used ones**

### 4.4.1 PDF Creator

*What is a PDF File?*

“PDF” means Portable Document Format. The extension of the file is .pdf. This format was developed by Adobe ® Systems for ease of document sharing on the Internet and for easy printing of documents. When converted to a PDF file, the document retains the original layout and is a very secure way of sharing and publishing information on the Internet. PDF is an open file format specification; it is available to whoever wants to develop software utilities for managing, creating, accessing or viewing PDF documents. Adobe ® offers a free reader to view PDF files.

**PDF Creator** is an application for converting documents into Portable Document Format (PDF) format on Microsoft Windows operating systems. It works by creating a virtual printer that prints to PDF files, and thereby allows practically any application to create PDF files by choosing to print from within the application and then printing to the PDF Creator printer. PDF Creator can be associated with .ps files to manually convert PostScript to PDF format.

PDF Creator can convert to the following file formats: PDF, PNG, JPEG, SVG, TIFF, PS, EPS, TXT, PSD, PCL, BMP, PCX, RAW. It also allows to digitally sign PDF documents. PDF Creator allows you to disable printing, copying of text or images and modifying the original document. You can also choose between two types of passwords, user and owner, to restrict PDF files in several ways. The former is required to open the PDF file, while the latter is necessary in order to change permissions and password.

Bullzip PDF Printer, CutePDF, deskPDF, Nitro PDF Reader, PDF-XChange are some of the freeware available.

Editors

- LibreOffice: free (MPLv2) GUI tools to manipulate, split, merge, encrypt and decrypt PDF files
- Adobe Acrobat: Adobe Systems's proprietary desktop PDF authoring suite.
- Adobe Photoshop: Adobe Systems's Graphic Design software and image editor.
- Nitro PDF Pro: a proprietary commercial PDF creator/editor with an interface styled after Microsoft Office; replicates most or all features of the Adobe Acrobat full commercial version; offers a separate freeware reader (which also supports PDF creation, annotation, collaboration and signing); Ghostscript not additionally needed.
- PDFSaM: free (GPLv2) command-line and GUI tools to manipulate, split, merge, encrypt and decrypt PDF files
- PDF-XChange Viewer: Freeware PDF reader, tagger, editor (simple editions) and converter (free for non commercial uses).

**Viewers**

- Adobe Reader: Adobe's PDF reader is free only for personal use. For commercial use, Adobe Reader should be purchased.
- Evince: a free (GPL), open source PDF reader.
- Foxit Reader
- Google Chrome: Includes a PDF viewer
- GSview:
- Javelin PDF Reader
- Microsoft Edge:
- Nitro PDF Reader

**PDF Writer**

The PDF Writer is a PDF creator that can be used for converting Word (.doc or .rtf) to PDF files. TruePDF is the first free PDF printer, creator, and writer that creates PDF

Adobe Acrobat is the most used Word to PDF converter. It lets you convert Word, Excel, or PowerPoint (PPT) docs to PDF. PDF-file.com offers PDF conversion software for converting PDF to Word documents or to .rtf format, and converting Word to PDF files or text to PDF document format. The PDF Converter offers multi-lingual conversion capability.

Microsoft Word 2013: The 2013 edition of Office allows PDF files to be converted into a format that can be edited.

### In Text Activity:

- Download the free Adobe® Acrobat® Reader® at the link <http://www.adobe.com/products/acrobat/readstep2.html> to view PDF files



- View the tutorial video of PDF Creator on the link [www.youtube.com/watch?v=ILtfCMNmrfc](http://www.youtube.com/watch?v=ILtfCMNmrfc) and create a PDF file.—blog
- Search the internet and Prepare a list of open source pdf creators
- Download a PDF creator and convert a word file to a pdf file



### 4.4.2 File Archiving

An Archive is a single file that contains one or more files and/or folders in a compressed format along with metadata. Archive is a collection of computer files that have been packaged together for backup, to transport to some other location, for saving away from the computer so that more hard disk storage can be made available. An archive can include a simple list of files or files organized under a directory or catalogue structure. An *archive* is a single file that contains any number of individual files plus information to allow them to be restored to their original form by one or more *extraction* programs. Archive files are used to collect multiple data files together into a single file for easier portability and storage, or simply to compress files to use less storage space. For example, they make it easy to locate all files in a particular category or related to a particular project at a later date. They also allow the directory tree structure (i.e., hierarchy of directories) in which the files were originally contained to be maintained.

Some common archive formats include Zip files, Stuffit archives, and TAR files. On personal computers with the Windows operating system, WinZip is a popular program that lets you create an archive or extract its files. WinZip also compresses the files that are archived, but compression is not required to create an archive. A WinZip archive has the file name suffix ".zip". Creating a Zip file does not delete or change the original files.

In order to open the files in an archive, they must first be extracted from the archive. Compressed archives must also be decompressed before the files can be extracted. Both of these processes can be performed using a compatible file decompression utility, such as WinZip, Stuffit Expander, WinRAR, or 7-Zip. These programs support multiple standard archive formats, as well their own proprietary compressed file types.

File Extensions: .ZIP, .ZIPX, .SIT, .SITX, .TAR, .TGZ, .RAR

### In Text Activity

- Watch the YouTube link <https://www.youtube.com/watch?v=2HJ2zyh6k4s> and learn the process of file archiving

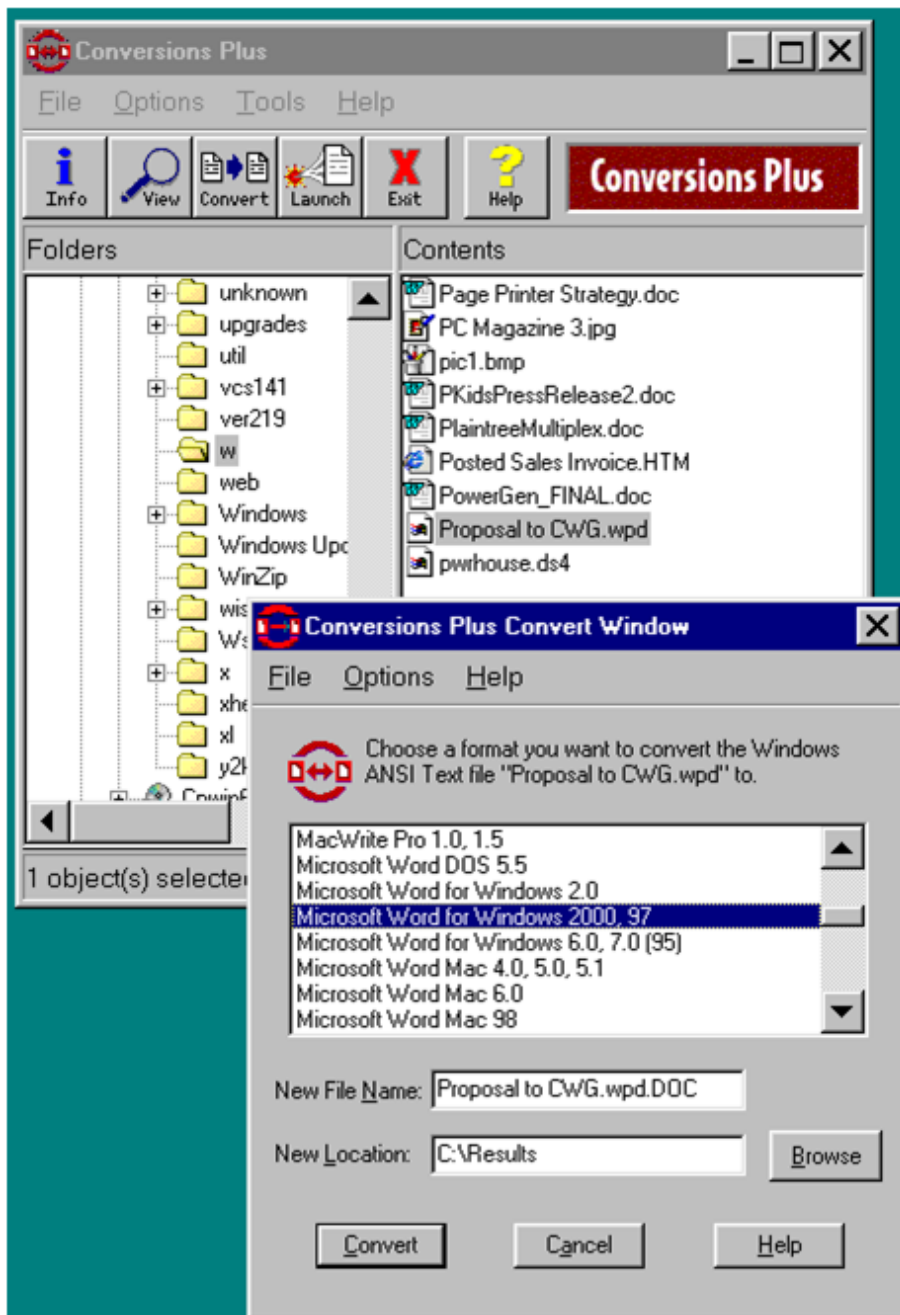
- Download open source video file archiving software



### 4.4.3 File Converter

File converter is an application that converts a file from one format to another without altering the contents of the file. The conversion may be between the formats of two applications that use the same operating system (such as between two different Microsoft Windows word processors) or between the formats of applications from different operating systems. Applications are also available that convert a graphical image from one file format to another. Many of the applications that change a Macintosh file into a PC-compatible file, or vice versa, consist of two programs running simultaneously on two physically connected computers. MacLink Plus from Data Viz and LapLink Mac from Traveling Software are two examples of this type of file-conversion program.

*Changing from one file type to another:* There are many data conversion programs on the market that support a wide number of text, database, spreadsheet and graphics formats. If a text document, database or spreadsheet format is not supported in a packaged conversion program, the textual data within the file can be converted if the application that created it is available and it can export its contents to ASCII text; however, page format settings as well as macros and other attributes will be lost.



Conversion programs such as Conversions Plus from DataViz, Inc. provide conversion between a wide variety of file formats. This example converts a Word Perfect document (.wpd) to a Word document (.doc) by simply highlighting the source file, clicking Convert and selecting the destination format. Packaged conversion programs carry forward all layout settings as long as the target format supports the same feature.

How to convert files?

There are dozens of file formats for word processing documents, database files, graphics, spreadsheets and so on. If a file was created in one application and you want to use it in another, you can either import the file or use a conversion program.

Converting Text Files: Most word processing programs provide an Import function, which provides built-in conversion for various document formats. Simply select Import from the File or Import menu and choose the document type you want to input. If your word processor does not import the document type you need, you can usually use the ASCII file format as a common denominator; however, you will need the word processing program that created the original document.

If both word processing programs import and export ASCII files, convert your original document into an ASCII file using the source word processor. Look for Export in the File or Export menu. Select ASCII file or Text File. After creating an ASCII file of the source document, use the destination word processor and import that file using the Import option, again for an ASCII file or Text File. Note that all format commands (bold, italic, headers, footers, etc.) will generally be lost between conversion.

**Converting Database Files:** Most database programs provide an Import function, which provides built-in conversion for various record formats. Simply select Import from the File or Import menu and choose the database type you want to input. If your database program does not import the file type you need, you can usually use the ASCII file format as a common denominator; however, you will need the database program that created the original file.

If both database programs import and export ASCII files, convert your original file into an ASCII file using the source database program. Look for Export in the File or Export menu. Select ASCII file or Text File.

**Converting Images and Drawings:** Most paint, drawing, word processing, desktop publishing and presentation graphics programs provide an Import function, which provides built-in conversion for various image and drawing formats. Simply select Import from the File or Import menu and choose the graphics file type you want to input. If your program does not import the file type you need, you can convert one image or drawing format into another using an independent graphics conversion program.

**ACTIVITY:**

- Watch the video on the link -- <https://www.youtube.com/watch?v=pbaD3U-9tvs> Download a free file converter and convert a word, spreadsheet, html and image into a pdf format
- Download a free file converter and convert PDF to DOCX,, HTML, JPG, SWF, and TXT.

**CHECK YOUR PROGRESS 2**

2.1 Acronym of "PDF" is \_\_\_\_\_

- a Profitable Document File
- b Profitable Document Format
- c Portable Document Format
- d Portable Document File

Wrong

Wrong

Correct Option

Wrong

**Solution**

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)



2.2 What is the file extension of an archive format?

- .arc
- .rpt
- .cit
- .zip

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



2.3 Which of the following is NOT a feature of a file converter?

- a) Convert image from one file format to another
- b) Alter content of the file
- c) Change Macintosh file into a PC compatible file
- d) Convert word perfect document (.wpd) to a word document (.doc)

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

## 4.5 COMPUTER SECURITY



**Did you know that a computer needs security?** Yes a computer needs to have in it a security system and it is called, "**Computer security**", which is also known as **cybersecurity** or **IT security**. It is the protection of information systems from theft or damage to the hardware, the software, and to the information on them, as well as from disruption or misdirection of the services provided. Computers and the information stored in it are susceptible to hacking/cracking, and vulnerable to malware like *virus*, *worms* and *spyware*. Let us read further to know what do we mean by computer hacking/ cracking, computer virus, spyware, antivirus, misuse and abuse, and certain safety measures to be adopted.



#### 4.5.1 Hacking

We all know the general meaning of the term,- 'hack'.

In terms of a computer, the term hack means to gain unauthorized access to data in a system or computer. You must have viewed films such as, '**War Games**' portraying hackers breaking into the Pentagon's security system and the movie '**Hackers**' portraying Angelina Jolie as the main hacker. What is computer hacking and who is a hacker?



Computer hacking is the practice of modifying computer hardware and software to accomplish a goal outside of the creator's original purpose. People who engage in computer hacking activities are often called hackers.

Hacking is the gaining of access (wanted or unwanted) to a computer and viewing, copying, or creating data (leaving a trace) without the intention of destroying data or maliciously harming the computer. **Hacking** is a broad term used to describe many complex activities wherein the end goal is typically to obtain access to a computer system's servers, database, or stored files. This access may be legal ("white hat" hacking ) or illegal ("black hat" hacking), termed "cracking". **Cracking** is often used to describe malicious or malevolent hacking in which the end goal is to cause damage to the integrity of the targeted computers, whether to destroy, copy, or modify files, or possibly to install easy routes back into the system known as "backdoors".

The term "hacking" and "hacker" are often used incorrectly to refer to the criminal activity of breaking into online computer systems. Most hackers ARE NOT criminals. Alternative terms such as "cracker" were coined in an effort to distinguish between those adhering to the historical use of the term "hack" within the programmer community and those performing computer break-ins. We mistake hacking and hackers to be bad most of the time. Crackers use a method called cracking(opposite of hacking). Cracking is a method by which a person (Cracker) gains unauthorized access to a computer with the intention of causing damage. Whereas a Hacker is a person who gains authorized/unauthorized access to a computer WITHOUT the intention of causing damage. Crackers are the ones who create virus, cracks, spyware, and destroy data. Hackers who intend to steal personal information, change a corporation's financial data, break security codes to gain unauthorized network access, or conduct other destructive activities are sometimes called "crackers."

#### In Text Activities

1 Watch the movie "War Games" on [www.imdb.com/title/tt0086567/](http://www.imdb.com/title/tt0086567/) and list the activities and damages caused by the wizkid who is a hacker. Watch clipping on [https://www.youtube.com/watch?v=U2\\_h-EFlztY&list=PLZbXA4lyCtqGOS2KC1mAAKaGwbup-DQt&index=2](https://www.youtube.com/watch?v=U2_h-EFlztY&list=PLZbXA4lyCtqGOS2KC1mAAKaGwbup-DQt&index=2)

[https://www.youtube.com/watch?v=KXzNo0vR\\_dU](https://www.youtube.com/watch?v=KXzNo0vR_dU)<https://www.youtube.com/watch?v=bh2ShAQ4lw0>

Watch the movie Insecurity (2007) <https://www.youtube.com/watch?v=UThxz1Zrq0s>

and the movie Hackers 3 Antitrust on [https://www.youtube.com/watch?v=lcPgH\\_fSiKs](https://www.youtube.com/watch?v=lcPgH_fSiKs)

List the consequences of hacking --blog

View the video <https://www.youtube.com/watch?v=vviaj3mK4WA> and list the activities of the hackers.

2 Read the cases of hacking from this link <http://topyaps.com/top-10-cases-of-hacking-that-were-straight-blackout-for-victims> – Blog

### 4.5.2 Computer Virus

Have you heard of the term virus. Yes? What do you know about a virus? The word virus owes its origin to a Latin word meaning slimy liquid or poison. Would you like to be infected by it? No! A computer virus gets its name from of course -- the biological virus. Similar to a biological virus, a computer virus too is something you don't want to have. Then what do we mean by a computer virus?

Computer viruses are small programs or scripts that can negatively affect the working of your computer. It is a program or piece of code that is loaded onto your computer without your knowledge and runs against your wishes. It is a program or programming code that replicates by being copied or initiating its copying to another program, computer boot sector or document.

A computer virus is a malware program that, when executed, replicates by inserting copies of itself (possibly modified) into other computer programs, data files, or the boot sector of the hard drive; when this replication succeeds, the affected areas are then said to be "infected".

According to Webster's Collegiate Dictionary, a computer virus is "a computer program usually hidden within another seemingly innocuous program that produces copies of itself and inserts them into other programs or files, and that usually performs a malicious action (such as destroying data)". Computer viruses are never naturally occurring; they are always man-made. Once created and released, however, their spread is not directly under human control.

Even a simple virus is dangerous because it will quickly use all available memory and bring the system to a halt. An even more dangerous type of virus is one capable of transmitting itself across networks and bypassing security systems. These malicious little programs can create files, move files, erase files, consume your computer's memory, and cause your computer to malfunction. Some viruses can duplicate themselves, attach themselves to programs, and spread across networks.

Opening an infected e-mail attachment is the most common way in which virus spreads. Viruses often perform some type of harmful activity on infected hosts, such as stealing hard disk space or CPU time, accessing private information, corrupting data, displaying political or humorous messages on the user's screen, spamming their contacts, logging their keystrokes, or even rendering the computer useless. However, not all viruses carry a destructive payload or attempt to hide themselves—the defining characteristic of viruses is that they are self-replicating computer programs which install themselves without user consent.

Viruses can be transmitted as attachments to an e-mail note or in a downloaded file, or be present on a diskette or CD. The immediate source of the e-mail note, downloaded file, or diskette you've received is usually unaware that it contains a virus. Some viruses wreak their effect as soon as their code is executed; other viruses lie dormant until circumstances cause their code to be executed by the computer. Some viruses are benign or playful in intent and effect ("Happy Birthday, Ludwig!") and some can be quite harmful, erasing data or causing your hard disk to require reformatting.

There are three main classes of viruses: File infectors, System or boot-record infectors, Macro viruses

*Trojan horses:* A virus is a particular case of a Trojan horse, one which is able to spread to other programs (i.e., it turns them into Trojans too). A Trojan or Trojan horse is a malware that is non-self-replicating that appears to perform a desirable function for the user, but instead facilitates unauthorized access to the person's computer system. This also makes it possible for hackers to access the computer remotely and perform various operations. A Trojan can be installed through a software download, websites containing executable content, or e-mail attachments. Once installed, the Trojan can be used to perform spamming, data service, installation of software, or viewing the user's screen. Trojan malware is growing in popularity and accounts for 83% of the global malware.

### In Text Activities

- View the animation video on computer virus <https://www.youtube.com/watch?v=c34QwtYI40g> and list the activities of the computer virus.



- Reflect on the problems faced by you when your computer had been infected by virus and the advantages of installing antivirus



### 4.5.3 Spyware

We have already studied about virus, worms, and Trojan horse. What is Spyware?

With so many types of malicious software being spread around the Internet, it is important to be aware of what spyware is and what spyware does. Spyware, as the term suggests, refers to software that spies on your computer and may be could steal and transmit your passwords or other personal information, such as credit card numbers.

Spyware is a general term used to describe software that acts, without appropriately obtaining your consent, such as Advertising, Collecting personal information and Changing the configuration of your computer

Spyware is a software that monitors your computer and reveals collected information to an interested party. This can be benign when it tracks what webpages you visit; or it can be incredibly invasive when it monitors everything you do on your computer. Spyware is often associated with software that displays advertisements (called adware) or software that tracks personal or sensitive information.

Spyware is any type of malware that can be installed on computers that aids in gathering information about a person or organization without their knowledge. On the Internet, spyware is programming that is put in someone's computer to secretly gather information about the user and relay it to advertisers or other interested parties. Spyware can get in a computer as a software virus or as the result of installing a new program.

#### In Text Activities

- Read the case studies of spyware from the link [www.youtube.com/watch?v=ccQH-9\\_twx](http://www.youtube.com/watch?v=ccQH-9_twx) .
- Browse the internet and make a list of cases filed against perpetrators for infecting PCs with spyware and the legal consequences



### 4.5.4 Antivirus Software

**We now know that we need to protect our computers and the information in it from malware. How could we do it? An antivirus could help us. What do we mean by antivirus software and how could we use it to prevent malware infections?**

Anti-virus software is also known as an *anti-virus program* or a *vaccine*. Anti-virus software is a software that detects, prevents, and removes viruses, worms, and other malware from a computer. The terms antivirus and antimalware are often used synonymously.

Originally the label "antivirus" was given to programs that identified and removed a particular type of malware called a virus. A modern antivirus software can protect from malicious Browser Helper Objects (BHOs), browser hijackers, ransomwares, keyloggers, backdoors, rootkits, trojan horses, worms, malicious LSPs, dialers, fraudtools, adwares and spywares. Some products also include protection from other computer threats, such as infected and malicious URLs, spam, scam and phishing attacks, online identity (privacy), online banking attacks, social engineering techniques, Advanced Persistent Threat (APT) and botnet DDoS attacks.

**Cloud antivirus:** Cloud antivirus is a technology that uses lightweight agent software on the protected computer, while offloading the majority of data analysis to the provider's infrastructure.

One approach to implementing cloud antivirus involves scanning suspicious files using multiple antivirus engines. CloudAV was designed to send programs or documents to a network cloud where multiple antivirus and behavioral detection programs are used simultaneously in order to improve detection rates. CloudAV is used for virus scanning on devices that lack the computing power to perform the scans themselves. Some examples of cloud anti-virus products are Panda Cloud Antivirus and Immunit.

**Online scanning:** Some antivirus vendors maintain websites with free online scanning capability of the entire computer, local disks, folders or files. Periodic online scanning is a good idea for those that run antivirus applications on their computers because those applications are frequently slow to catch threats. One of the first things that malicious software does in an attack is disable any existing antivirus software and sometimes the only way to know of an attack is by turning to an online resource that is not installed on the infected computer. Many websites run by antivirus software companies provide free online virus scanning, with limited cleaning facilities (the purpose of the sites is to sell antivirus products). Some websites—like Google subsidiary VirusTotal.com—allow users to upload one or more suspicious files to be scanned and checked by one or more antivirus programs in one operation. Microsoft offers an optional free antivirus utility called Microsoft Security Essentials.

### In Text Activity

Watch the video on installing antivirus on your computer on the link <https://www.youtube.com/watch?v=uNiOfiNL9II> Install an antivirus program and scan your computer for virus.



### 4.5.5 Firewalls

Do you know what a firewall means? The term *firewall* originally referred to a wall intended to confine a fire or potential fire within a building. Later it referred to similar structures, such as a metal sheet used in a vehicle or aircraft to separate the engine compartment from the passenger compartment. A computer firewall also acts similarly by blocking dangerous network traffic. A firewall is software or hardware that checks information coming from the Internet or a network, and then either blocks it or allows it to pass through to your computer, depending on your firewall settings. Firewall technology emerged in the late 1980s when the Internet technology began to be used widely for connectivity.

A **computer firewall** is a network security system that monitors and controls the incoming and outgoing network traffic based on predetermined security rules. A firewall typically establishes a barrier between a trusted, secure internal network and another outside network, such as the Internet, that is assumed not to be secure or trusted. A computer firewall controls access between networks. It also screens network traffic and is able to block traffic that is dangerous. Firewalls act as the intermediate server between SMTP and Hypertext Transfer Protocol (HTTP) connections. It generally consists of gateways and filters which vary from one firewall to another.

### Common personal firewall features:

- Blocks or alerts the user about all unauthorized inbound or outbound connection attempts
- Allows the user to control which programs can and cannot access the local network and/or Internet and provide the user with information about an application that makes a connection attempt
- Hides the computer from port scans by not responding to unsolicited network traffic
- Monitors and regulates all incoming and outgoing Internet users
- Prevents unwanted network traffic from locally installed applications
- Provides information about the destination server with which an application is attempting to communicate
- Tracks recent incoming events, outgoing events, and intrusion events to see who has accessed or tried to access your computer.
- Blocks and prevents hacking attempt or attack from hackers

**Limitations:**

- If the system has been compromised by malware, spyware or similar software, these programs can also manipulate the firewall, because both are running on the same system. It may be possible to bypass or even completely shut down software firewalls in such a manner.
- Firewalls can't protect your Networks against attacks.
- Firewall may limit access from the Internet, but it may not protect your network from wireless and other access to your systems.
- The alerts generated can possibly desensitize users to alerts by warning the user of actions that may not be malicious.

**To be sure that Windows Firewall is on:**

Windows Firewall is on by default in few versions of Windows. To make sure it hasn't been turned off, follow these steps:

(1)Go to control panel (2)System & Security (3)Windows firewall (4) Click to open Windows Firewall –(5) In the left pane, click Turn Windows Firewall on or off (6) If you are prompted for an administrator password or confirmation, type the password or provide confirmation (7) Below each network location type, click Turn on Windows Firewall, and then click OK. It is recommended that you turn on the firewall for all network location types.

**In Text Activity**

Watch the video on need for firewall on the link

<https://www.youtube.com/watch?v=8lrkqeOqZoc> --blog



**Check your progress - 3**



3.1) Gaining access to a computer file without the knowledge of its creator to modify or copy the file is called \_\_\_\_\_

- a White hat hacking
- b Black hat hacking
- c Cracking
- d Both b and c

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



3.2 Computer virus is a malware program that, when executed, replicates by inserting copies of itself into other \_\_\_\_\_

- a computer programs
- b data files
- c boot sector of the hard drive
- d All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



3.3 Spyware is a software that monitors your computer and reveals collected information like:

- a. Webpages you visit
- b. Tracks personal or sensitive information
- c. Credit card information and password
- d. All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)



3.4 Anti-virus software is a program that \_\_\_\_\_

- a. replicates virus
- b. detects virus
- c. attaches virus
- d. spreads virus

Wrong

Correct Option

Wrong

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Correct Option \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)





3.5 Firewall is used for

- a. Network security system
- b) monitoring incoming network traffic
- c) controlling outgoing network traffic
- d) All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



### 4.5.6 Misuse

The use of computers and internet is rapidly growing in all spheres of life due to the enormous amount of information it offers. However, this immensely useful technology has led to its addiction and misuse. Internet use has caused social isolation and depression, especially for teens; and children misuse the Internet for anonymous identity experimentation and has affected their education, health and career. Though the advantages of using the internet are numerous, we cannot afford to ignore the misuse.

- If you are surfing the net, you are most likely to stumble across negative information like pornography, videos related to violent crimes, terrorism, documentaries on serial killers, etc.
- Internet is also a haven for pranksters. Recently, flipkart which is the largest e-commerce company in India, decided to stop delivering consignments which value greater than ten thousand rupees to consumers in Uttar Pradesh as there have been cases where people order expensive products on a Cash on Delivery basis and then refuse to accept the order. In such cases, the company and the sellers associated with company suffer huge losses. It is really easy to play such pranks without being caught.
- **Internet addiction:** is the excessive use of the computer that interferes with daily life. There are cases where children and teens spend numerous hours on end playing computer games, chatting, or surfing the net while forgetting their responsibilities or even to eat. From a behavioral standpoint, it may be considered a compulsive behaviour.
- Time waits for none. Online games, social networking sites, online shopping sites, chat rooms, etc. deviate the users and they tend to visit these sites than on concentrating on the purpose of searching the internet
- Internet is the easiest way to reach out to the people. Some people use this to fulfill their own evil intentions. An advertiser offer an attractive discount on a product and may ask for your bank account details and you may give

him all the details for an advance payment. The dangers of looking for such offers online is the possibility of them being fake and even worse, may steal personal information.

- **Identity Theft:** Yes! Internet steals your ID. Whatever is put up on social media websites is accessible to a lot of people. You have an account on orkut/facebook/twitter/Google+/ any other social website? If yes, can you guarantee that you are well acquainted with all people in your friend list and that none of them has a fake account? And the result is a lot of people have been a victim. Not only is the identity stolen but also the pictures are cropped and used. these



### 4.5.7 Abuse

Internet abuse refers to improper use of the internet and includes Computer crime i.e use of computers in criminal activity like:

- **Cyber-bullying :** includes various forms of psychological abuse, akin to conventional bullying, communicated via the Internet. For example: Repeated mockery of a person, sending obscene short text messages from the Internet, obscene content conveyed during chats, sending threats through communicators, Publishing private video footage or photographs of an individual without their consent. It may take even great dimensions by becoming public, when it takes place on public blogs or social networking sites such as MySpace, FaceBook, Hi5, or even media hosting sites such as YouTube.
- **Grooming:** is the preparation and psychological manipulation of a child with the intent of sexual exploitation. The first step of grooming is to gain the trust of a minor, with the groomer presenting his/her actions as beneficial for the minor. This may occur in the context of private communication via messenger programs. Sometimes it may occur in forums or Social Networking Sites. The goal of these interactions is to arrange a meeting with the minor, or to manipulate the minor so as to obtain pornography. Grooming can be the cause of psychological harm due to seduction used by the groomer.
- **Hacking:** can be quite distressing because it implies that someone may have accessed personal files, accounts and information in your computer
- **Phishing:** is the term used to describe an attempt by a party to extract another person's security passwords, personal information, banking details, user-names and other such sensitive information in order to commit fraud or extortion. For example, phishing emails may describe how the receiver has won the lottery in another country or has inherited a large amount of money from a distant relative. The emails are usually portrayed as coming from a national authority or legal representative, who asks for a down-payment to be made in order for the total sum of money to be transferred to the receiver's bank-account.
- **Inappropriate content:** is a label for any sort of Internet content, whether verbal, visual or audio which may be illicit, dangerous, or age-inappropriate and yet publicly available.

#### In Text Activity

- Watch the link <https://www.youtube.com/watch?v=txrBZlfaPBs> and list the misuse and abuse of ICT



### 4.5.8 SAFE PRACTICES

#### 1. PREVENTION IS BETTER THAN CURE

*To fight against today's rampant security threats, as a user you have to be informed and proactive. Here are some practical guidelines that you can follow to minimize the risk of infection and attack.*

It is better to prevent an attack than to try and cure it.



Best practices for computer security to secure your computer, and the data stored on them:

- **Use security software:** It is better to install antivirus programs on your computer to prevent a virus attack. This will alert you when your current software applications are out of date or require a security update. Some of these programs include Norton AntiVirus, McAfee VirusScan, and Virex. It is also important to update your anti-virus program to scan and check for all the latest virus.
- **Install real-time anti-spyware protection:** While many free programs can detect spyware threats once they've infected a system, but professional (licensed) anti-spyware programs are required to prevent infections and fully remove those infections already present.
- **Practice the principle of least privilege (PoLP):** Do not log into a computer with administrator rights unless you must do so to perform specific tasks. Running your computer as an administrator leaves your computer vulnerable to security risks and exploits. Simply visiting an unfamiliar Internet site with these high-privilege accounts can cause extreme damage to your computer, such as reformatting your hard drive, deleting all your files, and creating a new user account with administrative access. When you do need to perform tasks as an administrator, always follow secure procedures.
- **Maintain current software and updates**
- **Frequently back up important documents and files:** This protects your data in the event of an operating system crash, hardware failure, or virus attack. Save files in multiple places using two different forms of media (e.g., Cloud Storage, Oncourse Resources, or USB flash drive).
- **Never share passwords or passphrases:** Pick strong passwords and passphrases, and keep them private.
- **Beware of email or attachments from unknown people or with a strange subject line:** Never open an attachment you weren't expecting, and if you do not know the sender of an attachment, delete the message without reading it. To open an attachment, first save it to your computer and then scan it with your antivirus software.
- **Do not download unfamiliar software off the Internet:** KaZaA, Bonzi, Gator, HotBar, WhenUSave, CommentCursor, WebHancer, LimeWire, and other Gnutella programs all appear to have useful and legitimate functions. However, most of this software contains spyware, which will damage your operating system installation, waste resources, generate pop-up ads, and report your personal information back to the company that provides the software. Obtain public domain software from reputable sources, and then check the newly downloaded software thoroughly, using reputable virus detection software on a locked disk, for signs of infection before copying it to a hard disk.
- **Do not propagate virus hoaxes or chain mail**
- **Log out of or lock your computer:** Forgetting to log out poses a security risk, because it leaves your account open to abuse. If someone could sit down at that computer and continue working from your account, doing damage to your files, retrieving personal information, or using your account to perform malicious actions.
- **Shut down computers**
- **Remove data securely: Remove files or data you no longer need to prevent unauthorized access to them. Merely deleting is not sufficient, as it does not actually remove the data from your system.**
- **• Deploy encryption whenever it is available**
- **• Secure your home network**
- **• Perform daily scans**
- **• Disable autorun**
- **Disable image previews in Outlook: Prevent against automatic infection by disabling image previews in Outlook.**
- **Don't click on email links or attachments: Don't click on email attachments without scanning them for viruses. As for clicking on links, users should access Web sites by opening a browser and manually navigating to the sites in question.**
- **• Surf smart: Many business-class anti-malware applications include browser plug-ins that help protect against drive-by infections, phishing attacks and similar exploits. Some provide "link protection," in which Web links are checked against databases of known-bad pages.**

- • **Use a hardware-based firewall:** Computers connected to the Internet should be secured behind a capable hardware-based firewall.
- • **Clear your cache:** Popups can store information in your browser's cache, leading to them reappearing constantly. To help prevent this, clear your browser's cache regularly.
- • **Consider a different browser:** Browsers such as Firefox, Chrome, and Opera are much more secure than older browsers, and more customizable.
- • **Be careful with USB drives:** You could get an infection just by inserting the USB drive, or could get your USB drive infected by plugging it into a public computer. Try to use other methods for file sharing, such as online storage or email to send files.
- • **Delete your browser's temporary internet files every day.**
- • **Never enter user account, personal, financial, or other sensitive information on any Web page at which they haven't manually arrived.**

Whenever possible, these preventive features should be practiced.

#### IN TEXT ACTIVITY:

- Watch the video on safe practices of web surfing on the link <https://www.youtube.com/watch?v=yrln8nyVBLU>

### Check Your Progress -4



4.1 ) Which of the following is a result of misuse of the internet?

- a Access to negative information
- b) **Internet addiction**
- Identity theft
- d) All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

4.2 ) Internet abuse refers to

- a) phishing
- b) grooming
- c) cyber bullying
- d) All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

4.3) Which of the following practices would help you in minimizing the risks of security threats on your computer?

- Use security software
- Never share passwords
- c) Disable autorun
- d) all the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)

3. Wrong (Feedback)
4. Correct Option (Feedback)



#### 4.6 LET US SUM UP

Application software is a computer program designed to perform a group of coordinated functions, tasks, or activities for the benefit of the user. Word processing, spreadsheets, presentation and drawing software are some of the application software. Word processing (WP) software is a computer software application that performs the task of composition, editing, formatting, and sometimes printing of documents. A spreadsheet is used for capturing, displaying, and manipulating data arranged in rows and columns. Presentation software is an application program designed to allow the user to present information in an engaging way such as with text, pictures, sound and video. Presentation software is a tool used to create visual presentations. Drawing software is defined as a computer graphics program for creating art and creating illustrations on the computer.

Utility software is system software used to support the computer infrastructure, distinguishing it from application software which is aimed at directly performing tasks that benefit ordinary users. PDF Creator, File Archiving and PDF Converters are commonly used ones. PDF Creator is an application for converting documents into Portable Document Format (PDF) format on Microsoft Windows operating systems. PDF Creator can convert to the following file formats: PDF (including PDF/A (1b) and PDF/X (X-3:2002, X-3:2003 and X-4), PNG, JPEG, SVG, TIFF, PS, EPS, TXT, PSD, PCL, BMP, PCX, RAW. PDF Creator allows you to disable printing, copying of text or images and modifying the original document. Archive files are used to collect multiple data files together into a single file for easier portability and storage, or simply to compress files to use less storage space. File converter is an application that converts a file from one format to another without altering the contents of the file. The conversion may be between the formats of two applications that use the same operating system (such as between two different Microsoft Windows word processors) or between the formats of applications from different operating systems.

A computer needs to have in it a security system and it is called Computer security. It is the protection of information systems from theft or damage to the hardware, the software, and to the information on them, as well as from disruption or misdirection of the services provided. Computer hacking is the term is used to describe many complex activities wherein the end goal is typically to obtain access to a computer system's servers, database(s), or stored files. This access may be legal ("white hat" hacking ) or illegal ("black hat" hacking), termed "cracking". Computer virus is a program usually hidden within another seemingly innocuous program that produces copies of itself and inserts them into other programs or files, and that usually performs a malicious action. Spyware is any type of malware that can be installed on computers that aids in gathering information about a person or organization without their knowledge. Anti-virus software is a program that detects, prevents, and removes viruses, worms, and other malware from a computer. Computer firewall is a network security system that monitors and controls the incoming and outgoing network traffic by establishing a barrier between a trusted, secure internal network and another outside network, such as the Internet.

The wide use of ICT has led to its addiction, misuse, and abuse such as Cyber-bullying, Grooming, Hacking, and Phishing and has caused social isolation and depression, especially for teens, and children which has affected their education, health and career. To fight against today's rampant security threats, a has to be informed and proactive and has follow to follow certain safety practices to minimize the risk of infection and attack.

#### 4.7 UNIT END EXERCISES

- 1) How is application software helpful to a teacher?
- 2) Do word processors help teachers and students in creative writing? How?
- 3) In what scenario would a teacher choose to use a spreadsheet?
- 4) For the following scores obtained by s student in the monthly tests prepare a frequency polygon. Interpret the progress of the student.



Sl. No.	Month	Total Score
1	June	68
2	July	72
3	August	76
4	September	49
5	October	78
6	November	86

- 5) Why is using a presentation software better than using a slide projector?
- 6) List the advantages of using a drawing software when compared to drawing figures on the blackboard?
- 7) What is PDF Creator?
- 8) Discuss the functions of file archiving.
- 9) Enumerate the uses of file converter
- 10) Define a computer virus
- 11) Differentiate between virus and worm
- 12) Define spyware and discuss the ill effects of being affected by spyware
- 13) Enumerate the misuses of ICT
- 14) List out the abuses of ICT
- 15) Discuss the need for antivirus
- 16) Explain the measures to be taken to secure your computer against virus infection and strategies for virus removal
- 16) Explain the steps of confirming that the firewall is on in your computer
- 17) List the safe practices to be adopted while using ICT

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## 5.10 References

## 5.1 INTRODUCTION

Veeresh was working as a Sports teacher in one of the reputed schools in Mysore. Once Principal called him and asked him to get the quotations for the sports materials so that the school can order for the materials. Principal gave only one day for it and Veeresh said yes. Veeresh seems to be very smart. He straight away entered the computer lab. Any guess, why he entered the lab? After half an hour with some papers in his hand he entered Principal's chamber. When she went through the details of those papers, she felt very happy, made a shake hand and congratulated him for his commendable work; the reason for this is, Veeresh checked the availability of the quality materials through internet and contacted those people through online and got the quotations immediately through e-mail and presented the hard copies to the Principal. Veeresh just by spending few minutes in the lab he saved his energy ,time , money , stress and strain of visiting each and every shop to check the list and materials.

We all know that this is the era of Advanced Science and technology. We all live in the Global World. Communication and contact with people have become very easy. Interaction, sharing, information passing on everything has become very easy. It is easy to access and make the information like text, audio, video, online shopping, selling things etc., Also it is easy to access to worldwide people at a very low price. Access to internet is same for all no matter where they are. One can connect to any computer in the world, and go to many excited places without leaving your chairs. Everyone can work like Veeresh and make use of the technology to speed up our work and update ourselves about the latest happenings in and around us within no time.

In this unit, you are going to study about computer network, concept and architecture of internet, locating internet resources while working with the system, how to locate the resources will also be familiarized to you in this unit. Different types and uses of browsers will also be discussed. Finally you are going to get familiarized with the search strategies and advanced searches. Apart from all this you will also be studying about, the safe practices of internet usage which is very important to know and follow.

## 5.2 OBJECTIVES

After studying this Unit, you will be able to

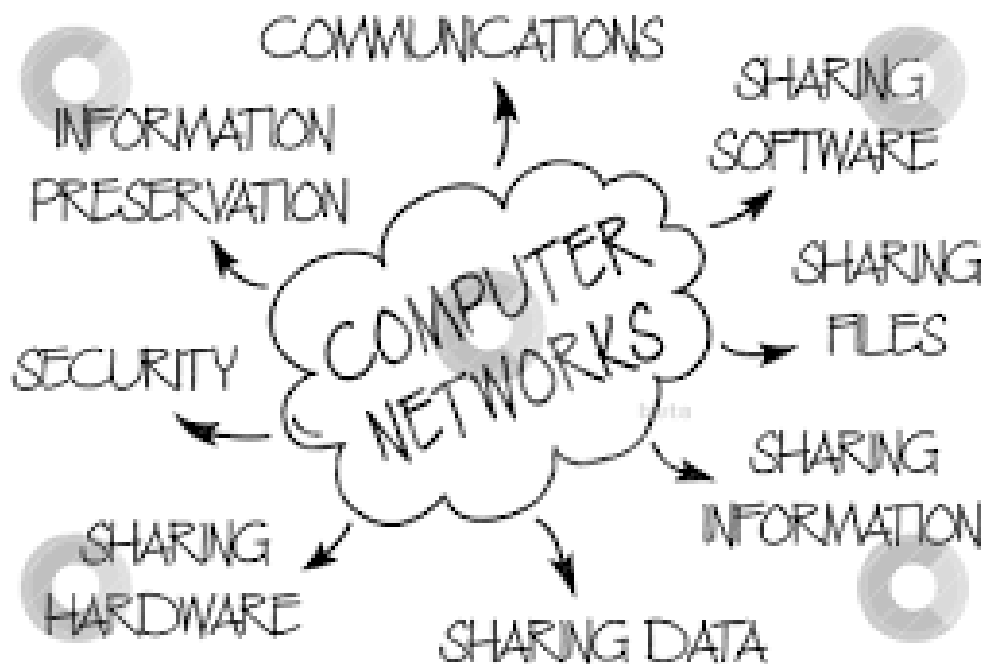
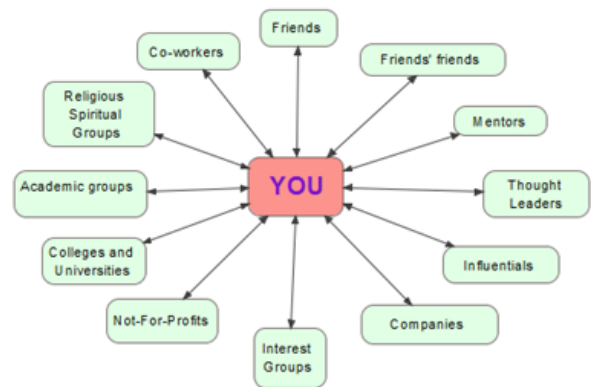
- explain the meaning of LAN and WAN
- explain the concept and architecture of Internet
- explore various possibilities of accessing internet
- locate and evaluate internet resources for educational use
- explain the features of different types of browsers
- use different browsers for accessing internet resources
- bookmark and save internet resources for later use
- use basic and advanced search strategies for locating resources

- install and use different browser plugins and extensions
- follow safe practices while using internet

### 5.3 COMPUTER NETWORK

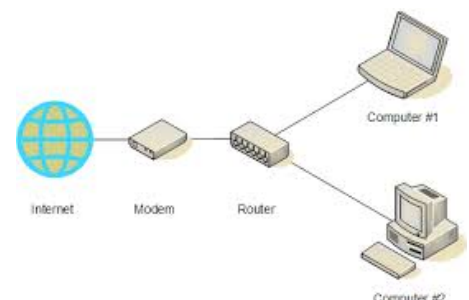
Hope you have heard the word network. Definitely you are maintaining a good link or network in your friends circle. Why do we need this network? Yes, to share information, to know their whereabouts and about their well being.

Now let us know what we mean by computer network and why we need to have it. Here two words are coined together, that is computer and network. As per your knowledge goes it means network of computers. A computer network means where a number of computers are linked together. It allows them to share resources with others.



A network consists of two or more computers which are linked with each other in order to share resources (such as printers and CDs), exchange files, or allow electronic communications.

The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams (Fig – 3). Networking involves installing network cards in each computer. Each computer is then connected through cabling or wirelessly to a central device called a hub. Operating systems contain components that are dedicated to the task of enabling computers to communicate over a network. This software makes use of special rules of communication called protocols. There are many different types of protocols used for a variety of purposes. The most commonly used protocol for establishing and maintaining communication across a network is called TCP/IP or Transmission Control Protocol/Internet Protocol. Networked computers can share hardware, software and data.



#### Client-server and peer-to-peer networks

Networks on which all computers have equal status are called peer-to-peer networks. On most networks, certain computers have special dedicated tasks. Since these machines provide services to other computers, they are called

servers. The computers that make use of the services of servers are called clients or workstations. A network such as this is called a client-server network.

A server which is used for the central storage of files is called a file server. Using a file server, users can access their work from anywhere on the network. They can also make these files available to users on other computers. File servers also enable users to co-operate on a task by centralizing the results of their work. Sending files to a server from a client computer is called uploading, whereas receiving a file from a server to a client computer is called downloading.

A computer attached to a printer which users can access is called a print server. Having a single printer rather than a printer attached to each computer obviously saves capital. An increasingly important type of server is an applications server. In the case of applications servers, application packages are not installed on the workstations but on the applications server. A communications server is a computer dedicated to connecting a network to the outside world. These are often called proxy servers. As the case of print servers illustrates, one of the greatest values of having a network is that it enables resources to be shared.

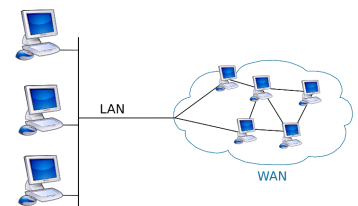
In the case of computer networks depending upon the geographical area covered by a network, they are classified as:

- Local Area Network (LAN)
- Metropolitan Area Network (MAN)
- Wide Area Network (WAN)
- Personal Area Network (PAN)

In this Unit let us concentrate on LAN and WAN.

### 5.3.1 LAN

LAN (Local Area Network) is a computer network that occupies relatively a very small area. Usually a LAN is limited to a single room, building or a small Campus with group of buildings. Many of the middle to large-sized School and College Campuses including businesses establishments today use LANs. This has become easy accessibility for the employees to interact and share information. A WLAN is a Local Area Network that is connected wirelessly.



### 5.3.2 WAN

A WAN or Wide Area Network is a group of widely dispersed computers that are connected together. These could be across the same town or across a country or even across the world. Apart from distance, the other feature that distinguishes a WAN from a LAN is that the WAN would make use of a range of communication technologies such as telephone, microwave and satellite links. Much of the problems faced by LAN connections can be solved by WAN. Most WANs are made from several LANs connected together.

### 5.3.3 Advantages of Networking

#### File Servers

- Users can access their work from any workstation connected to the network.
- Users can easily exchange work with colleagues.
- Users can easily co-operate on tasks.
- Backing up is centralised and can be placed under the control of experts who will follow the correct procedures.

#### Printer Servers

- Instead of having printers attached to each computer, printers only need to be purchased for the print servers. This results in financial savings.
- As there are fewer printers to look after there is lower maintenance.
- As far fewer printers need to be purchased better quality printers with advanced features can be purchased.

#### Application Servers

- Software only needs to be installed on the applications server instead of each workstation.
- The software is configured in the same way for all users.

- Upgrading of software only needs to be done on the server.
- Cost of licensing software for an applications server is less than the cost of many stand-alone versions.
- Centralising applications software simplifies the process of implementing software policies in an organisation. Software policies refer to what software may be installed on computers and how it may be used.

### Internet Connection Sharing (Proxy Servers)

- Proxy servers contain a repository of Internet sites recently visited and cached for quicker access at a future date.
- Proxy servers can be configured with firewall software. This helps protect the network from attack by hackers.
- Files can be filtered for computer viruses before being passed onto the network.
- Organisations can control access of users to outside sites.
- Since there is only one point of communication there is a large saving on line costs.

Hope, now you are familiarized with the concept of LAN and WAN. Since you are using it in your day to day work it becomes easier for you to differentiate their usage.

**Activity:** After viewing the video, distinguish LAN, WAN and MAN  
<https://www.youtube.com/watch?v=eDZcLmofADA>

## ? Check your Progress – 1

Write the expansion of the following acronyms.

1. LAN :
2. MAN :
3. WAN :
4. WLAN :

Submit



Fill up the Blanks

1. In Network  are linked with each other.
2. Services to a network is provided by
3. LAN occupies  area.
4. LAN transmits data faster than a
5. World's most popular WAN is

Submit

## 5.4 INTERNET

Hope you are familiar with the store-room. You might have seen it either at your home or at your work place right! Store means to collect/gather and room is a place to keep all these collected materials. In the same way we have a technology assisted very big store house of learning material which is called Internet. The Internet is the collection of all computers across the world which can access each other in some way. The links between computers might include telephone, fiber optic cable, radio, microwave or satellite. Today tens of millions of computers are able to access each other. The Internet has no central organisation which controls its use. Because the Internet knows no borders, many governments have tried to control the flow of information across the Internet. However, communications technology is so varied and so widespread that this is a near impossible task.

**Intranet:** An intranet is a collection of all computers within an organisation that can access each other in some way. Users may browse computers with in an intranet using a browser but will usually not be able to access the wider Internet. In the same way, outsiders will not be able to access the intranet of an organisation. An intranet can be thought of as a private Internet.

### 5.4.1 Concept and Architecture

Internet is a powerful resource for learning, and is an efficient means of communication. It is very useful in education and provides a number of learning benefits. It includes the development of independent learning and research skills. It helps by improving access to specific subject learning across a wide range of learning areas. It also includes integrated or cross-curricular studies and communication and collaboration, such as the ability to use learning technologies to access resources and create resources.

Generally, everyone thinks that the internet and web World Wide Web (WWW) are same, but it is false. The web is a software application or services that run on the internet .It is a collection of documents and resources. It is one of the fastest growing parts of the internet. It provides easy access to a huge range of information that is stored on computers around the world.

There are different definitions for internet but the meaning is the same as shown below

**Definition 1:**The series of interconnected network allowing communication of data surrounded by millions of computers worldwide.

**Definition 2:**A global communication network that allows computers worldwide to connect and exchange information.

**Definition 3:** A worldwide system of computer network, a network of networks in which users at any one computer can get information from any other computer.

The word "Internet" exactly means "network of networks". The Internet consists of thousands of smaller regional networks spread throughout the world. It connects approximately 80 million users in Asian countries on any given day.

**World Wide Web:** The World Wide Web or WWW is a part of the Internet. The WWW consists of all the sites that can be accessed using a web browser such as Mozilla, Internet Explorer, Opera or Google Chrome. In order for a browser to access a web site, the web site must contain files that have a particular format constructed using Hypertext Markup Language or HTML. These sites are typically developed using special web development applications, but it is possible to create simple web sites using a word processor by saving the document in HTML format. The HTML documents are stored as web pages on special servers known as web servers. These run special web server software such as Apache Web Server or Internet Information Services.

The WWW enables the free flow of information across the world. Developments in technology have made access to the Internet easier and faster. As a result the WWW also became known as the Information Super high way. Most of the activities listed under the Internet in the previous section are now actually carried out using the World Wide Web. In other words, the sites are created in HTML or a similar format, are installed on web servers and are accessed by web browsers.

The internet is a great tool for developing the communication and collaboration skills of students and teachers. Above all, the internet is an effective means of building language skills. Through e-Mail, chat rooms and discussion groups,

students learn the basic principles of communication in the written form. This gives teachers the opportunity to incorporate internet-based activities into normal literacy programs and bring variety to their teaching strategies.

Collaborative projects can be intended to improve literacy skills, generally through e-Mail messaging with their peers from other schools or even other countries. Collaborative projects are also useful for engaging students and providing significant learning experiences. In this way, the internet becomes an effective means of advancing intercultural understanding. Moderated chat rooms and group projects can also provide students with opportunities for collaborative learning.

**Activity 1:** Watch the video to know more about internet

[https://www.youtube.com/watch?v=7\\_LPdtKXPc](https://www.youtube.com/watch?v=7_LPdtKXPc)

**Activity 2:** Watch the video to study about Internet and its architecture

<https://www.youtube.com/watch?v=EXsxKjdkhul>

### Benefits of Internet

- The internet is easy to use.
- It develops communication, collaboration and language skills.
- The internet is data and information loaded, including a range of medium.
- The Search engines that are available online are, fast and powerful.
- We can become researchers because of easier access to data.
- People are motivated to share their work online with the world.
- The internet appeals to different learning styles.
- Unlike paper the web can present dynamic data sources which change over time.
- The characters in an e-Mail don't get transposed or mixed up when they are sent over long distances.
- We can access libraries around the world.

You can add more to the list based on your exposure and usage. Now let us study about the internet architecture.

Architecture: What is Internet architecture? It is by definition a meta-network, a constantly changing collection of thousands of individual networks intercommunicating with a common protocol.

The Internet's architecture is described in its name, a short form of the compound word "inter-networking". This architecture is based in the very specification of the standard TCP/IP(Transmission Control Protocol/Internet Protocol ) protocol, designed to connect any two networks which may be very different in internal hardware, software, and technical design. Once two networks are interconnected, communication with TCP/IP is enabled end-to-end, so that any node on the Internet has the near magical ability to communicate with any other no matter where they are. This openness of design has enabled the Internet architecture to grow to a global scale. Please go through link to know more about Internet Architecture.

[https://en.wikipedia.org/wiki/Computer\\_architecture](https://en.wikipedia.org/wiki/Computer_architecture)

### ? Check your Progress-2



State whether the following statements are True or False

1. Internet is a giant collection of cables and computers.

True  False

True

2. Internet can be owned by any person.

True  False

**False**

3. Internet and World Wide Web can be used as synonym.

True  False

**False**

4. Internet connects and exchanges information only through network connection.

True  False

**True**

5. Internet is very difficult to use.

True  False

**False**

6. Internet cannot take more load of information.

True  False

**False**

7. Inter networking is called as Internet's Architecture.

True  False

**True**

8. Internet technical architecture looks a bit like a multi dimensional river.

True  False

**True**



### 5.4.2 Accessing Internet









So far we have discussed about the concept of internet and its architecture. Now you need to know how to access the internet. Assume that you are sitting in front of the computer which has LAN connection. Now you need to gather/collect some information for the topic you have selected to teach in the class. You know how to open the system. Further when you saw the screen with full of small pictures, I think you got confused and stuck there, since you are not aware how to connect yourself to the internet. Trial and error method can sometimes help you in accessing but to know the right way of accessing would help you to work in a better way and also would be a sort of motivation for you.



**Internet access** connects individual computer terminals, computers, mobile devices, and computer networks to the Internet, enabling users to access Internet services, such as email and the World Wide Web. Internet service providers (ISPs) offer Internet access through various technologies that offer a wide range of data signaling rates (speeds).


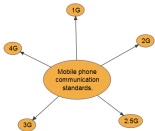
Access to the Internet grew from an estimated 10 million people in 1993, to almost 40 million in 1995, to 670 million in 2002, and to 2.7 billion in 2013. There were roughly 0.6 billion fixed broadband subscribers and almost 1.2 billion mobile broadband subscribers in 2011. In developed countries people frequently use both fixed and mobile broadband networks. In developing countries mobile broadband is often the only access method available.


*The below given table has highlighted the different ways and means to access Internet*

SI No.	Name	Description	Devices required	Speed
1	<b>Dial-up Internet Access</b> 	<ul style="list-style-type: none"> <li>Early 1980s internet access was directly connected through modems and analog telephone lines.</li> </ul>	analog telephone lines , Modem	Avg. speed exceeds 54kbps
2	<b>Cable Internet Access</b> 	<ul style="list-style-type: none"> <li>All the cables of the subscribers terminate at the company's central office.</li> <li>These cables are then connected through fiber optic cable, satellite and microwave transmission.</li> <li>These broadband cables provides continuous connection with an ISP (Internet Service Provider)</li> </ul>	fiber-optic or coaxial copper cable, hybrid fiber coaxial wiring,	400mbpsfor business connections, and 250 mbps/s for residential service
3	<b>Digital Subscriber Line (DSL)</b> 	<ul style="list-style-type: none"> <li>DSL can operate without interrupting the voice call.</li> <li>DSL uses the high frequencies for internet, while the low (audible) frequencies of the line are left free for telephone communication.</li> <li>These frequency bands are subsequently separated by filters installed at the customer's premises.</li> </ul>	single phone line	ranges from 256 kbps to over 100 mbps

<p>4 <b>Power-line Internet</b></p> 	<ul style="list-style-type: none"> <li>■ This line carries Internet data through electric power transmission.</li> <li>■ This technology can provide people in rural and low population areas access to the Internet with little cost in terms of new transmission equipment, cables, or wires.</li> </ul>	<p>parts of the radio spectrum</p>	<p>range from 256 kbps to 2.7 mbps</p>
<p><b>Broadband Internet Access:</b></p> 	<ul style="list-style-type: none"> <li>■ The term broadband includes a broad range of technologies, all of which provide high Intern-speed internet by using computers built-in Ethernet.</li> <li>■ Broadband provides improved access to Internet services such as:</li> <li>■ Faster browsing –World Wide Web</li> <li>■ Faster downloading of documents, photographs, videos, and other large files</li> <li>■ Telephony, radio, television, and videoconferencing</li> <li>■ Virtual private networks and remote system administration</li> <li>■ Online gaming, especially massively multiplayer online role-playing games which are interaction-intensive.</li> </ul>	<p>coaxial cable, optical fiber, radio or twisted pair.</p>	<p>60 Mbps.</p>
<p><b>Wi-Fi networks:</b></p> 	<ul style="list-style-type: none"> <li>■ Wi-Fi is a trade name for a wireless local area network (WLAN).</li> <li>■ Individual homes and businesses often use Wi-Fi to connect laptops and smart phones to the Internet.</li> <li>■ Wi-Fi is used to create city-wide and campus-wide wireless networks.</li> <li>■ Wi-Fi networks are built using one or more wireless routers called access points.</li> <li>■ The Wi-Fi network is connected to the larger Internet using DSL, cable modem, and other Internet access technologies.</li> </ul> <p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>■ Wi-Fi Hotspots may be found in coffee shops and various other public establishments.</li> </ul>	<p>wireless routers, DSL, cable modem,</p>	<p>Data rates range from 6 to 600 Mbps.</p>

		<ul style="list-style-type: none"> <li>■ Wireless Internet access points are available in public places such as airport halls, Star hotels , normal hotels, public terminals, usually fee based.</li> <li>■ shopping malls, and other venues increasingly offer wireless access to computer networks.</li> <li>■ This facility is provided to those users who carry their own laptop or Smart phones...</li> <li>■ These services may be free to all, free to customers only, or fee-based.</li> <li>■ A whole campus or park, or even an entire city can be enabled.</li> </ul>		
<p><b>WiMAX</b></p> 		<ul style="list-style-type: none"> <li>■ WiMAX is a wireless wide area network that provides the high speed of DSL</li> <li>■ It does not require hotspots and no distance limitations.</li> <li>■ WiMAX gives to wireless Internet connectivity what GSM has given to phones.</li> <li>■ WiMAX surpasses the Wi-fi range of 30 metre with 50 km with a speed of upto 1Gbps.</li> <li>■ WiMAX signals also penetrate building walls much more effectively than Wi-Fi.</li> </ul>	<p>a transmitter and a receiver. The transmitter is a WiMAX tower, much like a GSM tower.</p>	<p>up to up to 70 Mbps</p>
<p><b>Satellite Broadband</b></p> 		<ul style="list-style-type: none"> <li>■ SatelliteInternet service provides fixed, portable, and mobile Internet access.Satellite antenna dishes require a clear line of sight to the southern sky. Service can be adversely affected by moisture, rain, and snow (known as rain fade) the system requires a carefully aimed directional antenna.</li> </ul>	<p>VSAT dish antenna with a transceiver</p>	<p>Data rates range from 2kbps to 1 Gbps downstream and from 2 kbps to 10 Mbps upstream.</p>
<p><b>Local Multipoint Distribution Service</b></p>		<ul style="list-style-type: none"> <li>■ Local Multipoint Distribution Service (LMDS) is a broadband wireless access technology that uses microwave signals operating between 26 GHz and 29 GHz.</li> <li>■ It is conceived as a fixed wireless, point-to-multipoint technology for utilization in the last mile.</li> </ul>		<p>Data rates range from 64 kbps to 155 Mbps</p>

	<ul style="list-style-type: none"> <li>LMDS has been surpassed in both technological and commercial potential by the LTE and WiMAX standards.</li> </ul>		
<p><b>Mobile Internet Dongles</b></p> 	<ul style="list-style-type: none"> <li>A mobile dongle is, essentially, a small modem that connects to your computer through a USB interface.</li> <li>A mobile dongle allows you to access the internet via a 4G or 3G broadband connection.</li> <li>We can use them to access the internet practically anywhere, unlike a fixed line that can only be used in your home or office.</li> <li>Mobile dongles are also called USB modems, internet sticks, USB network adapters or USB mobile broadband sticks..</li> <li>A mobile dongle can be a useful tool, especially if you need internet on the go on a regular basis. Look out for the best plan available.</li> </ul> <p><b>ADVANTAGES :</b></p> <ul style="list-style-type: none"> <li>The main advantage of a USB modem is that it lets you to connect to the internet wherever you are.</li> <li>They're also pretty small, and thanks to technological progress, they've become quite fast.</li> <li>You also don't need to worry about charging an internet stick because they run on your computer's power.</li> <li>Furthermore, you can use a dongle with any device that has a USB connection, enabling you to connect practically anything to the internet.</li> </ul>	<p>Dongle/ USB modems, internet sticks, USB network adapters or USB mobile broadband sticks</p>	<p>speeds of up to 21Mbps (depending on location) on 3G</p>
<p><b>Mobile phone communication standards.</b></p> 	<ul style="list-style-type: none"> <li><b>1G networks</b> are considered to be the first analog cellular systems, which started early 1980s.</li> <li>There were radio telephone systems even before that. 1G networks were conceived and designed purely for voice calls with almost no consideration of data services (with the possible exception of built-in modems in some headsets).</li> <li><b>2G networks</b> (GSM, CDMAOne, D-AMPS) are the first digital cellular systems launched early 1990s,</li> </ul>		

		<p>offering improved sound quality, better security and higher total capacity.</p> <ul style="list-style-type: none"> <li>■ With this new technology came many of the services we now take for granted - text messaging, multimedia messaging, internet access, etc., and also introduced us to the SIM card.</li> <li>■ <b>2.5G networks</b> are the enhanced versions of 2G networks with theoretical data rates up to about <b>144kbps</b>. GPRS offered the first always-on data service.</li> <li>■ <b>3G networks</b> are newer cellular networks that have data rates of <b>384kbps</b> and more.</li> <li>■ The UN's International Telecommunications Union IMT-2000 standard requires stationary speeds of 2Mbps and mobile speeds of 384kbps for a "true" 3G.</li> <li>■ <b>4G technology</b> refers to the fourth generation of mobile phone communication standards.</li> </ul>		
<p><b>Li-Fi (Light Fidelity)</b></p> 		<ul style="list-style-type: none"> <li>■ It is a bidirectional, high speed and fully networked wireless communication technology similar to Wi-Fi.</li> <li>■ Li-Fi, (Light Fidelity), a technology using LED light that is hundred times faster than some Wi-Fi facilities.</li> <li>■ Li-Fi optical wireless communications Communications(OWC) technology uses light from Light-emitting diodes(LED) as a medium to deliver networked mobile high-speed communication in a similar manner to wi-fi.</li> <li>■ Unlike Wi-Fi connectivity, Li-Fi provides greater security, safety and data densities along with inherent properties that eliminate unwanted external network hacking.</li> </ul>	<p>Light-emitting diodes(LED)</p>	<p>speeds of 224 Gbps.</p>

**Activity**

To know more about how the internet dongles work, go to the link and also watch the video.

Mobile Internet Dongles - A Simple Guide - Switcher.ie  
<https://switcher.ie/broadband/guides/what-is-a-mobile-dongle/>

What Is A Dongle? - YouTube  
<https://www.youtube.com/watch?v=Q8fvSfmDNDU>

## ? Check Your Progress-3

Match the following:

A	B
1.Email and World wide Web	<input type="text"/>
2.Dial-up Internet access	<input type="text"/>
3.Cable Internet access	<input type="text"/>
4. Power-line Internet	<input type="text"/>
5.Broad Band Access to Internet	<input type="text"/>
6.Wi-Fi networks	<input type="text"/>
7.Mobile broadband access	<input type="text"/>
8.Mobile Dongles	<input type="text"/>
9. Li-Fi	<input type="text"/>

Check

## 5.5 Locating Internet Resources

Although technology is a very important, useful and indispensable part of the life, effective and appropriate usage of it still needs to be improved in education. How we access the Internet and other resources for our classes or for some academic information is very important. As we have experienced, internet is the reservoir of both required and unwanted information. The diversity of Internet resources which are used for the studies should be assessed for its reliability, validity, copy right, free service or chargeable and the accessibility of these resources should be investigated and assessed properly. The use of the Internet in the educational environment has enabled easy access to many resources, and information sharing has, therefore, significantly increased. Moreover, the prevalence of this sharing has brought additional benefits in that these resources can be used in any location and any time. Almost every one of us likes to access internet in order to speed up our work. In this sub unit you are going to study about how to get the related resources from the net.

### 5.5.1 Navigating

Navigation is a process of navigating a network of internet resources in the World Wide Web. This is organized as hypertext or hypermedia. Web navigation came about with the introduction of the World Wide Web, in 1989 when Tim

Burners-Lee invented it. Once the World Wide Web was available, web navigation increasingly became a major aspect and role in jobs and everyday lives. With one-third of the world's population now using the internet, web navigation maintains a global use in today's ever evolving international society. Web navigation is not restricted to just computers, either, as mobile phones and tablets have added avenues for access to the ever growing information on the web today. The most recent wave of technology which has affected web navigation is the introduction and growth of the smart phone. As of January 2014, 58% of American adults owned a smart phone, and that number is on the rise from previous years. Even Indian youths and adolescents have started using smart phones.

Navigation menus allow visitors to move from one page or section to the next. Without these, it would be difficult to conveniently explore websites. Website navigation menus usually come in one of two orientations: vertical and horizontal. Horizontal navigation menus show items side by side while vertical navigation is set for using the one side of pages to navigate through a set of screens. Perhaps, the **navigation menu** is a website's single most important component. Navigation menus are designed to place in the most visible location of the page, and thus can greatly influence visitor's first impression.

For more details refer the website suggested below.

[https://en.wikipedia.org/wiki/Web\\_navigation](https://en.wikipedia.org/wiki/Web_navigation)

### 5.5.2 Search Strategies

We know that, when we have some important information about a person or a place we go in search of them. In the same way when we want some information for our regular class room teaching which covers some activities, digital images, videos etc., then we think of searching them through internet.

Many times searching the World Wide Web can be both beneficial and frustrating. You may find vast amounts of information, or you may not find the kinds of information you're looking for. Searching online will provide you with a wealth of information, but not all of it will be useful or of the highest quality.

Not all of the information located on the Internet can be found via search engines. Researchers Chris Sherman and Gary Price call this information the "invisible Web" (another name that is frequently used is the "deep Web"). Invisible Web information includes certain file formats, information contained in databases, and pages omitted from search engines.

So, using search engines is not the only way to find material on the Web, but these search engines are one tool you can use. Knowing a few search strategies and hints can make the search more profitable. This guide provides information on the different ways of locating material on the Web including using search engines, searching the invisible Web, and using Web directories.

**Some of the recommended steps to be followed during the Internet search are as follows:**

- Use nouns in your queries – who/what, when, where, how and why; avoid conjunctions, verbs, adverbs and adjectives.
- Use keywords at the right "level" of specificity: precise, but not overly restrictive.
- Use phrases where natural; they are your most powerful weapon
- Constrain your search by using two or three related, but narrowing, concepts in your query
- Keep overall query length limited to six to eight keywords maximum.

#### **Activity:**

Use any search engine using the specifications and find the difference of website directory displayed.

### 5.5.3 Selecting



We know that when we start working on the internet without specific objective, unnecessarily we are going to waste time since it has huge information both related and unwanted. Most sites will be general in nature (i.e., serve a broad cross-section of users). Subject-specific sites needed to be selected by the teacher as per the requirement. While selecting the information we need to first decide what we want and accordingly with the help of the search engines we can go to specific website and select the information we want. Following are some of the important points we need to consider while selecting resources in the internet.

- accuracy of the information
- the authority of information publisher
- the breadth and depth of information
- the reliability and efficiency of hyperlinks on main page
- the quality of layout and design
- whether the information is in time
- who is the audience of information
- the originality of Information
- the operating capability of main page
- Site readily accessible.
- downloads are quick and easy.
- navigation easy.
- links to relevant sites.
- copyright holder, if material is protected by copyright.

After selecting the resource we need to evaluate whether it is reliable, valid, and trustworthy resource to refer and quote. Yes now let us move on to the next concept that is evaluation.

#### 5.5.4 Evaluating

Unlike similar information found in newspapers or television broadcasts, information available on the Internet is not regulated for quality or accuracy; therefore, it is particularly important for the individual Internet user to evaluate the resource or information. Keep in mind that anyone can publish anything they wish on the Web. It is often difficult to determine authorship of Web sources, and even if the author is listed, he or she may not always represent him or herself honestly, or he or she may represent opinions as fact. The responsibility is on the user to evaluate resources effectively. Hence we can say that Web sources can be created by anyone and therefore are riskier in terms of their credibility and authority, they should always be evaluated according to the following criteria:

#### Evaluation Criteria: Sites must contain credible information and be user friendly

1. Site access and usability
2. Resource identification and documentation
3. Author identification
4. Authority of author
5. Information structure and design
6. Relevance and scope of content
7. Validity of content
8. Accuracy and balance of content
9. Navigation within document
10. Quality of the links and
11. Aesthetic and affective aspects

#### Activity 1

Remember to evaluate Wikipedia articles too; Evaluating Wikipedia (can access the file by clicking on the link) gives some tips.

#### Activity 2

<http://rs.ed.uiuc.edu/students/tbarcalow/490net/EvalRubric.htm> After watching the video,



develop a rubric to evaluate any of the related resource in the internet by keeping in mind the criteria to be followed for evaluation.

- Note: The quality of Web pages linked to the original Web page may vary; therefore, you must always evaluate each Web site independently.
- Be very critical of any information you find on the Web and carefully examine each site.
- Web pages are susceptible to both accidental and deliberate alteration, and may move or disappear with no notice.

[https://www.youtube.com/watch?v=99k\\_B4qHvVA](https://www.youtube.com/watch?v=99k_B4qHvVA)

### 5.5.5 Saving and Bookmarking

While working with computers many times we come across important and most relevant information which we need to refer in future also. Then what we need to do is the question. There are many options by which we can save the information for future use.

Following are the simple ways of saving the internet resources:

1. **Print Internet Resources:** You can print resources from the Internet to make hard copies for the classroom. You can print out web pages, graphics, data, or email letters. Photocopy these printouts or transfer them to an overhead transparency. CAUTION: A web page may be much larger than you think. You can end up with one "page" that prints out to 10 sheets of paper. So when you print, you may want to print a page at a time. Also remember that just like information from any other source, information from the web may be copyrighted. It is important to observe copyright laws.
2. **Save Internet Resources on a Disk, Hard Drive, or Zip Drive:** You can save individual web pages simply by using the "save as" feature on your net browser. You have a choice of saving "text" or "HTML." Selecting "text" allows you to later open the document in a word processor. Depending on the word processor that you use, some or all of the formatting will be retained. If you select "HTML" you get all of the colors and formatting. This saves it as an HTML document which can be opened with a web browser such as Netscape Navigator or Internet Explorer without being connected to the Internet.



When you save web pages, the graphics are not automatically saved with the page. You must save each of the images separately. With a PC you do that by placing the mouse arrow over the graphic and pressing the right mouse button. A dialogue box appears. For a MAC, click and hold for a few seconds until the dialogue box appears. You can select the option "Save this image as..." You can now open these documents in the web browser or another appropriate program without being connected to the Internet.

### Activity

Practice saving a [weather image](#) (click on the link) on the hard drive of your computer.

**Bookmarking:** Bookmarks are the webpage locations or URLs that are retrievable. Bookmarks are a feature of all internet web browsers. The book, marking function allows you to save an internet address that you have visited. They are saved by name rather by address. This makes it easier for you to recognize and access it later. The web links that you save are known as favorites in internet explorer. The bookmark option is usually found in the top browser menu.

However, along with the bookmarking methods that are a built in feature of your favorite web browser, there are, also many external applications that help you save, catalogue and access your web bookmark.



### Activity

Bookmark any 3 websites of your choice in your default web browser.

### 5.5.6 Safe Practices

Is the Internet safe for both children and adults? How can I differentiate a real and a fake website? What do I need to do to be safe from viruses? What do I have to do to be a safe user? All these are critical questions that less savvy computer users ask themselves every day. The Internet offers so many opportunities to explore create and collaborate. But it's important to keep yourself safe and secure, so that you can make the most of it.

You might have heard of many different kinds of cyber-crime. A criminal might try to gain access to your information – like your email password, banking details or social security number. They might do this by installing malware (malicious software) on your computer, trying to hack into your account, or tricking you into giving them the information. Then they could steal from you, impersonate you or even sell your details to the highest bidder. A criminal might also try to use the Internet to scam you, sell you fake goods or make you do things that cost you money. Or, like a thief who steals a getaway car without caring who the owner is, they could want your computer or a website you own as a tool to commit cyber-crime.

Whether you're a new Internet user or an expert, the tips and tools given here will help you to navigate the web safely and securely.

When they address these questions to their more knowledgeable counterparts, they get the following answers:

- Secure your passwords - Learn more about how to create strong passwords and keep your information safe. □ Prevent Identity Theft- Know the common tricks that criminals employ to help you protect yourself from online fraud and identity theft.
- Signing in and signing out - Signing into your Google Account is simple and useful – but know when it is important to sign out as well.
- Report abuse and illegal activities - Help yourself and others stay safe online by reporting people or companies who send spam, try to sell counterfeit goods, distribute malware, or are otherwise abusing our systems.
- Use secure networks - Be extra careful whenever you go online using a network you don't know, and learn about setting up your home router and Wi-Fi network securely.
- Manage multiple accounts - Many devices now support multiple online accounts. Learn more about how to control which account you use, and when.
- Know your Google security and privacy tools - Find out more about the tools you can use to help stay safe with Google.
- The choice of the browser: Most of the interaction with the Web is through the browser. So choice of the Web browser should be our utmost priority. For Example: Mozilla Firefox is the fast, stable and secured web browser. It also has a built in updater, allowing you to update your browser without any complicated procedures. Internet Explorer is less safe than its counterparts-Firefox or Opera.
- Security updates: Running malicious code through the browser can possibly damage the operating system. It can have both active and passive effects. Furthermore, your machine will not display any shiny red warning if things stop working, especially not while you are browsing. Instead it may close and can show an error report, at worst, your machine will crash. So we have to be very cautious about the updates.
- Links: This is one of the most common methods of trying to take users to potentially dangerous websites.



## ? Check your Progress-4



### Fill up the Blanks

1. Navigation, searching, selecting and evaluation are means for
2. Testing the quality of the links is one of the criteria for
3. Searching engines facilitates  of resources in the internet.
4. While selecting the internet resources  should be very clear.
5. Saving an Internet address can be done through



## 5.6 BROWSER

A browser is software that is used to access the internet. A web browser is a computer program application found on all modern computers. They have also now become a common feature of mobile phones or other mobile devices and tablet computers like the iPad or Android tablets.

A web browser (commonly referred to as a browser) is a software application for retrieving, presenting, and traversing information resources on the World Wide Web. An *information resource* is identified by a Uniform Resource Identifier (URI/URL) and may be a web page, image, video or other piece of content. Hyperlinks present in resources enable users easily to navigate their browsers to related resources. Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems. Now let us concentrate on different types of browsers.

### 5.6.1 Types of browsers

- Internet Explorer: Created by Microsoft this browser comes in-built with Windows operating system.
- Mozilla Firefox : Managed by Mozilla corporation this is one of the best open source web browser with many features like spell checking, live bookmarking, location-based browsing etc.
- Opera: It is a fast, simple and safe way to get around on the web.
- Google Chrome: Fastest, simple and the most secure browser which works with Windows, Linux and MAC operating systems.



### 5.6.2 Uses

We are familiar with types of browsers now. Most of the people use Internet browsers daily. Mozilla's Firefox, Microsoft's Internet Explorer, Apple's Safari, and Google's Chrome are examples of Internet browsers.

- A browser lets you visit websites and do activities within them like login, view multimedia, link from one site to another, visit one page from another, print, send and receive email, among many other activities.
- The most typical use of an Internet browser is to load and view websites on the Internet.
- Internet browsers can also be used to view local files on a computer. For example, you can open text documents or highly formatted documents such as XML (Extensible Markup Language) or HTML (Hyper Text Markup Language) documents.
- Internet browsers are used to communicate in different forms. People can send email (electronic mail) and video chat (e.g. Google Chat) within an Internet browser.
- People also use Internet browsers to listen to songs, watch movies or past television episodes, and stream radio live.

- The most common browser software titles on the market are: Microsoft Internet Explorer, Google's Chrome, Mozilla Firefox, Apple's Safari, and Opera. Browser availability depends on the operating system your computer is using (for example: Microsoft Windows, Linux, Ubuntu, Mac OS, among others)
- When you type a web page address such as [www.allaboutcookies.org](http://www.allaboutcookies.org) into your browser, that web page in its entirety is not actually stored on a server ready and waiting to be delivered. In fact each web page that you request is individually created in response to your request.
- You are actually calling up a list of requests to get content from various resource directories or servers on which the content for that page is stored. It is rather like a recipe for a cake - you have a shopping list of ingredients (requests for content) that when combined in the correct order bakes a cake (the web page). The page maybe made up from content from different sources. Images may come from one server, text content from another, scripts such as date scripts from another and ads from another. As soon as you move to another page, the page that you have just viewed disappears. This is the dynamic nature of websites. Now let us proceed to know about plugins and extensions.

### Activity: Explore the following links for further details about browsers

- [Uses of Internet Browser | eHow](#)
- [What is a Web Browser? What does a Web Browser Do.](#)

[www.allaboutcookies.org/browsers/](http://www.allaboutcookies.org/browsers/)

### 5.6.3 Plugins and Extensions

Many browsers have an online Store that allows users to find extensions and see lists of popular extensions. For example: Google Chrome, Mozilla Firefox and Apple Safari all provide such stores, together with unofficial stores.

Browser toolbars are considered to be a particular kind of browser extensions that present a toolbar. Browser toolbars are specific to each browser, which means that a toolbar working on a browser does not work on another one.

#### Toolbars

A browser toolbar is a toolbar that resides within a browser's window. Browser toolbars are considered to be a particular kind of browser extensions that present a toolbar. Browser toolbars are specific to each browser, which means that a toolbar working on a browser does not work on another one.

Browser extensions can help protect your online privacy far beyond the private browsing feature available on most browsers. Most of the browser extensions related to privacy fall into three groups: extensions that prevent third parties from tracking your movements, extensions that block ads and scripts, and passive security tools that enforce good habits.

#### Plug-ins

Plug-ins add specific abilities into browsers using application programming interfaces (APIs) allowing third parties to create plug-ins that interact with the browser. The original API was NPAPI, t subsequently Google introduced the PPAPI interface in Chrome. Browser plugins is quite simply a third party library that plugs in to the browser that can be embedded inside a web page.

#### What you can do with a plugin

A plugin is, quite simply, a third party library that “plugs in” to the browser that can be embedded inside a web page using an `<embed>` tag or a `<object>` tag. Many of them then draw pretty pictures or animations, though that's not

required. Many allow you to talk to them through JavaScript, though that's not required. In short, a plugin affects only a specific page in which it is placed.

Examples of common plugins include:

- Macromedia Flash
- Microsoft Silverlight
- Apple QuickTime
- Adobe Reader (at least this includes a plugin in addition to the rest of the application)

Some plugins respond to a mime type and can run in place of the page, such as Adobe Reader, which allows you to view PDF files in your web browser. Again, however, it affects only that page, and no others.

**Now hope you have followed what actually you mean by plugins and extensions. We shall proceed to study the last concept of the Unit that is Search strategies.**

## 5.7 SEARCH STRATEGIES

Successful searching combines creative guessing of Uniform Resource Locators (URLs) along with smart use of subject directories and search engines. Here are three general strategies. Before using any of them, be sure to consider what organization might be a likely source for providing the necessary information.

1. URL Guessing and Cutting
2. Using Subject Directories
3. Using Search Engines

For a quick overview list of strategies that can be considered is listed below.

- Guess organization's URL before trying search engines
- Search for organization URL otherwise
- Use "phrase searching" and unique words as much as possible
- Use directories (Yahoo!, ODP, Look Smart) for broad, general topics
- Use multiple step approach – can be several clicks to an answer
- Folders to narrow large search sets: Tacoma, WiseNut, Vivisimo, or NLRResearch
- Try a title field search to focus results more by subject
- Use specialized search engines for news, Usenet postings, phone numbers, etc.

### Developing a Search Strategy

When using search tools, a good plan can save your time. Begin by creating a concept map or another type of visual planning guide. This plan could include your central topic or problem, a word list, and a set of required information. Your central topic or problem may have many components. What type of information are you seeking (i.e., ideas, facts, opinions, options)? What form will this information take (i.e., text, graphics, charts)? Your word list should include key words, narrowing words, broadening words, and related words.



Also, be sure you think about that information you already know versus new information that you need. How can you eliminate background information sites and get to the point of your project?

**Select the Keywords.** Use words related to the type of information you seek.

- Select precise words and avoid common words such as the, of, and apply.
- If you're looking for teaching materials, use "lesson plan", "teacher guide", or "project ideas" in your search.
- If you're seeking a particular kind of teaching resource, use "web quest", "tutorial", or "tips" in your search. Search for earthquake+webquest.

- Students might use words such as "student projects", "examples", or "photographs".

**Search in Cycles.** View your search from different angles and approaches.

- If you're exploring information about the art of sculpture, you might do a series of searches the following combination of words: sculpture, sculptors, famous statues, carving, Alexander Calder, and even gargoyles.
- Try a variety of (at least three different) search engines, directories, and guides in your search. You might start with a general guide such as **About.com** and end with more precise tools such as **Google**.
- Broaden or narrow your search with operators. Keep in mind that different search tools use different operators. Many search engines assume that you're using the word AND between each word even if you don't enter it. Try to Explore so that you are going to learn on your own by committing mistakes and rectifying them.

#### Activity:

Explore the following web links

- Web Search Strategies Explained by Common Craft (VIDEO)
- <https://www.commoncraft.com/video/web-search-strategies>
- Search for a particular topic using the above mentioned strategies.

## ? Check your progress-5



State whether the following statements are True or False

1. Securing the pass word is one of the safe practices.

True  False

**True**

2. Browser is one of the hard wares to access Internet.

True  False

**False**

3. Google is one of the outdated types of browser.

True  False

**False**

4. Mozilla firefox is a fast, light and tidy open source web browser.

True  False

**True**

5. Internet Explorer has been created by Microsoft.

True  False

**True**

6. Safari is World's most innovative browser.

True  False

**True**

7. Internet browser's main function is to block the websites.

True  False

**False**

8. Extensions are online stores.

True  False

**True**

9. Selecting precise words is one of the strategies for searching.

True  False

**True**

10. Plugins are considered as third party library.

True  False

**False**



## 5.8 LET US SUM UP

- A network consists of two or more computers which are linked with each other in order to share resources (such as printers and CDs), exchange files, or allow electronic communications.
- Server is a powerful computer that provides one or more services to a network and its users. For example, file storage and email.
- LAN is a computernetwork that occupies relatively a very small area. Might be at home, office or school.
- Usually a LAN is limited to a single room, building or a small Campus with group of buildings.



- LANs are capable of transmitting data at very fast rates, much faster than data can be transmitted over a telephone line; but the distances are limited and there is also a limit on the number of computers that can be attached to a single LAN.
- A wide-area network (WAN) is a system of LANs connected with each other. A WAN covers a large geographical area. Most WANs are made from several LANs connected together. The world's most popular WAN is the **Internet**
- World Wide Web (WWW) is a software application or services that run on the internet .It is a collection of documents and resources. It is one of the fastest growing parts of the internet. It provides easy access to a huge range of information that is stored on computers around the world.
- Broadband Internet access: The term broadband includes a broad range of technologies, all of which provide higher data rate access to the Internet.
- Wi-Fi is a trade name for a wireless local area network (WLAN). Individual homes and businesses often use Wi-Fi to connect laptops and smart phones to the Internet. Wi-Fi is used to create city-wide and campus-wide wireless networks.
- Mobile Internet Dongles: A mobile dongle is, essentially, a small modem that connects to your computer through a USB interface. A mobile dongle allows you to access the internet via a 4G or 3G broadband connection.
- Navigation is a process of navigating a network of internet resources in the World Wide Web.
- Subject-specific sites will be selected by the teacher as per the requirement.
- While selecting the information we need to first decide what we want and accordingly with the help of the search engines we can go to specific website and select the information we want.
- The book, marking function allows you to save an internet address that you have visited. They are saved by name rather by address.
- Safe Practices: Secure your passwords, Prevent identity theft, avoid scams, keep your device clean, use secure networks, manage multiple accounts, know your goggle security and privacy tools etc.,
- A browser is software that is used to access the internet. A web browser is a computer program application found on all modern computers. The major web browsers are Firefox, Internet Explorer/Microsoft Edge, Google Chrome, Opera, and Safari.

## 5. 9 UNIT-END EXERCISES

1. As a teacher analyze the role of Internet in your regular class room teaching.
2. How are you going to give hands on experience for your students regarding safety usage of Internet? Suggest the action plan.
3. Suggest five projects and their action plan in your subject for which students need to use various applications of internet and have to submit a report.
4. On an experimental basis, try to conduct a class using mobile internet access and record the impact of the same. Analyze the results with that of conventional class room teaching.
5. Ask children to do a survey of Wi-Fi connections in their locality and interview the community about its usage and ask them to submit a report.

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4. [www.sfsu.edu/~teachers/workshops/webasateachingtool/Edresources.html](http://www.sfsu.edu/~teachers/workshops/webasateachingtool/Edresources.html)Educational Internet Resources/Search Strategies
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9. <http://www.ipl.org/div/aplus/specific.htm>
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- 

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## unit - 6 : Multimedia

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#### Structure

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### 6.1 INTRODUCTION

Today the use of computers, tablets, phones, projectors has become so extensive that it becomes impossible to imagine a world that existed without all these gadgets. In such a scenario you would certainly expect the teaching and learning process to have progressed beyond the chalk and talk method. The combination of the advances in hardware and software has resulted in enhanced learning facilities. Now one can sit in a classroom or in front of a computer and see images, animations, videos and graphics presented on a screen with music or sounds or can even interact with others in a virtual setting. This is multimedia learning which is developed on the premise that students can learn more deeply from well-designed multi-media materials than from traditional modes of communication. In this unit we will look at the meaning, types, tools and advantages of multimedia in education and see how this has made learning interesting and more meaningful.

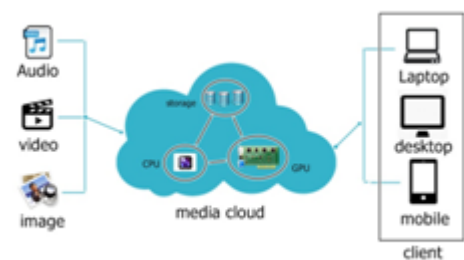
### 6.2 OBJECTIVES

After studying this unit, you will be able to

- define multimedia
- explain the elements of multimedia
- categorize the types of multimedia
- explain the process of multimedia production
- create and edit audio, video, text, images and graphics
- create educational multimedia learning material
- integrate multimedia resources in education
- use various hardware tools in creating and displaying multimedia resources
- develop criteria and evaluate educational multimedia resources
- explain the advantages of multimedia

### 6.3 MULTIMEDIA

Information which is stored in different forms could be combined and used in different combinations. Multimedia can be recorded and played, displayed, dynamic, interacted with or accessed by information processing devices, such as computerized and electronic devices. Multimedia devices are electronic media devices used to store and experience multimedia content. This process has given rise to the term 'Multi-media'. This combination of different media for communication has influenced and changed all aspects of our life, including the teacher and the learner. Multimedia has become an inevitable part of any presentation. We have seen that it has found a variety of applications right from entertainment to education. The evolution of internet has also increased the demand for multimedia content. Multimedia is a term used to describe how multiple means of media like text, audio, graphics, animation, video, and interactivity are used to communicate information. It is also often used to describe any computer media. This helps us to understand information at a faster rate.



#### 6.3.1 Meaning of Multimedia

Multimedia is defined in many ways. Most of the definitions agree on the characteristic that multimedia contains texts, graphics, animations, video and sound in an unified way and the content can be structured and presented differently. Let us explore some of the definitions given below.

“Multimedia is the exciting combination of computer hardware and software that allows you to integrate video, animation, audio, graphics, and text resources to develop effective presentations on an affordable desktop computer” (Fenrich, 1997).

“Multimedia is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program” (Phillips, 1997).

From these definitions we see that Multimedia is a concept which sees the use of text, graphic art, sound, animation, and video in different combinations. This integration of Media into one whole and that which gives the user more benefits than any one of the media used individually is Multimedia.

**Interactive Multimedia:** The Encyclopedia Britannica Online defines "Interactive Multimedia" as, any computer-delivered electronic system that allows the user to control, combine, and manipulate different types of media, such as text, sound, video, computer graphics, and animation. Interactive multimedia integrates computer, memory storage, digital (binary) data, telephone, television, and other information technologies. Their most common applications include training programs, video games, electronic encyclopedias, and travel guides. Interactive multimedia shift the user's role from observer to participant and are considered the next generation of electronic information systems.

#### Activity:

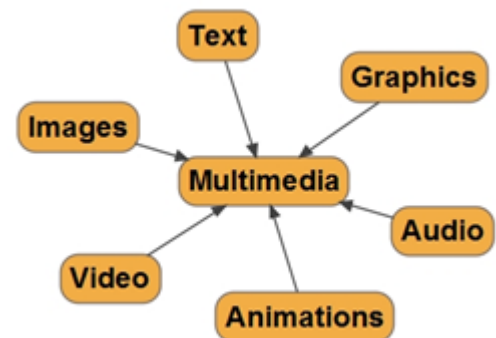
View this video on multimedia in education from the links here and discuss with your classmates.

1. <https://www.youtube.com/watch?v=SH73vNexb88>
2. <https://www.youtube.com/watch?v=LbEiBNQMg9U>

### 6.3.2 Elements of Multimedia

The different building blocks of Multimedia are Text, Images and graphics, Audio, Video, and Animation. Any multimedia application consists in any or all of them. Let us learn about each one of them

- Text - ASCII/Unicode, HTML, Postscript, PDF
- Audio – Sound, music, speech, structured audio (e.g. MIDI)
- Still Image - Facsimile, photo, scanned image, photographs, drawings, maps and slides
- Video (Moving Images) – Movie, a sequence of pictures
- Graphics – Computer produced image
- Animation – A sequence of graphics images



**1. Text:** Text and symbols are very important for communication in any medium. Using text in online training has many advantages: text files are small so they perform well at low bandwidth, the user can search for specific words or phrases, and text can be easily updated. You can create text directly within an authoring application or import it from external text files. Anti-aliasing enables you to create attractive text that blends into the background color without any jagged edges. Authorware, Director, and Flash all support anti-aliased text. Using anti-aliased text helps avoid having to create display text as a graphics file, which would make your overall course size much larger than if you simply entered text directly into the authoring tool.

**2. Images and Graphics:** Images play a very important role in a multimedia. It is expressed in the form of still picture, painting or a photograph taken through a digital camera. The points at which an image is sampled are known as picture elements, commonly abbreviated as pixels. The pixel values of intensity images are called grayscale levels. There are different kinds of image formats like the Captured Image Format and the format when images are stored. The captured image Format is known by two main factors that is spatial resolution which is specified as pixels x pixels (eg. 640x480)

and color encoding, which is specified by bits per pixel. Both factors depend on hardware and software for input/output of images. The Stored Image Format is when we store an image; we are storing a two-dimensional array of values, in which each value represents the data associated with a pixel in the image. These images can be edited with the help of few of the software like general drawing programs, JASC Paint Shop Pro, Corel Photo Paint, Macromedia Fireworks ,Art Rage: free (NZ) paint program simulating , Corel Draw , and Open Office / Libre Office Draw, GIMP, and Mypaint.

**Graphics Formats:** Most Web browsers can display GIF and JPEG graphics files. Web browsers that are version 4.0 or later can use the JPEG format for continuous-tone images, such as photographs and images that use color gradients. The PNG format was developed as a patent-free replacement for the GIF format. PNGs can use an alpha channel to define transparency in a graphic. Import PNG files into any of the Macromedia tools as an alternative to GIF files, especially if you need 24-bit graphics or graphics with transparency. Use this format in Web-native content only when delivering to newer browsers; some older browsers do not support the PNG format also display PNG graphics files. The two most popular graphic formats for online training and Web pages in general are GIFs and JPEGs. Both are bitmap files that are relatively small in size. The two formats compress images differently, each excelling at compressing different types of graphics. Using software such as Macromedia Fireworks, you can compare the file size of your graphics with various optimization settings to help you pick the best file format. Use the GIF format for line art and graphics that have large areas of a single color. Graphics saved in the GIF format can have one transparent color where JPEG graphics cannot. There are applications like format factory which helps us in converting graphics from one format to other.

**3. Audio:** Audio can enhance learning concepts and reinforce ideas presented as text or graphics on the screen. Using audio may be essential to the teaching of topics such as a foreign language or music appreciation. There are three types of audio assets that are commonly used in e-learning:

- Music
- Narration (voice-overs)
- Sound effects

Music demands a higher-quality and a wider sound-frequency range than narration and therefore produces larger files. Narrations generally have a smaller sound frequency range so it can be compressed more than music and still retain good sound quality. Sound effects are generally short so they don't have a large impact on the overall file size of an online course.

**Audio Formats:** The WAV and AIFF audio formats, popular on Microsoft Windows and Macintosh systems respectively, usually create files that are too large to use in an online course. Use one of the compressed formats with the goal of balancing small file size with acceptable quality audio. You have different options depending upon which authoring software you use. Both Shockwave Audio (SWA) used by Authorware and Director, and MP3, which is used by Flash are popular compressed formats useful for all three types of audio used in e-learning. The open source audio editing software like audacity is very popular tool for audio editing.

**4. Video:** Although video requires lots of bandwidth to download, it is very useful for conveying certain information. Using video in e-learning helps realistically demonstrate equipment and processes among other things. For instance, an e-learning course in botany might show a video of a sprouting seed. A course about the features of an airplane might show a video of a crewmember properly closing and securing a door for takeoff. The intricate level of detail visible in video is also ideal for illustrating subtle, nonverbal information. For example, to teach sales skills you could use a video to demonstrate an interaction between a salesperson and a customer, then have the learners analyze the body language of the people involved in the transaction.

**Video Formats:** There are three standard digital video formats: Quick Time, Video for Windows, and MPEG. Video files tend to be large so they really aren't appropriate for delivery on modem connections. You may choose to include video in your e-learning course if you are delivering it over an intranet or to users with relatively high bandwidth connections. There are many open source video editing tool and open shot is one such popular tool.

**5. Animation:** Animation illustrates concepts with movement, shows processes, or draws attention to a region or elements of a screen. Since animations usually involve graphics, they are highly dependent upon the size and file type of the graphics that are being animated.

**Animation Formats:** There are many ways you can create animations. Authorware, Dreamweaver, Director and Flash can all create animations. An animation created within an authoring program is usually smaller and more efficient than an animation created in another tool and then imported in your authoring program. This is particularly true when an animation is based on shapes created with the software's drawing tools rather than with imported bitmaps. For example, Flash excels at creating vector graphics and animations. Although Flash can animate bitmap graphics, animations made predominately with vector graphics in Flash are considerably smaller than animations created with bitmap graphics. Simple 2D animations can be created using open source tools like pencil or tupi and more advance tools like blender.

For more information go to the following link- <https://en.wikipedia.org/wiki/Multimedia>



## Activity



**Go to the following link and view the video on the use of Multimedia Presentation Tools which shows how the elements of Multimedia are used and enhanced with software tools**

<https://www.youtube.com/watch?v=ugYYX758obM>



### 6.3.3 Types of Multimedia

Multimedia may be broadly divided into Linear and Non-linear Multimedia.

In Linear Multimedia the active content progresses without any navigational control for the viewer. The viewer interacts with the multimedia application in which the content is sequentially arranged. The viewer does not control the progress of the content. In other words, the viewer is a passive receiver of the multimedia content most of the time. For example a movie uses a combination of audio, graphics and animations, but the viewer has no control over the sequence of events.

Non-linear Multimedia uses interactivity to control progress as with a video game or self-paced computer based training. It allows one to use the content according to ones wants. It is a two way communication. This communication can be controlled by using buttons, links and hypertext. Hypermedia is an example of non-linear content. It connects to different media elements such as audio and video. Multimedia presentations which are live or recorded are also Non-linear. A recorded presentation may allow interactivity via a navigation system. A live multimedia presentation may allow interactivity via an interaction with the presenter or performer.

### Different Types of Multimedia Interactivity

According to Reimann as stated in Andresen (2013), interactivity contains a broad range of possibilities for influencing the process of learning and the content of studies:

- *Manipulating objects* on the screen by mouse activities;
- *Linear navigating*: moving forward/backward on the screen;
- *Hierarchic navigating*: the possibility of selecting sites/content by using special menus;
- *Interactive help functionality*. This kind of help, which can be available through special menu buttons, is most effective when adapted to the topical presentation of information;
- *Feedback*: The program answers by giving an assessment on the quality of user activities. These answers are visible on the screen. The further course program may be dependent on this assessment, i.e. adaptability is established;
- *Communicative interaction*: The possibility of interaction with other persons, i.e. other users or 'friends' in social networks. Since, 'social networks consist of people who are connected by a shared object' (Zengestrom, 2005), networks can foster learning about these objects.
- *Constructive interaction*: The program provides an opportunity for constructing or configuring objects on the screen. For example, users have a possibility to actively create their own nodes and link models, i.e. they can add new nodes and new links between already existing nodes and in this way develop their own hypertext structure;
- *Reflective interactions*: The program stores the learner's individual activities for further analysis (e.g. a navigation path within a hypermedia lesson). Furthermore, the program can provide the learner with an 'expert path' or a 'guided tour';
- *Simulative interactivity*: Objects on the screen are linked together and exchange information in such a way that a particular configuration of objects produces 'behavior' of these objects (simulations of machines, simulations of social interactions, etc.);
- *Non-immersed contextual interactivity*: The learner is involved in an activity that implies a pedagogical purpose. Many edutainment applications (software which combines education and entertainment) and adventure games use this kind of interactivity (Scenario 3);
- *Immersed contextual interactivity*: This is virtual reality. Within virtual reality the user dives into a simulated three-dimensional world.

### 6.3.4 A brief History of Multimedia

Li and Drew (2004) in their book on fundamentals of multimedia have traced the history of multimedia as follows:

Year	Major Events
17 <sup>th</sup> Century	Newspapers, which were perhaps the first mass communication medium, using text, graphics, and images.
1830	Motion pictures were originally conceived of in the 1830s to observe motion too rapid for perception by the human eye
1887	Thomas Alva Edison 'commissioned the invention of a motion picture camera in 1887.
1895	In 1895, Guglielmo Marconi sent his first wireless radio transmission at Italy. A few years later (1901), he detected radio waves beamed across the Atlantic. Initially invented for telegraph, radio is now a major medium for audio broadcasting. In 1909, Marconi shared the Nobel Prize for physics.
1910	Silent feature films appeared from 1910 to 1927; the silent era effectively ended with the release of <i>The Jazz Singer</i> in 1927.
1926	Television was the new medium for the twentieth century. It established video as a commonly available medium and has since changed the world of mass communication.

1945	Vannevar Bush (1890-1974) wrote a landmark article describing what amounts to a hypermedia system, called "Memex." Memex was meant to be a universally useful and personalized memory device that even included in the concept of associative links - it really is the forerunner of the World Wide Web.
1960	Ted Nelson started the Xanadu project and coined the term "hypertext." Xanadu was the first attempt at a hypertext system - Nelson called it a "magic place of literary memory."
1967	Nicholas Negroponte formed the Architecture Machine Group at MIT
1968	Douglas Engelbart, greatly influenced by Vannevar Bush's "As We May Think," demonstrated the "On-Line System" (NLS), another early hypertext program.
1969	1969 Nelson and van Dam at Brown University created an early hypertext editor called FRESS- [4]. The present-day Intermedia project by the Institute for Research in Information and Scholarship (IRIS) at Brown is the descendant of that early system.
1976	The MIT Architecture Machine Group proposed a project entitled "Multiple Media." This resulted in the Aspen Movie Map, the first hypermedia videodisc, in 1978.
1985	Negroponte and Wiesner cofounded the MIT Media Lab, a leading research institution investigating digital video and multimedia.
1989	Tim Berners-Lee proposed the World Wide Web to the European Council for Nuclear Research (CERN).
1990	Kristina Hooper Woolsey headed the Apple Multimedia Lab, with a staff of 100. Education was a chief goal.
1991	MPEG-1 was approved as an international standard for digital video. Its further development led to newer standards, MPEG-2, MPEG-4, and further MPEGs, in the 1990s.
1991	The introduction of PDAs in 1991 began a new period in the use of computers in general and multimedia in particular. This development continued in 1996 with the marketing of the first PDA with no keyboard.
1992	JPEG was accepted as the international standard for digital image compression. Its further development has now led to the new JPEG2000 standard.
1992	1992 The first MBone audio multicast on the Net was made.
1993	The University of Illinois National Center for Supercomputing Applications produced



	NCSA Mosaic, the first full-fledged browser, launching a new era in Internet information access.
1994	Jim Clark and Marc Andreessen created the Netscape program.
1995	The JAVA language was created for platform-independent application development.
1996	DVD video was introduced; high-quality, full-length movies were distributed on a single disk. The DVD format promised to transform the music, gaming and computer industries.
1998	1998 XML 1.0 was announced as a W3C Recommendation.
1998	Handheld MP3 devices first made inroads into consumer tastes in the fall, with the introduction of devices holding 32 MB of flash memory.
2000	World Wide Web (WWW) size was estimated at over 1 billion pages

**Activity:**

Please view the video on history of technology in education from the link here <https://www.youtube.com/watch?v=UFwWWszX9s>

### Check your Progress – 1



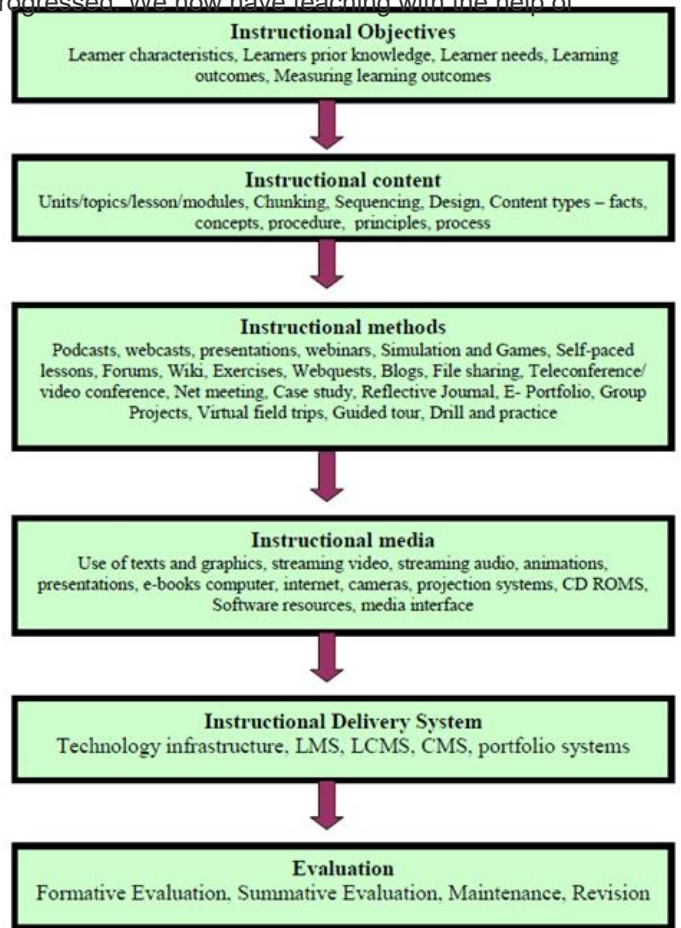
Fill in the blanks with suitable words

1. The different building blocks of Multimedia are Text, Images and graphics, Audio,  and
2. The points at which an image is sampled are known as picture elements, commonly abbreviated as
3. Multimedia may be broadly divided into  and  Multimedia.
4. There are three types of audio assets that are commonly used in e-learning they are Music,  and



### 6.4 DEVELOPING MULTIMEDIA

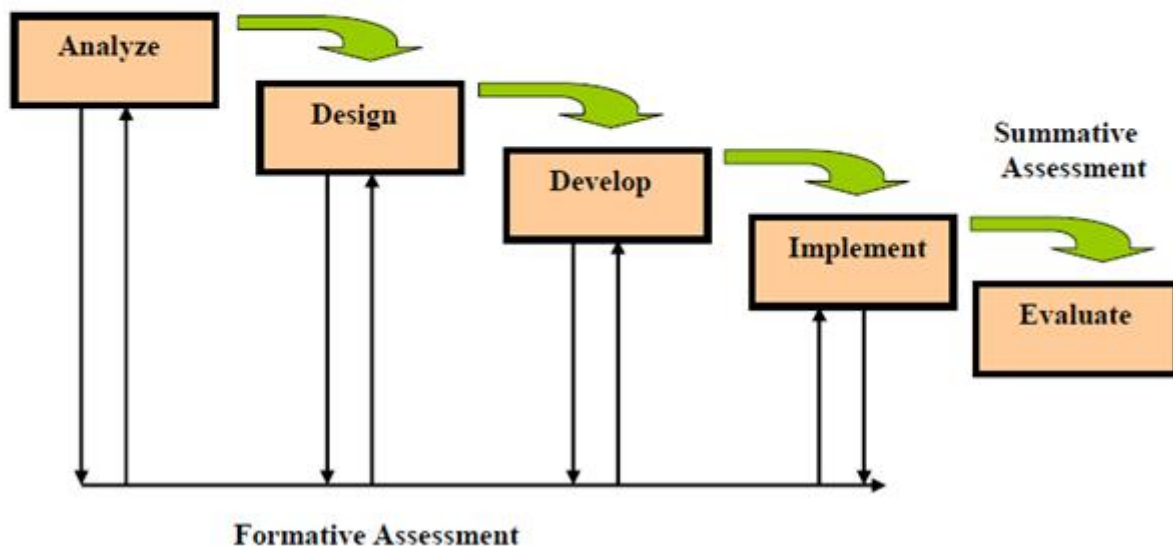
There has been a drastic change in the way teaching has progressed. We now have teaching with the help of Multimedia, a teaching machine and virtual classrooms. These changes are here to stay because of the availability of different types of Instructional media. The outlook of education has changed and the role of the teacher and the school has been redefined. Teachers are now facilitators using ICT based courseware. When we speak about Multimedia development, it includes the planned and organized use of all available materials which include all the elements of Multimedia viz Text, Audio, Image and Graphics, Video, Animations and all electronic and other media to achieve the goal of education in a most effective manner. Thus the development of Multimedia first focuses on the learners and what is required for them and of them. It involves planning instructional objectives, instructional content, instructional method, instructional media, how to deliver the content, and evaluation. There are many instructional design models for developing multimedia and what follows is the discussion of the one of the important design model ADDIE.



**6.4.1 ADDIE Model of Multimedia Development:** The instructional development model ADDIE is also appropriate for planning and developing multimedia resources.

**ADDIE** - This acronym stands for the 5 phases contained in the model:

- **Analyze** - analyze learner characteristics, task to be learned, etc.
- **Design** - develop learning objectives, choose an instructional approach
- **Develop** - create instructional or training materials
- **Implement** - deliver or distribute the instructional materials
- **Evaluate** - make sure the materials achieved the desired goals



Activity:

The following link from YouTube provides five different videos explaining each phase of ADDIE instructional model viz. Analysis, Design, Develop, implement, and evaluate. Please go through all these video to familiarize yourself with ADDIE model of instructional design.

<https://www.youtube.com/watch?v=JZdv5lrJs4U&list=PL20E84CD77B301A20>



**6.4.2 Interface Design Guidelines for Multimedia:** While designing the interface for multimedia content there are many design guidelines to be kept in mind. These guidelines and its explanations are provided in the following table.

Interface design guidelines	Explanations of Guidelines
<b>Promote the use of graphics</b>	User interfaces should include not only words, but a combination of words and graphics. In an eLearning course, graphics are not supposed to constitute simply decorative illustrations, but explanative illustrations
<b>Maintain the contiguity of related items</b>	In each screen of the course there should be an explicit connection among related information. The contiguity guideline is applied in the following ways <ul style="list-style-type: none"> <li>■ Text should be near the relative graphic, by placing graphics in a decreased size precisely next to the text, placing each piece of text exactly next to the piece of graphic it explains or using pop-up text boxes.</li> <li>■ Results and feedback should be in the same screen with the question.</li> <li>■ Hyperlinks information should not cover the information of the initial screen, but lead to a separate window.</li> </ul>
<b>Promote the use of audio in graphics description</b>	In cases where it is feasible, each time words and graphics are to be presented simultaneously, the instructional designer should use only oral narration and not words printed on the screen

<p><b>Provide appropriate navigation support</b></p>	<p>Information, actions and possible choices should always be visible and easily accessible to the user. Navigation through the course can be supported with one or more of the following choices [</p> <ul style="list-style-type: none"> <li>■ <i>Course map</i>, which presents the hierarchy of the course content.</li> <li>■ <i>Paths</i> that show exactly where the learner is at the moment.</li> <li>■ <i>Previous, next</i> and <i>exit</i> elements and <i>indications</i> of where the learner is at the moment.</li> <li>■ <i>Pop-up text boxes</i> that provide additional information.</li> <li>■ <i>Guided tour</i>, which demonstrates certain basic steps to navigate through the course.</li> <li>■ <i>Visibility</i> and <i>ease of exit</i> along with an explicit warning message</li> <li>■ <i>Descriptive names of links</i>, which function as an indication about the content to which they lead.</li> </ul>
<p><b>Attain eLearning content coherence</b></p>	<p>Coherence means uniformity in information presentation as well as in the possible actions of the learner during the entire course. In an eLearning course, coherence is enhanced when the instructor follows the following guidelines:</p> <ul style="list-style-type: none"> <li>■ Coherence in <i>links design</i>, so that it immediately indicates that it leads to another point of the course. This design should be the same during the entire course.</li> <li>■ Coherence in <i>screen structure</i>, so that navigation support elements are always in the same place</li> <li>■ Coherence in <i>screen design</i>, which means that the use of the various aesthetic choices should remain the same</li> <li>■ Coherence in <i>terminology</i> use, which means that terms used should always have the same meaning as far as the result of their use is concerned</li> </ul>
<p><b>Support interactivity</b></p>	<p>The text of each page should be relatively short and, if the instructor wants to provide more information, it is preferable to give it through links. This means that information is not presented in a linear way, but the learner can control information attainment, processing and presentation through links that contain the relative information. Interactivity can be applied in a course through:</p> <ul style="list-style-type: none"> <li>■ Links into the main content that leads to further information.</li> <li>■ Links that lead to the next page, along with short text on each screen.</li> </ul>
<p><b>Organize links to create a useful course menu</b></p>	<p>A menu is a set of options, displayed on the screen, where the selection and execution of one or more of the options result in a change in the state of the interface. Some guidelines for the effective use of a course menu are:</p> <ul style="list-style-type: none"> <li>■ <i>Menu classification and levels</i>. The elements that constitute the menu usually derive from the course structure and the course navigation elements. The selection of the course elements that constitute the menu and their classification</li> </ul>

	<p>depend on criteria of sound sequence, functional criteria, or even criteria of frequency of use. Elements that are common in many parts of the course are placed in a superior level menu.</p> <ul style="list-style-type: none"> <li>■ <i>Menu position.</i> Menu should be visible and accessible from any point of the screen and it should be placed in a way that it does not cover another part of the menu or an important part of the screen when it opens.</li> <li>■ <i>Minimising user steps.</i> While navigating through the menu or the links, learners should be able to have access to the desirable page after 2-3 steps at most.</li> </ul>
<b>Promote the use of common language</b>	The learning environment should contain words and phrases that the learner can immediately comprehend. The terminology used, the language and the visual representations should be compatible with the learner context. The dialogue and the presented information should not contain software terms.
<b>Provide help</b>	Help gives the learner the distinct steps to follow every time a problem arises. So, it should be available anywhere in the eLearning course. Learners should be able to consult help with easy, simple and standard steps. The return to the usual environment should be easy and obvious.
<b>Provide appropriate screen design</b>	<p>Screen design refers to the development of attractive and effective screens. Below, there are presented some guidelines that the instructor should follow in order to create useful and effective screens, along with the ways they can be applied (aesthetics):</p> <ul style="list-style-type: none"> <li>■ <i>The most significant information immediately distinguished.</i> This can be applied by using frames or white space, by selecting the appropriate colours and by using bullet points, numbering and font style.</li> <li>■ <i>Hierarchy.</i> The selection of the appropriate colours, white space, different bullet points, different fonts and sizes play an important role in the codification of different groups of data and help in the application of hierarchy.</li> <li>■ <i>Perception of the environment (Gestalt).</i> Font type and size constitute the main elements for the application of the gestalt guideline.</li> </ul>

Source: M.U.Paily.(2009). Instructional Design in E-learning. IGNOU:New Delhi



## 6.5 TOOLS FOR CREATING AND USING MULTIMEDIA

We know that one learns best by doing. When we are absorbed in constructing knowledge from a combination of different tools like the Digital Camera, Camcorder, Scanner ,Interactive white board or the Multimedia Projector we more likely to gain a clearer understanding of concepts and how these different tools are used to integrate various learning materials sequentially or non-sequentially. Let us learn about how these tools can be used in preparing Multimedia Learning Material. Please visit the links given with each tool to learn more



Name of the Tool	Description
<p><b>6.5.1 Digital Camera</b></p> 	<p>A <b>Digital Camera</b> is an electronic device that converts images and videos digitally and stores them for later reproduction. Most cameras that are used today are digital and are incorporated into many devices like mobile phones, tablets, laptops, vehicles and many other. Unlike film cameras, digital cameras can display images on a screen immediately after being recorded, and store and delete images from memory. The stored images can be uploaded to a computer immediately for printing or also stored in an external disc. Many digital cameras can also record moving videos with sound. Some digital cameras can crop and edit pictures. You can learn more about it by visiting the link below.</p> <p>(Source: <a href="https://en.wikipedia.org/wiki/Digital_camera">https://en.wikipedia.org/wiki/Digital_camera</a>)</p>
<p><b>6.5.2 Camcorder</b></p> 	<p>A <b>camcorder or a video camera recorder</b> is a transportable electronic recording device which is used in recording live-motion video and audio for later playback.</p> <p>Earlier the Camcorder used to be bulky and heavy using magnetic tape for the recording but now the digital video camcorders are smaller and lighter and have better picture quality and longer battery life. The important aspect of the recorded digital video is that it can be stored and transferred to a computer where you can edit with ease which allows you to change the order of shots and undo edits. This means that you can easily modify, draft and re-draft the recorded films and use it creatively to prepare Multimedia Learning Material</p> <p>(Source: <a href="https://en.wikipedia.org/wiki/Camcorder">https://en.wikipedia.org/wiki/Camcorder</a> )</p>
<p><b>6.5.3 Scanner</b></p> 	<p>A <b>scanner</b> is an input device that converts an image such as a photograph, textual document into an electronic digital form by a process called scanning. Most of the Scanners are flatbed and have a cover that can be lifted so that magazine, photographs and bulky books can be scanned. They work in combination of computer software programs which help in the creation of an electronic version of the scanned document, allows you to view it and edit it on a computer. Thus you can use and publish the stored image as it is or by modifying it.</p> <p>(Source: <a href="https://en.wikipedia.org/wiki/Image_scanner">https://en.wikipedia.org/wiki/Image_scanner</a> )</p>
<p><b>6.5.4. Interactive white Board</b></p>	<p>An <b>interactive whiteboard (IWB)</b> is a large interactive display that connects to a computer. A projector projects the computer's desktop onto the board's surface where users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand. They are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work</p>



groups, in training rooms for professional sports coaching, in broadcasting studios, and others.

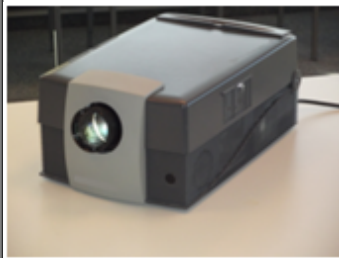
Examples of the characteristics accessible when using an interactive whiteboard:

- Add comments
- Highlight text
- Add notes and drawings and then save them to be printed out and shared, or added to a virtual learning environment.
- Show pictures and educational videos . Parts can be labeled or highlighted.
- Show the content on a website

(Source: [https://en.wikipedia.org/wiki/Interactive\\_whiteboard](https://en.wikipedia.org/wiki/Interactive_whiteboard) )

### 6.5.5.Multimedia

#### Projector



A **Multimedia Projector** or LCD Projector is a type of video projector for displaying video, images or computer data on a screen or any other flat surface. It is a modern equivalent of the slide projector or overhead projector. The presentation of visual media through projection is an effective way to entertain, educate, and communicate with people on a large scale. The use of Multimedia Projector can give the essence of the presentation in bullet points, It can bring the audio and visual inputs to the classroom, It can be projected on the screen allowing everyone to watch the presentation, It can be made interesting by using movies and such clippings and inputs planned elsewhere in the world can be brought into our own classrooms.

(Source: [https://en.wikipedia.org/wiki/LCD\\_projector](https://en.wikipedia.org/wiki/LCD_projector) )

## ? Check Your Progress – 2



Write the name of the Multimedia tool next to the image



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•



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## 6.6 USE OF MULTIMEDIA IN EDUCATION

Multimedia is used in many applications today. It has become integrated in all aspects of one's life. It improves the way people relate with electronic information. Today it has been widely used in the education sector. Teachers use multimedia in different ways for different levels of students. The different ways one can use it are for individualized instruction, collaborative learning, computerized assessments and Multimedia presentations. Technologies allow us to overcome limitations of time, distance, and physical capability, but they only empower us when they can be gracefully used by large, productive segments of our society. For example we see that open and distance learning is one area where many are taking advantage of the content and the courses that are delivered to the students. Some of the new concepts that are used by educationists are podcasting, webinars,, learning management systems and many more.

There are studies showing that learners who learn using Multimedia material have more retention of the concepts taught versus traditional modes of instruction and the student involvement was higher. It has also shown that learner's comprehension also increased with the concepts being taught with Multimedia material. The using and designing of Multimedia material by the learners also develop many skills, Connell, and Carver, Lehrer Ericksen (1992) list some of the major thinking skills that learners learn and use as multimedia designers.

- Project Management Skills
- Research Skills
- Organization and Representation Skills
- Presentation Skills
- Reflection Skills

### Project Management Skills

- Planning a timeline for the finishing of the project.
- Assigning resources and time to different parts of the project.
- Assigning roles to team members.

### Research Skills

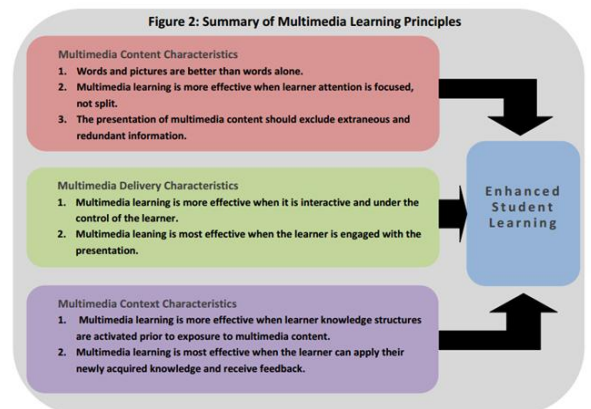
- Defining the nature of the problem and how research should be organized.
- Asking questions about structure, models, cases, values, and roles.
- Searching for material using text, electronic and pictorial information bases.
- Analyzing and interpreting all the information collected to identify and interpret patterns.

### Organization and Representation Skills

- Deciding how to section and classify information to make it understandable.
- Deciding how information will be denoted (text, pictures, movies, audio, etc.).
- Determining how the information will be systematized (hierarchy, sequence) and how it will be linked.

### Presentation Skills

- Mapping the design onto the presentation and implementing the ideas in multimedia.
- Attracting and maintaining the interests of the intended audiences.





## Reflection Skills

- Evaluating the program and the process used to create it.
- Revising the design of the program using feedback

### Activity:

Go to the following link and view the video on the use of Multimedia in Education

<https://www.youtube.com/watch?v=6AAHZA0RFYI>

## 6.7 ADVANTAGES OF MULTIMEDIA

Multimedia activities encourage students to work in groups, express their knowledge in multiple ways, solve problems, revise their own work, and construct knowledge. The advantages of integrating multimedia in the classroom are many. Through participation in multimedia activities, students can learn:

- Real-world skills related to technology
- The value of teamwork
- Effective collaboration techniques
- The impact and importance of different media
- The challenges of communicating to different audiences
- How to present information in compelling ways
- Tailor information to the needs of the individual
- Techniques for synthesizing and analyzing complex content
- The importance of research, planning, and organization skills
- The significance of presentation and speaking skills
- How to accept and provide constructive feedback
- How to express their ideas creatively

Multimedia also helps in increasing learning effectiveness and is more attractive over traditional, lecture-based learning methods. It also offers system portability and frees the teacher from routine tasks.



### Activity

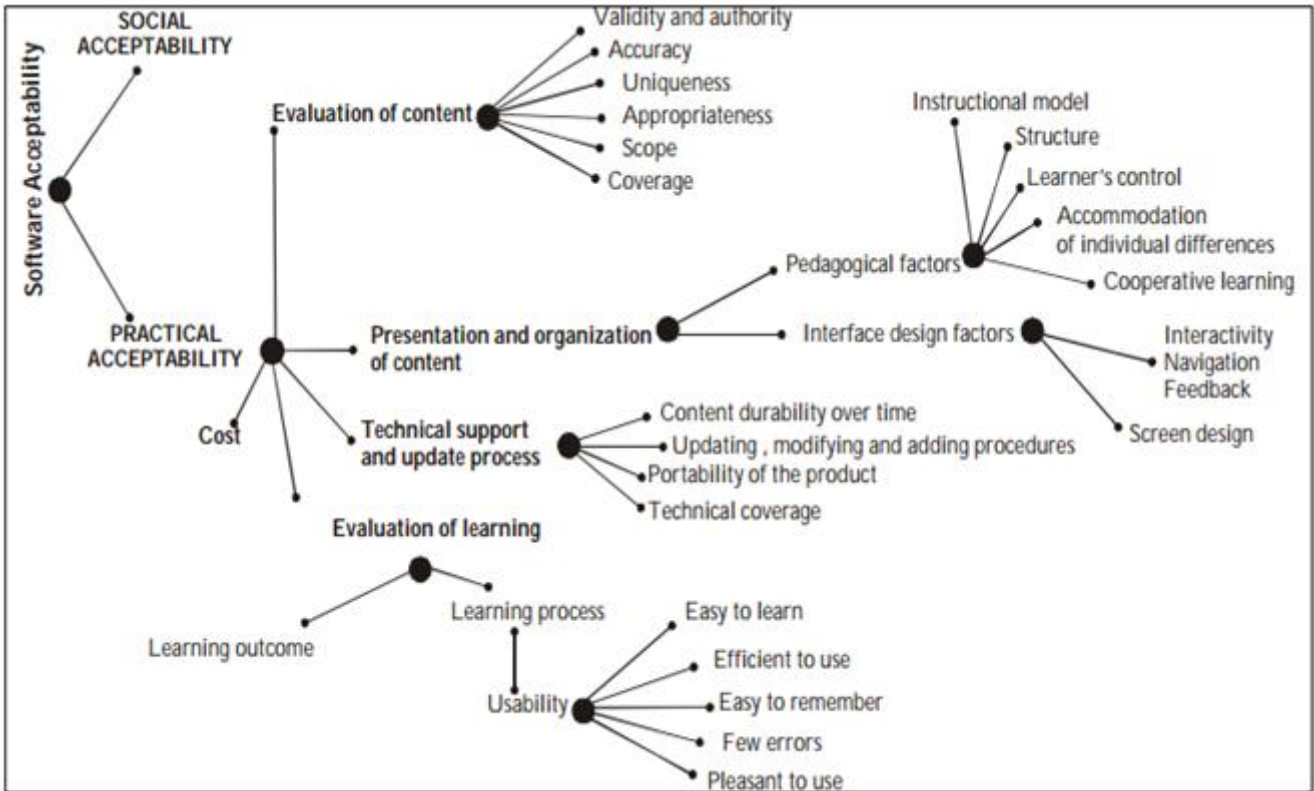
Explore the advantages of Multimedia in Education suggested by Jana Sosnowski in her article **Advantages and Disadvantages of schools using Multimedia**, at

<http://education.seattlepi.com/advantages-disadvantages-schools-using-multimedia-3099.html>

## 6.8 EVALUATION OF MULTIMEDIA RESOURCES

Evaluation of Multimedia Resources: Currently there are many multimedia resource available both online and offline by way of CD/DVD format. Selecting the right multimedia resources is very important for teacher, students, and parents. In order to make a sensible decision of choosing the best available resource one must use certain criteria for evaluating the multimedia resources. A short version of evaluation framework

Georgiadou, E ,Economides,A.A., Michailidou,A.(2001) presented a framework for evaluating educational multimedia and the shorter version of the same is given below:



Some of the major aspects for evaluating multimedia resources are content characteristics (accuracy, educational value, authority, currency and uniqueness), Instructional characteristics (purpose, objectives, presentation of content, level of difficulty, the text, graphics, video, colour, sound, user participation/interactivity, assessment), Technical characteristics (technical needs to use, design and navigation, user support materials, ease of operation). Detailed criteria for evaluating educational software/ multimedia based on the rubric by Kristine Miller and Jacqueline Bach (2001) is given below:

Software Evaluation Checklist Based on Rubric Developed by Kristin Miller and Jacqueline Bach, SAS in School @ Interns, Summer 2001		
Criteria	Exemplary Characteristics	Rating
Instructional Content	<ul style="list-style-type: none"> <li>■ Information is accurate, complete, and current</li> <li>■ Facts come from reliable sources which are clearly identified</li> <li>■ Content and context are consistent with the theme • All information relates to the stated purpose and learning goals</li> <li>■ Content moves learners beyond the basics and encourages higher levels of thinking; students are engaged in applying what they learn</li> </ul>	
Curriculum Connections	<ul style="list-style-type: none"> <li>■ National and state standards are accessible within the product and may be easily linked to lessons</li> <li>■ Lists all prerequisite skills</li> <li>■ Uses all real world examples to make the instruction relevant for the learner</li> <li>■ Complies with all subject based guidelines</li> </ul>	

Graphics/Multimedia	<ul style="list-style-type: none"> <li>■ Graphics are well designed and rendered to enhance learning</li> <li>■ Background and text are pleasing, compatible and easy to read</li> <li>■ Graphics are consistent, appropriate and designed to optimize learning</li> <li>■ Colors are used in an effective way</li> <li>■ Animation always complements learning</li> <li>■ Multimedia appears to be directly related to stated purpose and learning goals</li> </ul>	
Lay-out	<ul style="list-style-type: none"> <li>■ Layout is clear and intuitive; learners can always find what they need</li> <li>■ It is easy to navigate through the information to find necessary features</li> <li>■ Layout is logical</li> <li>■ Layout is consistent on all pages</li> </ul>	
Technical Aspects	<ul style="list-style-type: none"> <li>■ All links work properly</li> <li>■ Pages work in most common browsers: Netscape and Internet Explorer</li> <li>■ All multimedia resources work at all times</li> <li>■ Users are able to access web site or install software with ease</li> <li>■ Clear and complete directions are available for access or installation</li> </ul>	
Adaptability/Accessibility	<ul style="list-style-type: none"> <li>■ Hyperlinks have ALT tags for rollover to assist sight-impaired learners</li> <li>■ Paragraphs and sections have clear and accurate informative headings</li> <li>■ Clear and clean fonts are used consistently • Content is culturally diverse</li> <li>■ Product accommodates unique learning styles and various ability levels</li> </ul>	
1. Engagement/Interactivity	<ul style="list-style-type: none"> <li>■ Always requires learners to become actively engaged in order to learn</li> <li>■ Text and documents always employ multimedia enhancements to make learning interactive</li> <li>■ Provides appropriate feedback throughout the instruction</li> <li>■ Keenly motivates the learner to continue learning and master concepts</li> </ul>	
Teacher & Learner Support Materials	<ul style="list-style-type: none"> <li>■ Program offers help at any stage</li> <li>■ Provides various ways to reach technical support</li> <li>■ Program provides students with additional resources such as web sites, bibliographies, etc. which are suitable to lesson</li> <li>■ Teachers and students can easily track a student's progress through feedback or other documentation</li> </ul>	
Assessment	<ul style="list-style-type: none"> <li>■ Assessment methods are challenging, appropriate, and suited to</li> </ul>	

	<p>learning goals</p> <ul style="list-style-type: none"> <li>Teachers can easily assess students' progress by evaluating the outcomes provided within the product</li> </ul>	
Age/Grade Appropriateness	<ul style="list-style-type: none"> <li>Reading level is appropriate for target audience</li> <li>Product is suitable for the age and grade level</li> <li>Directions are clear and complete enough for students to perform required tasks</li> </ul>	
Flexibility	<ul style="list-style-type: none"> <li>Learners can save at regular intervals and re-enter the instruction at any point</li> <li>All aspects of the software can be easily integrated into classroom activities</li> <li>The program features activities for use in whole class instruction, individual, or group learning experiences</li> </ul>	
<b>Comments</b>	<b>Overall Rating</b>	

Source: SASinSchool.com retrieved from <https://www.ncsu.edu/midlink/sw.checklist.pdf>

**Activity:** select a multimedia CD/DVD or a multimedia content from the website in your own subject area and evaluate this multimedia package based on the criteria so far discussed and share your evaluation report in the blog.

## Check Your Progress – 3

### Fill in the blanks with suitable words

- The evaluation phase has two aspects namely  And
- Planning a timeline, assigning roles to team members and managing the resources and time are related to developing  skill.
- helps in increasing learning effectiveness over traditional, lecture-based learning methods .

## 6.9 LET US SUM UP

- Meaning of Multimedia.....“Multimedia is the exciting combination of computer hardware and software that allows you to integrate video, animation, audio, graphics, and text resources to develop effective presentations on an affordable desktop computer” (Fenrich, 1997).
- Elements of Multimedia- The different building blocks of Multimedia are Text, Images and Graphics, Audio, Video, and Animation. Any multimedia application consists any or all of them.

- Types of Multimedia - Multimedia may be broadly divided into linear and non-linear categories Linear and Non-linear Multimedia
- Developing Multimedia- This includes four areas. They are Planning and Costing ,Designing and Producing, Testing and Delivering
- Tools for Creating and Using Multimedia- Different tools can be used in preparing Multimedia Learning Material. They are Digital Camera, Camcorder, Scanner, Interactive White Board and Multimedia Projector
- Use of Multimedia in Education-Multimedia is used in many applications today. It has become integrated in all aspects of one's life. It improves the way people relate with electronic information. The use and development of Multimedia material helps to develop the following skills-Project Management Skills, Research Skills, Organization and Representation Skills, Presentation Skills, Reflection Skills
- Advantages of Multimedia-Multimedia activities encourage students to work in groups, express their knowledge in multiple ways, solve problems, revise their own work, and construct knowledge.Multimedia also helps in increasing learning effectiveness and is more attractive over traditional, lecture-based learning methods. It also offers system portability and frees the teacher from routine tasks.
- Evaluation of Multimedia Resources-Evaluation provides evidence to help improve our programs and activities. Information on whether goals are being met and on how different aspects are working is essential to a continuous improvement process. Evaluation also frequently provides new insights or new information that was not anticipated. It helps in improving the Multimedia product and measures its effectiveness. The evaluation of the Multimedia material benefits the learners and helps to guarantee that they receive the highest quality Multimedia material.

## 6.10 UNIT END EXERCISES

1. Define Multimedia
2. Explain the elements of Multimedia
3. Develop Criteria and evaluate Multimedia resources
4. Discuss the principles of E-Learning and the Science of Instruction given by Clark and Mayer.

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## Unit - 7 : E-Learning

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#### CRITICAL UNDERSTANDING OF ICT

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#### Structure

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7.9 Let us Sum up

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## 7.11 References

### 7.1 INTRODUCTION

I am sure you have frequently encountered the words like, e-government, e-health, e-shopping, e-business, e-commerce, e-books, e-libraries, e-learning and so on. Almost everything today has gone electronic, while a few years ago World Wide Web was considered a Privilege, today it is a necessity. Everyone can use and learn from electronic devices. ICT today has the power to transform Education. The new millennium heralds exciting opportunities to diversify the ways in which education is offered. A greater flexibility is provided through online access to learning – when, where and how to do it?

Today anyone can obtain education anywhere, anytime through online education. Thus, breaking the shackles of traditional classroom and adapting to new and electronic learning Technologies empowers all learners irrespective of their diversities. This development in ICT has resulted in a learning environment called e-learning.



### 7.2 OBJECTIVES

After Studying this Unit, you will be able to

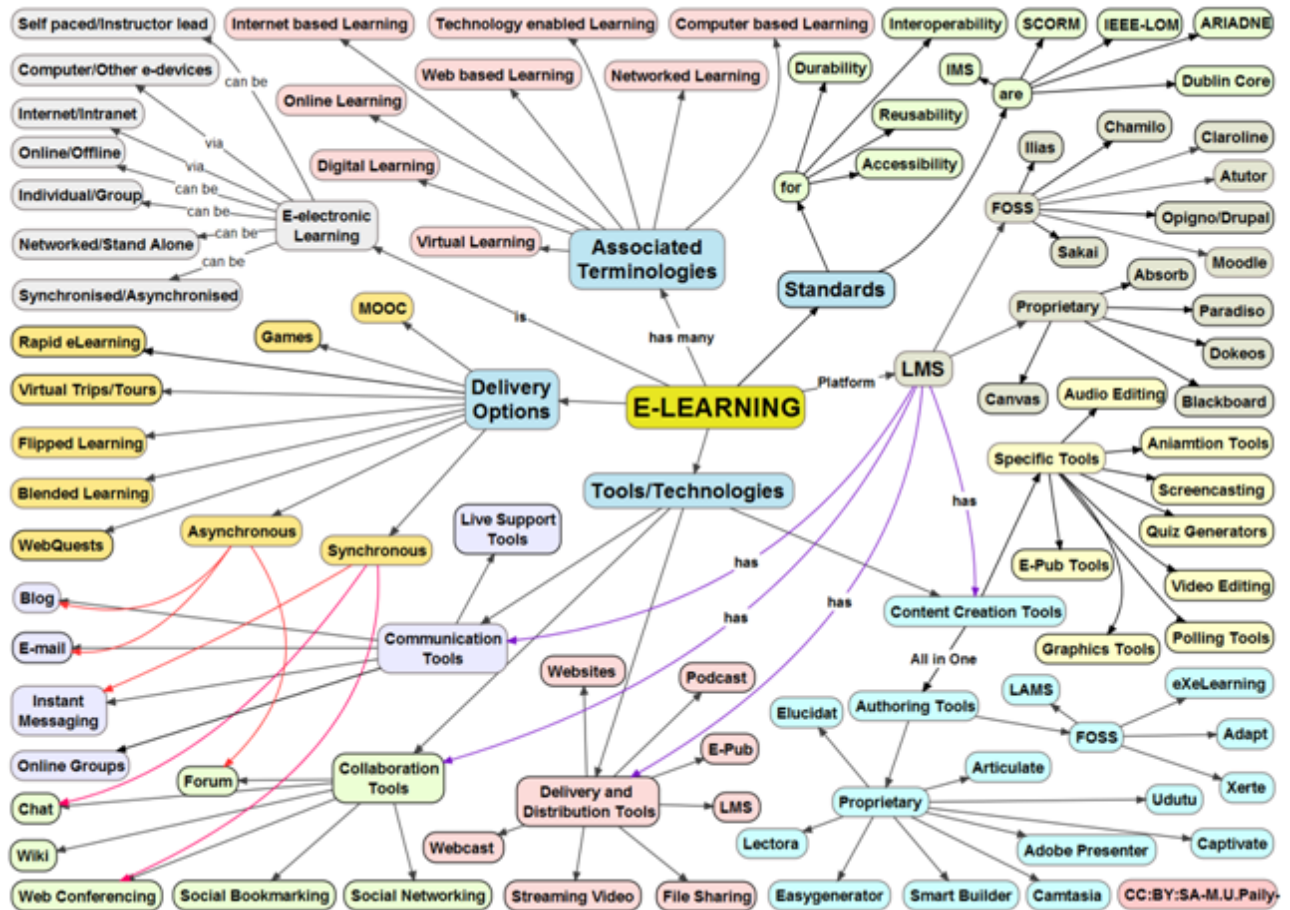
- sketch the History of e-learning
- define e-learning and blended learning
- explain the Characteristics of e-learning
- distinguish between Synchronous and Asynchronous e-learning
- classify the e-learning Technologies
- explain the features of Learning Management System(LMS)
- differentiate LMS from LCMS
- list the advantages and Limitations of e-learning
- list examples of different Learning Management Systems
- use learner management system
- explain the importance of e-learning standards

### 7.3 E-learning - CONCEPT AND CHARACTERISTICS

What is eLearning? E-learning is essentially imparting education through computer and network enabled digital technologies which include among other things, internet, intranet, computer, satellite TV, CDROM, audio and video resources. The term e-learning was first used in the professional environment in the year 1999 at CBT Seminar at Los Angeles. Therefore e-learning could be broadly defined as use of Information and Communication Technology (ICT) to enhance and support learning. This could range from teachers and students using e-mail for communication to entirely online courses. This term is used synonymously with virtual learning, online learning, computer based learning, web based learning, and networked learning. Whatever may be the definition of e-learning, it is currently changing the way schools and colleges teach and the students learn

The graphic below by M.U.Paily, gives an overview of e-learning by looking in to the associated terminologies, elearning standards, elearning delivery options, tools and technologies, and learner management system.





### 7.3.1 Definition of E-learning

E-learning is defined by many people, in many ways, since the term e-learning is used inconsistently, in order to gain a clear understanding of what e-learning is, here are a few definitions of e-learning.

The letter "e" in e-learning stands for the word "electronic", e-learning would incorporate all educational activities that are carried out by individuals or groups working online or offline via networked or standalone computers and other electronic devices.

- Brandon Hall defines E-learning as: "...instruction that is delivered electronically, in part or wholly via a Web browser, through the Internet or an intranet, or through multimedia platforms such as CD-ROM or DVD."
- Rosenberg: "E-learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance." Rosenberg claims that e-learning is based on three fundamental criteria:

- E-learning is networked, instant updating, storage and retrieval, distribution and sharing of information is therefore possible.
- E-learning is delivered to the end-user via a computer using standard internet technologies.
- E-learning focuses on the broadest view of learning: Learning solutions going beyond the traditional paradigms of training.
- E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material. (Derek Stockley 2003)

- Allison Rossett (2001) defines e-learning as: Web-based training (WBT), also known as e-learning and on-line learning, is training that resides on a server or host computer that is connected to the World Wide Web.
- "E-learning refers to educational processes that utilise information and communications technology to mediate synchronous as well as asynchronous learning and teaching activities" (Jereb & Šmitek, 2006)



- "E-learning is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration" (Alonso et al., 2005).
- "E-learning is the delivery of education (all activities relevant to instructing, teaching, and learning) through various electronic media" (Koohang & Harman, 2005)

Thus, E-Learning is the use of technology to enable people to learn anytime and anywhere. E-learning can include training, the delivery of just-in-time information and guidance from experts. E-learning could also be considered distance education in an evolved form, which has taken advantages of all the emerging technologies for enhancing learning experiences of every learner. In that sense e-learning could be considered as a new generation of distance education.

**Activity:** Listen to the video on You tube link <https://www.youtube.com/watch?v=Cw8WyHL-HLE> . Here, Dr. Mark Bullen, Education Specialist for e-learning at the Commonwealth of Learning explains his perspective on the meaning of e-learning. Note down the definition of e-learning given by Dr.MarkBullen in the video

### 7.3.2 Characteristics of E- learning

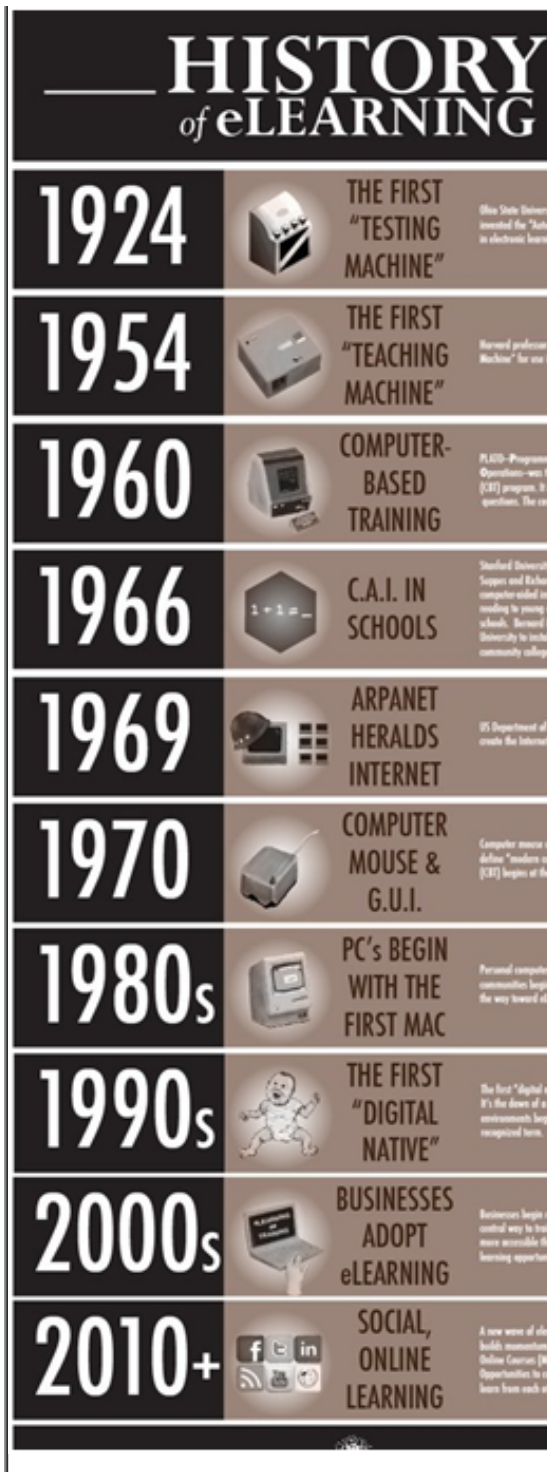
- **E-learning is Learner-Centric Learning:** The learner centric e-learning model makes an array of resources available to the learner, who is free to choose when, where and how to learn.
- **E-learning for lifelong learning:** With increasing access to technologies and its ever increasing sophistication this approach to learning facilitates lifelong learning among various stake holders.
- **E-learning is Flexible Learning:** E-learning has historically been linked with distance education and flexible learning. In distance education, various technologies can be used to link learners, instructors and resources that are removed in time or space. The hallmark of flexible learning, as its name suggests, is its adaptability to learners' needs and circumstances.
- **E-learning is Social:** E-learning seeks to foster collaboration and peers interaction. Various e-learning technologies facilitate various types of collaboration among learners and teachers.
- **E-learning Involves Learning Objects:** E-learning uses reusable learning objects. This RLO permits one to create e-learning course with ease.
- **E-learning is Personalized:** Usually e-learning system permits its users to personalize the learning by tailoring its offerings to their learning style, job requirements, career goals, current knowledge and personal preferences.
- **E-learning Involves Effective Communication:** The effectiveness of e-learning also depends on establishing two-way communication between teachers and learners, and among learners themselves. There are many standalone tools as well as learner management system integrated tools to foster interactive and collaborative engagement.



### 7.3.3 History of E- learning

Although e-learning has been around for decades, it has seen exponential growth in the last years, mainly because of the growth of the Internet. A short history of eLearning is placed below based on the work of Roberta Gogos (2016).

	In the early 1920s Sidney Pressey developed a machine to provide drill and practice items to students in his introductory courses
	During the 1950s Skinner presented the content in small, related chunks of information. Skinners Programmed Instruction was very



popular and at this very moment, programmed instruction was popular when it comes to digital self-study courses

PLATO- Programmed Logic for Automated Teaching Operations- was the first computer based training (CBT) programme. It offered the drills and the ability to skip questions

Stanford University Psychology professor Patrick Suppes and Richard Atkinson began using computer aided instruction (CAI) to maths and readings to young children. Stanford worked with this university to install the first computer in a community college for instructional work

US department of defence commissioned ARPANET to create the internet

Computer mouse and the GUI are invented helping to define modern computing. Computer based training begins at New Jersey institute of Technology

Personal computer era begins with Macintosh. online communities begin sharing information, slowly paving the way for eLearning

The first digital natives are born. Email takes off. It's the dawn of a new era of learning. Virtual learning environments begin and eLearning becomes a widely recognized term. LMS emerge by the end of 1990s

Businesses begin rolling out eLearning courses as a central way to train workers. Authoring tools are more accessible than ever and a wide range of online learning opportunities emerged

A new wave of eLearning inspired by social media builds momentum. YouTube, twitter, MOOC etc. emerges. opportunity to connect, share information and learn from each other are found everywhere

You can view the video on history of eLearning here <https://vimeo.com/116639145>

## ? Check your Progress – 1



Fill in the blanks with suitable words

- The letter "e" in e-learning stands for the word
- The term e-learning was first used in the professional environment in the year  at
- E-learning refers to the use of  technologies to deliver a broad array of solutions that enhance knowledge and performance.

4. E-learning involves systems based on much smaller units of content known as

Submit

## 7.4 APPROACHES TO ELEARNING

E-learning can be provided in many ways as given below

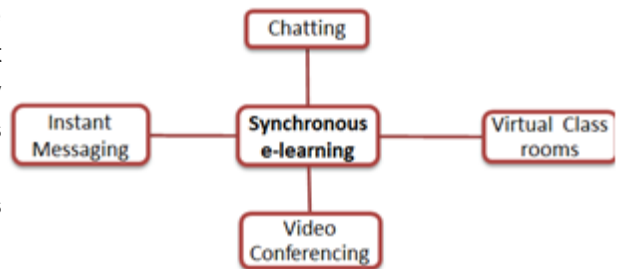
- Synchronous versus Asynchronous
- Networked versus Stand alone
- Individual versus Group
- Online versus Offline
- Internet versus Intranet
- Computer based versus Other digital devices
- Blended versus Fully online
- Self-paced versus Instructor lead

Some of these approaches are explained below:

### Synchronous E-learning

In Synchronous e-learning, communication occurs at the same time between individuals and information is accessed instantly. It is characterized by real time, simultaneous and two way communication. This is commonly supported by media such as Video Conferencing, Virtual Classrooms and Chat sessions. The most familiar form of synchronous electronic communication is real time two way text-based online chat, which is widely used in e-learning. More sophisticated forms of synchronous instruction

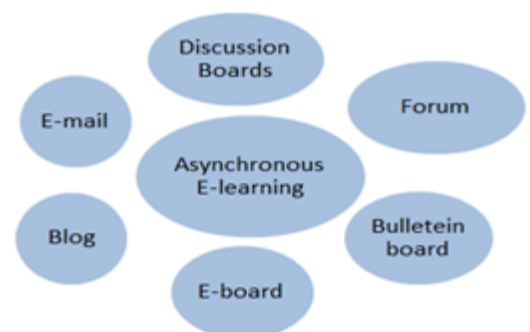
include virtual classrooms, which use information and communication technologies to mimic a traditional classroom environment. This may involve video-conferencing or the use of shared electronic whiteboards, which allow learning materials to be created and modified in real time, either by the instructor or the learners. Learners and Teachers experience synchronous e-learning as more social and avoid frustration by asking and answering questions in real time. Synchronous sessions help e-learners feel like participants rather than isolates.



### Asynchronous E-learning

As you are familiar with the use of e-mail which is also a two way communication, here the flexibility is that the sender and receiver of the message need not be online at the same time. You can check your e-mail at your convenient time. Thus Asynchronous means you need not be online at the same time. This Asynchronous E-learning is commonly facilitated by media such as e-mail and discussion boards, supports work relations among learners and with teachers, even when participants cannot be online at the same time. It is thus a key component of flexible learning. Asynchronous instruction allows participants to control their own timetables and fit learning

around their other commitments. This is a major bonus, especially for adult learners. Asynchronous e-learning makes it possible for learners to log on to an e-learning environment at any time and download documents or send messages to teachers or peers. Students may spend more time refining their contributions, which are generally considered more thoughtful compared to synchronous communication. Many of the technologies used in asynchronous e-learning also



permit two way communication between learners and instructors, or multi-directional, collaborative communication among learners themselves.

**Blended Learning:** In blended learning e-learning is being combined with traditional classroom methods and independent study to create a new, hybrid teaching methodology. Many use terms like hybrid, mixed, or integrative to describe the same trend. In a blended-learning course, for example, students might attend a class taught by a teacher in a traditional classroom setting, while also independently completing online components of the course outside of the classroom. In this case, in-class time may be either replaced or supplemented by online learning experiences, and students would learn about the same topics online as they do in class—i.e., the online and in-person learning experiences would parallel and complement one another.

The blended learning will have the essential requirement of

- In-person classroom activities facilitated by a teacher
- online learning materials provided through a website, bog, or LMS
- structured independent study and assignments both face to face and online mode

Blended learning can provide the convenience, speed and cost effectiveness of e-learning with the personal touch of traditional learning. Students can prepare for, consolidate and recall classroom experiences online, while gaining the benefits of interaction with teachers and students via an actual or virtual classroom. Student learning and retention rates improve without sacrificing the convenience, cost-effectiveness and customization of self-paced Web-based coursework.

**Individual versus group:** Individualized e-learning refers to situations where an individual learner is accessing learning resources such as a database or course content offline or online via an Intranet or the Internet. A typical example of this is a learner studying alone or conducting some research on the Internet, local network or using a CD or DVD. In group-based e-learning refers to situations where groups of learners are working together in real time or with time delay via an Intranet or the Internet. It may include text-based conferencing, online discussion forum, electronic mailing, and one or two-way audio and videoconferencing. Examples of this include learners engaged in a real-time chat or an audio-video conference.

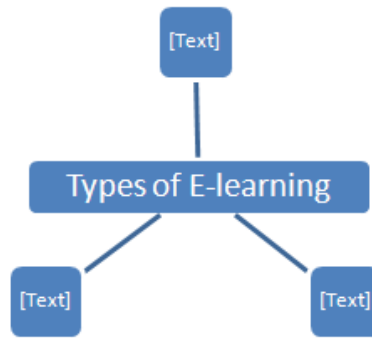
**Self-paced versus Instructor Lead:** In self-paced approach the e-learning courseware is usually made available through an online learning platform or on CD-ROM. Learners are free to choose the learning activities and learn at their own pace based on individual needs and interests. E-learning content is developed according to a set of learning objectives and is delivered using different media elements, such as text, graphics, audio and video. It must provide as much learning support as possible (through explanations, examples, interactivity, feedback, glossaries, etc.), in order to make learners self-sufficient. Whereas in instructor lead, the course is scheduled and led by an instructor and/ or facilitator through an online learning platform. E-learning content for individual study can be integrated with instructor's lectures, individual assignments and collaborative activities among learners. Learners, facilitators and instructors can use communication tools such as e-mails, discussion forums, chats, polls, whiteboards, and application sharing and audio and video conferencing to communicate and work together. At the end, a final step typically includes an exercise or assessment to measure learning.



## Check Your Progress –2

Fill in the Diagrams with appropriate words





Click to view the answer



## 7.5 E- LEARNING TOOLS AND TECHNOLOGIES

E-learning is a flexible learning environment which serves a number of individual and organizational purposes by making use of a number of technologies. There are many tools and technologies essential for e-learning and many of these tools come in handy as a standalone to deliver learning using variety of approaches to e-learning. In addition we also have many Learning Management Systems which integrate many of the individual tools into a single platform to develop and deliver online learning. A comprehensive list of e-learning tools and technologies are provided in the following table.

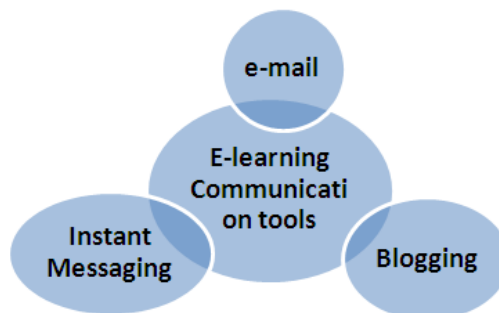
### E-learning Tools and Technologies

<p><b>Content creation tools</b></p> <ul style="list-style-type: none"> <li>○ Tools for creating avatars (virtual characters)</li> <li>○ Course and lesson authoring tools</li> <li>○ E-book tools</li> <li>○ Graphics and animation tools</li> <li>○ Image galleries and sound effects libraries</li> <li>○ Assessment tools</li> <li>○ Pdf tools</li> <li>○ Video and simulation tools</li> <li>○ Web page authoring tools</li> <li>○ Survey and polling tools</li> </ul> <p><b>Delivery and distribution tools</b></p> <ul style="list-style-type: none"> <li>○ Podcasting tools</li> <li>○ RSS tools</li> <li>○ Web casting and streaming tools</li> <li>○ Presentation tools</li> <li>○ Mobile learning tools</li> </ul> <p><b>User Tools</b></p> <ul style="list-style-type: none"> <li>○ Operating system</li> <li>○ Browsers</li> <li>○ Media players</li> <li>○ Plug ins</li> <li>○ Pdf reader</li> <li>○ Word processor</li> </ul>	<p><b>Communication and Collaboration Tools</b></p> <ul style="list-style-type: none"> <li>○ Discussion boards and forum tools</li> <li>○ E-mail tools</li> <li>○ Live support tools</li> <li>○ Meeting and teleconferencing tools</li> <li>○ Instant messaging and chat tools</li> <li>○ Social networking tools</li> <li>○ Social book marking and file sharing tools</li> <li>○ Wiki tools</li> </ul> <p><b>E-learning Systems</b></p> <ul style="list-style-type: none"> <li>○ Content management systems</li> <li>○ Learning management systems</li> <li>○ Course management systems</li> </ul> <p><b>Hardware Tools</b></p> <ul style="list-style-type: none"> <li>○ PC/laptop/ net book</li> <li>○ Smart phones/ palmtop computer</li> <li>○ Printer / scanner/ speaker</li> <li>○ Microphone /speaker/ web ca7</li> </ul>
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Source Paily.M.U.(2010)

### 7.5.1 Communication Tools

As you are aware, modern technology provides us with a plethora of options for communicating. The most common Communication tools used in e-learning include, e-mail, Instant Messaging and Blogging.



**E-mail:** E-mail stands for electronic mail; e-mail is defined as the transmission of messages over communication networks. There are many e-mail service providers and the most famous ones are Yahoo mail and G mail. Exchanging-mail messages with a mentor or peer is an e-learning experience.



**Instant Messaging(IM):** Instant messaging is the exchange of text messages through a software application in real-time. Instant messaging allows learners to chat with one another through text messages. This has become very popular as here, everything is performed in a faster, more reliable and cohesive manner. Instant messaging helps teachers to create subject specific groups for exchange of information and sharing of



resources. Instant messaging applications like WhatsApp are extensively used by teaching community as reliable communication tool.

**Activity:** Create a WhatsApp group of learners from your methodology subject and have regular discussion on your learning and share resources.

**Chat:** Chat is synchronous communication tool facilitating online communication. This tool helps teachers and learners to schedule a discussion on a particular question or theme and later save the chat discussion for later use. The chat tool is an integrated tool in all the LMS and there are many standalone chat applications which can be used outside the LMS.

**Blogging:** A blog is your own website that you are going to update on an on-going basis. A blog is a frequently updated online personal journal or diary. It is a place to express yourself to the world and to share your thoughts and your passions. In blogs entries are commonly displayed in reverse-chronological order. Most blogs are interactive, allowing visitors to leave comments and even message each other via widgets on the blogs and it is this interactivity that distinguishes them from other static websites. Many blogs provide commentary or news on a particular subject; others function as more personal online diaries. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. The ability of readers to leave comments in an interactive format is an important part of many blogs. Most blogs are primarily textual, although some focus on art (art blog), photographs (photo blog), videos (video blogging), music (MP3 blog), and audio (podcasting).



### 7.5.2 Collaboration Tools

All around the globe we are witnessing the transition towards collaborative learning. The benefits of collaborative learning are immense. It lets the learners gain from the experience of their peers and help them acquire and retain information in a more involved and engaged way. Thus, we see most of the e-learning is also social. The learners learn through collaboration with peers in smaller or larger groups. The e-learning



technology offers a number of collaboration tools to learn from one another, to work on assignments, Projects in groups and the like. Some of the popular collaboration tools include Chat, forum, wiki, online groups, audio/video conferencing, social bookmarking and social networking.

Collaborative learning forums promote learner interaction through message boards, where students can post questions and answers; text chat or forums, where learners can communicate outside the main classroom; and threaded discussions, where facilitators and students can discuss a given topic and review each other's responses.

**Wiki:** A wiki is a collaborative web site that collects and organizes content, created and revised by its users. The most well-known example is Wikipedia. Wikis are a way to grow a knowledge base around a particular content area, be it best practices in a particular field or how to use a specific piece of software. There are many software which help to create online wiki and one of the most famous one among that is Wordpress. Wiki is also a feature available in all the Learner Management System. In an e-learning context wiki permits teachers to give many kind of task to the learners to collaborate and create content on any topic. Wiki platforms are used extensively to create and share open educational resources and in Karnataka the KOER initiative is developed on a wiki platform.



**Social Bookmarking:** A social bookmarking service is a centralized online service which enables users to add, annotate, edit, and share bookmarks of web documents. Social bookmarking websites enhance and improve the



learning experiences by encouraging group collaboration. They also help in organizing and saving web resources faster and easier for students. Social bookmarking services offer greater scope for research, integration, and collaboration compared to the more traditional bookmarking applications such as browsers, which offer limited functionality. There are many services which are available freely for creating and sharing social bookmarks and most famous among them are Diigo, Delicious, and StumbleUpon. Teachers can create social bookmarks of resources chapter wise and invite other teachers to contribute and annotate. The social bookmarks thus created can be shared with the learners and teachers can also give assignments to learners to collaboratively build social bookmarks related to a particular topic.



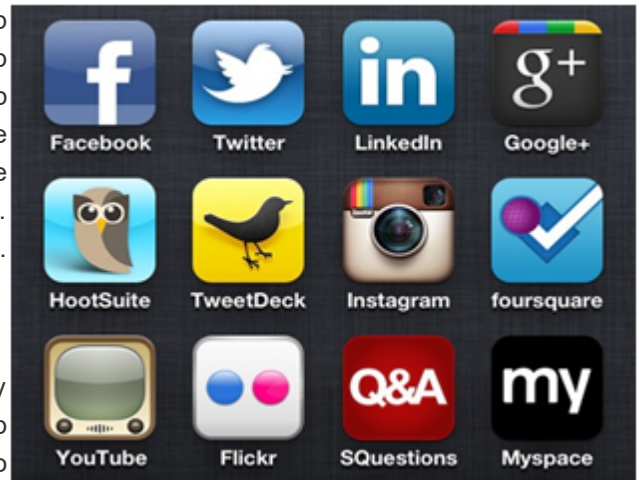
**Activity:** Create an account in social bookmarking site diigo and create bookmarks of five sites related to your subject, annotate the same and share with your colleagues

### Social Networking Sites

Social Networking site is the phrase used to describe any Web site that enables users to create public profiles within that Web site and form relationships with other users of the same Web site who access their profile. Social networking sites can be used to describe community-based Web sites, online discussions forums, chatrooms and other social spaces online. Examples include Facebook, twitter, LinkedIn , Google+ etc. (Source:

<https://www.flickr.com/photos/gavinjllewellyn/6235070321> ) .

Social networking can be used effectively for e-learning by creating specific interest groups. The learners within this group can share information, photographs, videos, graphics related to a particular topic. This can also be used by teachers to collaborate in generating and sharing resources online with ease thereby facilitating learning.



**Web Conferencing:** Web conferencing is highly interactive, Internet-based applications with a rich collaboration feature set (e.g. audio/video from presenters and learners, application sharing, white boarding and markup tools, breakout rooms, polling, quizzing, hand raising and emoticon responses, slides and media, Web site tours, public/private text Chat). It is capable of scaling from small groups to hundreds or thousands of simultaneous users. In "synchronous e-learning," we refer to Web conferencing. Web conferencing technologies offer tremendous potential for robust interactivity and collaboration through their versatility and rich feature options. There are many online tools for organizing video/web conferencing to facilitate collaborative learning. Applications like BigBlueButton.

Following are the some of the features of BigBlueButton





### Chat

You can interact with students through public and private chat.



### Polling

You can poll students anytime to increase engagement.



### Emoji

Students can raise hand and use emoji icons for feedback.



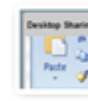
### Record and Playback

BigBlueButton can record your sessions for later playback by students



### Whiteboard

The whiteboard controls let you annotate key parts of your presentation.



### Desktop Sharing

You can broadcast your desktop for all users to see (requires latest version of Java for presenter only).



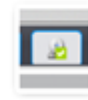
### WebRTC Audio

Users of Chrome and FireFox browsers will benefit from high-quality, low-latency WebRTC audio. (Users of other browsers will seamlessly use Flash-based audio.)



### Presentation

You can upload any PDF presentation or MS office document. BigBlueButton keeps everyone in sync with your current slide, zoom, pan, annotations, and mouse pointer.



### Web Cam

Multiple users can share their webcam at the same time. There is no built-in limit on the number of simultaneously active webcams.



## Activity

### Activity:

Explore the tools suggested by fedena in her blog dated April 16, 2015 on “Online Collaboration in E-learning: Tips and Tools, at <http://www.fedena.com/blog/2015/04/online-collaboration-in-e-learning-tips-and-tools.html>

### 7.5.3 Content Creation Tools/Authoring tools

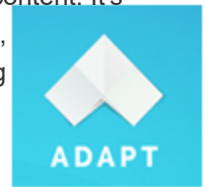
An e-learning content authoring tool is a software package which developers use to create and package e-learning content deliverable to end users. According to Wikipedia.org, “a content authoring tool is a software application used to create multimedia content typically for delivery on the World Wide Web. Content-authoring tools may also create content in other file formats so the training can be delivered on a CD (Compact Disc) or in other formats for various different uses. The category of content-authoring tools includes HTML, Flash, and various types of e-learning authoring tools.”

Thus, e-learning authoring tools are a class of products designed for people who need to create online educational or training courses that are deployed from a standard, cloud-based learning management system. Many programs can be considered authoring tools, including Flash, and PowerPoint. However, only a small group of programs specifically include support for e-learning content standards such as SCORM (Shareable Content Object Reference Model). There are many proprietary as well as open source authoring tools available currently in the market. Some of the most famous proprietary authoring tools are Elucidate, Lectora, Easygenerator, Smart Builder, Adobe Presenter, Camtasia, Articulate, Captivate and Udu. There are also many open source authoring tools which have many features. They are Learner Activity Management System (LAMS), Adapt, Xerte, and eXeLearning.

In addition to these SCORM compatible authoring tools there are many specific applications necessary for creating content such as image editing, video editing, audio editing and animation tools to create multimedia e-content. Currently most of the LMS have its own inbuilt authoring tools to create e-content due to the convergence of the software features.

Short descriptions of the popular open source authoring tools are given in the following section.

**Adapt:** The Adapt authoring tool is an application to allow you to quickly build responsive e-learning content. It's accessed through a web browser. You can create an account, log in, create courses and add assets, components and extensions. You can preview and publish your e-learning content from the authoring tool.



**LAMS:** Learner Activity Management System (LAMS) is a revolutionary new tool for designing, managing, and delivering online collaborative learning activities. It provides teachers with highly intuitive visual authoring environment for creating sequence of learning activities.



**Xerte:** Xerte is a fully-featured e-learning development environment for creating rich interactivity. Xerte is aimed at developers of interactive content who will create sophisticated content with some scripting, and Xerte can be used to extend the capabilities of Xerte Online Toolkits with new tools for content authors. Xerte Online Toolkits is a server-based suite of tools for content authors. E-learning materials can be authored quickly and easily using browser-based tools, with no programming required. Xerte Online Toolkits is aimed at content authors, who will assemble content using simple wizards. Content authors can easily collaborate on projects. Xerte Online Toolkits can be extended by developers using Xerte.



**eXeLearning:** The eXe project developed a freely available Open Source authoring application to assist teachers and academics in the publishing of web content without the need to become proficient in HTML or XML markup. Resources authored in eXe can be exported in IMS Content Package, SCORM 1.2, or IMS Common Cartridge formats or as simple self-contained web pages.



## Activity

### Activity

Explore the Tools used to create e-learning courses and lessons by going through this link  
<http://c4lpt.co.uk/directory/category/instructional/courseauthoring/>

## 7.5.4 Delivery and Distribution Tools

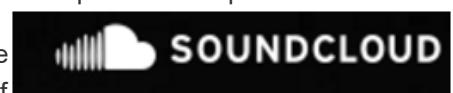
There are many options to deliver e-learning today. Most common approach is to deliver online learning using a Learner Management System which has so many e-learning tools and technologies integrated in one place. The other approach gaining popularity currently is Massive Open Online Course (MOOC) format. A massive open online course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. In addition to these two approaches e-learning can also be delivered as flipped learning in which the typical lecture and homework elements of a course are reversed. WebQuest is an inquiry-oriented lesson format in which most or all the information that learners work with comes from the web.

The e-learning could also be delivered or distributed through websites, as webcast, podcast, e-pub, streaming video, webinars, virtual tours and games.



**EPUB:** Wikipedia defines EPUB as an e-book file format with the extension epub that can be downloaded and read on devices like smart phones, tablets, computers, or e-readers. It is a free and open standard published by the International Digital Publishing Forum (IDPF). The term is short for electronic publication and is sometimes styled ePub. Sigil is an open source epub authoring tool and Calibre is an open source epub reader.

**Podcasting:** Podcasting is a form of audio broadcasting on the Internet. The audio files are developed and distributed using RSS to the computers of



subscribed users. These files may then be uploaded to digital music or multimedia players like the iPod. A podcast can be easily created from a digital audio file. The podcaster first saves the file as an MP3 and then uploads it to the Web site of a service provider. Vodcasting (video-on-demand casting) is the same principle as Podcasting with the addition of video.

Podcasting/Vodcasting allows educators to reach students using a medium they are accustomed to. It can be used to interact with students and parents beyond the school hours and can be a great facilitator to increase student engagement. Student created podcasts/vodcasts give students the opportunity to enhance their organization, communication and technology skills.



Record classroom lectures, provide supplemental information, provide review sessions, record classroom discussions, interview with experts, student projects are some of the uses of podcasts. Therefore podcast is versatile medium for delivering e-learning specifically audio content.

**Audio/Video Streaming:** Streaming Audio/Video is content sent in compressed form over the internet and displayed by the viewer in real time. With streaming video or streaming media, a Web user does not have to wait to download a file to play it. Instead, the media is sent in a continuous stream of data and is played as it arrives. The services offered by YouTube are valued by e-learning providers world over. Many institutions have created their own exclusive channels for providing their e-content to the end users using YouTube. E-learning professionals use to make their e-learning courses more interactive, fun, and informative using YouTube. In fact, it has the power to transform a potentially dull or complicated subject matter into an overall exciting and engaging e-learning experience. E-learning providers like Khan Academy uses YouTube extensively in delivering their e-content.



**MOOC:** Massive Open Online Course ( MOOC) is a new approach to delivering e-learning. MOOC is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. Some of the famous MOOC providers are edX, Coursera, and Udacity. The Indian MOOC initiative is known as SWAYAM.

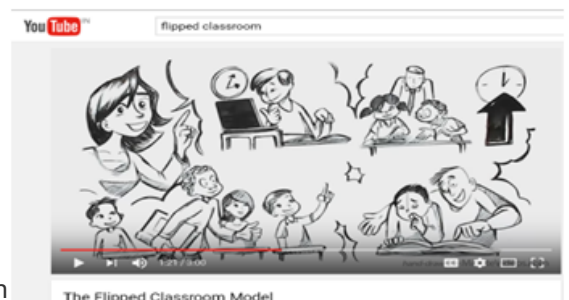
**Activity:**

1. Watch these two video about MOOC 1. <https://vimeo.com/70811271> , 2. <https://www.youtube.com/watch?v=eW3gMGqcZQc>
2. Take a MOOC courses from edX <https://www.edx.org/> or from Coursera <https://www.coursera.org/>

**Flipped Learning:** Flipped classroom model is yet another approach in delivering e-learning in a blended format. 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, discussion or debates. (Vanderbilt University, Center for Teaching).

Source: <http://edtechenergy.blogspot.in/?view=classic>

**Activity:** View the video on flipped classroom from the link [https://www.youtube.com/watch?v=qdKzSq\\_t8k8](https://www.youtube.com/watch?v=qdKzSq_t8k8) and plan how you can implement flipped learning for any topic of your choice.



**WebQuest:** Web Quest developed in 1995 by Bernie Dodge of San Diego State University. Simply put, a WebQuest is an inquiry-based activity where students are given a task and provided with access to on-line resources to help them complete the task. WebQuest is an online-based lesson in which most or all of the information that students explore and evaluate comes from the World Wide Web. According to Bernie Dodge, the six building blocks of a WebQuest are:

1. The Introduction orients students and captures their interest.
2. The Task describes the activity's end product.
3. The Process explains strategies students should use to complete the task.
4. The Resources are the Web sites students will use to complete the task.

5. The Evaluation measures the results of the activity.
6. The Conclusion sums up the activity and encourages students to reflect on its process and results.



**Activity:** Create an account in [www.zunal.com](http://www.zunal.com) . Browse through some of the webquests related to your subject. Also create a webquest on any topic and share with your colleagues.

### ? Check Your Progress-3

Match column 'A' with column 'B'

	A (E-learning Technologies)	B (E-learning Tools)
1	Content Creation tool	<input type="text"/>
2	Collaboration tool	<input type="text"/>
3	Communication tool	<input type="text"/>
4	Delivery & Distribution Tool	<input type="text"/>

Check

## 7.6 LEARNING MANAGEMENT SYSTEM (LMS)

After so many years of technology use in education, it is felt that educators today need a web-enabled relational database that links curriculum, instructional resources, assessment strategies, student data, and staff proficiencies all on a single platform. This is possible by adopting a comprehensive and systemic integration of a multi-dimensional system called Learning Management System (LMS). LMS provide an infrastructure platform through which learning content is delivered and the learning and learners are managed. It provides a combination of software tools that perform a variety of functions related to online and offline training administration and performance management. Typically, an LMS is internet-based software that deploys, manages, tracks, reports on the interaction between the learner and the content, and the learner and the instructor. Administratively, an LMS makes it easy to enter, track, manage, and report on learning activities and competencies. An LMS is not limited to e-learning and can also manage other forms of instruction. In essence, an LMS primarily focuses on competencies, learning activities, and the logistics of delivering learning activities. An LMS does not focus on creation, reusability, management, or improvement of content itself. Tasks of the LMS:

- Manage learners taking whole courses
- Manage the curriculum
- Manage courses in various curriculums

- Present options depending on learner profiles
- Track learner needs and preferences
- Track course completions and scores

**Features of LMS:** LMS has specific features meant for instructor, course interaction, and students. Listings of all these features are given below:



Source: M.U.Paily

**LMS and Learning Content Management System (LCMS)**

LMS	LCMS
<p>The <b>focus</b> of an LMS is to deliver online courses or training to learners, while managing students and keeping track of their progress and performance across all types of training activities. An LMS is not used to create course content.</p>	<p>LCMS is a related software technology that provides a multi-user environment where developers, authors, instructional designers, and subject matter experts may create, store, reuse, manage, and deliver digital educational technology (also known as e-learning) content from a central object repository.</p> <p>LCMS <b>focuses</b> on the development, management and publishing of the content that will typically be delivered via an LMS. Users can both create and re-use content and reduce duplicated development efforts.</p>

LMS Functionality	LCMS Functionality



LMS Functionality	LCMS Functionality
<ul style="list-style-type: none"> <li>■ Course Content Delivery</li> <li>■ Student Registration and Administration</li> <li>■ Training Event Management (i.e., scheduling, tracking)</li> <li>■ Curriculum and Certification Management</li> <li>■ Skills and Competencies Management</li> <li>■ Skill Gap Analysis</li> <li>■ Individual Development Plan (IDP)</li> <li>■ Assessing</li> <li>■ Reporting</li> <li>■ Training Record Management</li> <li>■ Courseware Authoring</li> <li>■ Resource Management</li> <li>■ Performance Management System               <ul style="list-style-type: none"> <li>■ Template-driven, Collaborative Content Development</li> <li>■ Facilitated Content Management (i.e., indexing and reuse)</li> <li>■ Publishing</li> <li>■ Workflow Integration</li> <li>■ Automated Interface with an LMS</li> </ul> </li> </ul>	<p>The components of an LCMS include:</p> <ul style="list-style-type: none"> <li>o An authoring application</li> <li>o A learning object repository,</li> <li>o A dynamic delivery interface</li> <li>o Administration tools.</li> </ul> <p>An LCMS may provide course to an LMS that tracks and manages the learner and learning.</p>

While LMS and LCMS have different strengths and weaknesses, and despite their distinction mentioned in the above table, the term LMS is often used to refer to both an LMS and an LCMS, although the LCMS is actually a complementary solution to an LMS. Either as separate platforms or as a merged product, LCMSs work together with LMSs to develop and deliver course content to students. Due to lack of industry standardization as well as being a young industry, products that combine LCMS and LMS attributes may be referred to as course management systems (CMS), learning management systems (LMS) and LMS/LCMS.

### Examples of Open source and proprietary LMS

As the name indicates the Open-source software is computer software whose source code is available free under a copyright license that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form whereas proprietary LMS software is developed and owned by a profit-generating entity that does not let users access and make adjustments to the computer code that determines the structure of the software and the activities it can execute.

There are a large number of commercial LMS/LCMS vendors offering a very large number of systems and many of them offer integrated LCMS and LMS solution. An alternative to the commercial vendors are Open Source systems. They are every bit as good as the commercial counterparts. A list of popular open source and commercial/proprietary LMS/LCMS is given below:





#### Activity:

1. Explore Moodle in action on this site <http://school.demo.moodle.net/> populated with courses, activities and users.
2. Try Moodle's standard features on this empty out-of-the-box site at <https://demo.moodle.net/>

### 7.7 E-LEARNING STANDARDS

According to ISO, standards can be defined as "documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose".

The goal of standards is to provide fixed data structures and communication protocols for Learning objects and cross-system workflows. This enables interoperability between application, such as Learning Management System (LMS) or in-house developed content, by providing uniform communication guidelines that can be used throughout the design, development and delivery of Learning Objects. There have been a number of efforts worldwide to develop standards for learning object interoperability. The standards support- Interoperability, durability, manageability, re-usability, and accessibility. These standards focus on content metadata, content packaging, and run-time communication to support tracking of student activities.

To this end, there are several organizations working toward standards and to make sure learning content is 'interoperable' with various learning management technologies. In recent years, groups like the Aviation Industry Computer-Based Training (CBT) Committee (AICC), the IMS Global Learning Consortium, Inc., the Institute of Electrical and Electronics Engineers (IEEE), the Alliance for Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE), the Dublin Core, Sharable Content Object Reference Model (SCORM) and CanCore have developed specifications or guidelines for various aspects of learning object development and use.

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### 7.8 ADVANTAGES AND POTENTIAL DRAWBACKS OF E-LEARNING

#### Advantages of e-Learning to the Trainer or Organization

- **Reduced overall cost** is the single most influential factor in adopting e-learning. The elimination of costs associated with instructor's salaries, meeting room rentals, and student travel, lodging, and meals are directly quantifiable.
- **Increased retention** and application
- **Consistent delivery** of content is possible with asynchronous, self-paced e-learning.
- **Expert knowledge** is communicated, but more importantly captured, with good e-learning and knowledge management systems.
- **Proof of completion and certification**, essential elements of training initiatives, can be automated.

#### Advantages to the Learner

- **On-demand availability** enables students to complete training conveniently at off-hours or from home.
- **Self-pacing** for slow or quick learners reduces stress and increases satisfaction.
- **Interactivity** engages users, pushing them rather than pulling them through training.
- **Confidence** that refresher or quick reference materials are available reduces burden of responsibility of mastery.

### Potential drawbacks

**Technology dependent:** Learners will need access to a machine of minimum specification as dictated by the e-learning supplier or access to a service with a high bandwidth to transfer the course materials in a timely way.

**Material Incompatibility:** Some materials designed for one particular system will not function properly on another (for example, the Apple Macintosh and the Windows PC). Standards will help in the area.

**Unsuitable for Certain Types of Training:** Any skill that relies heavily on inter-personal contact although these courses could be supplemented by e-learning.

**Unsuitable for Certain Types of Learners:** e-learning requires a high-level of self-discipline and personal time management. E-Learners need to be highly self-motivated to take full advantage of the medium as often the online learning experience can be impersonal. Working through 'packaged' programmes can be irritating.

**Reliant of the Quality of the Content:** It is too easy for some institutions to defer the photocopying costs onto the learner by placing all lecture notes and course handouts online. Such practices often mean that the course materials are in an inappropriate format for online learning. Course providers need to develop new technical skills and course design skills to suit the new medium.

**Expensive:** Start-up cost of an e-learning service is expensive and the cost of production of online training materials is very high. Teachers must be confident that the extra costs are balanced with the benefits of delivering a course online. Significant time needs to be invested in course set-up and in ongoing maintenance (checking links, updating course content etc.).

**Reliant on Human Support:** E-learning is still dependent on help on either the course materials or the software.

**Social/economic disadvantage:** It can limit or prevent access by some student groups (for example, cost of equipment, online access and printing).

**No Match for Face-to-Face Teaching:** Electronic communication does not necessarily provide a good match for face-to-face communication and is more linear than face-to-face discussion.

**Too Reliant on IT Skills:** Learners may have limited IT skills, or be uncomfortable with electronic communication and need to learn how to use the medium effectively.

**Disabilities:** Students with visual or physical impairments may be disadvantaged.

**Inflexible:** Flexibility may be lost as adjustments to the course in response to student reaction are not easy to make once the course is underway.

**Pedagogically Unsound:** The electronic environment does not per se offer a pedagogically enhancing learning environment.

## 7.9 LET US SUM UP

E-learning is: "...instruction that is delivered electronically, in part or wholly via a Web browser, through the Internet or an intranet, or through multimedia platforms such as CD-ROM or DVD".(Brandon Hall)

- E-learning methods can be classified into Synchronous, Asynchronous and Blended Learning Methods.
- Modern Technology provides us with a plethora of options for communicating. The most common Communication tools used in E-learning include, e-mail, Instant Messaging and Blogging.
- Some of the popular collaboration tools of e-learning include Chat, forum, wiki, online groups, audio/video conferencing, social bookmarking and social networking.

- Some of the Content Creation Tools/Authoring tools are Course and lesson authoring tools, E-book tools, Graphics and animation tools, Assessment tools, Video and simulation tools, Survey and polling tools.
- There are many proprietary as well as open source authoring tools available currently in the market. Some of the famous proprietary authoring tools are Elucidate, Lectora, Easygenerator, Smart Builder, Adobe Presenter, Camtasia, Articulate, Captivate and Udutu. There are also many open source authoring tools which have many features. They are Learner Activity Management System (LAMS), Adapt, Xerte, and eXeLearning.
- Some of the delivery and distribution e-learning tools include SCORM, e-pub, audio/video streaming and Podcasting.
- A learning management system provides students with the ability to use interactive features such as threaded discussions, video conferencing, and discussion forums.
- LMS is the framework that handles all aspects of the learning process.
- LCMS focuses on the development, management and publishing of the content that will typically be delivered via an LMS. Users can both create and re-use content and reduce duplicated development efforts.
- MOODLE is a popular open source LMS.
- There are several organizations working toward standards and to make sure learning content is 'interoperable' with various learning management technologies. The e-learning standards support- Interoperability, durability, manageability, re-usability, and accessibility. These standards focus on content metadata, content packaging, and run-time communication to support tracking of student activities.

## 7.10 UNIT END EXERCISES

1. Outline the History of e-learning
2. List the any 10 e-learning tools and classify them as synchronous and asynchronous e-learning tools
3. Discuss the type of e-learning that could be used by a teacher in a rural school with only one computer having internet facility.
4. Explain the Collaboration tools used in e-learning
5. Compare the features of LMS and LCMS
6. Give three examples each for an open source and Proprietary LMS

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## Unit - 8 : ICT Integrated lesson

### Menu

#### CRITICAL UNDERSTANDING OF ICT

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Unit - 2 : Computer Hardware Fundamentals

Unit - 3 : Computer Software

Unit - 4 : Application Software

Unit - 5 : Network and Internet

unit - 6 : Multimedia

Unit - 7 : E-Learning

#### Unit - 8 : ICT Integrated lesson

Unit - 9 : ICT in assessment

Unit - 10 : ICT for Educational Management

Unit - 11 : ICT for Teacher Professional Development

Unit - 12 : E-content and open educational resources

#### Structure

8.1 Introduction

8.2 Objectives

8.3 Web 2.0 Tools and Technologies

8.3.1 Wiki

8.3.2 Blog

8.3.3 Podcasts

8.3.4 Social Network

8.3.5 Social Bookmark

8.4 Constructivist Learning and ICT

8.4.1 5E Approach

8.4.2 Project Based Learning (PBL)

8.4.3 Web Quest

8.4.4 Virtual Field Trip

8.5 Let us Sum up

## 8.6 Unit End Exercises

## 8.7 References

### 8.1 INTRODUCTION

Ms.Reeta is IX standard class teacher and a social science teacher, had given an assignment for the students on Indian National Movement. Students were asked to use the internet resources and share their materials collected from the web. After explaining the steps and objectives of the project, in a collaborative mode the rubrics for evaluation also evolved. Students felt happy and started working on the same. Group 1 students came to Ms. Reeta asking about the scope of using Wikipedia for the work. Ms.Reeta agreed to use it, but asked them to read and understand the information available there. One of the students just asked her a doubt that she could see in some web sites stating that, it was developed using Web 2.0 technology. Meanwhile Group 2 students came with an idea to develop a Blog for sharing the information. When Ms.Reeta enquired from where they could get the idea, one of the students informed that she could get it from one of her Facebook friends. In the evening Ms.Reeta could recognize that her students are very good in using internet resources. She thought to update her knowledge about web 2.0 technology tools from the computer teacher and could help her students better for the completion of the assignment. Students were much happy to work with the tools.

From this anecdote, you can understand that students are users of technology and in order to make them understand the better use of technology, you have to update and explore yourself about technology and web 2.0 tools. This unit focuses on Web 2.0 technology tools and its integration in the teaching learning process.

### 8.2 OBJECTIVES

After studying this Unit, you will be able to

- list Web 2.0 technology tools
- explore the uses of Wiki
- describe the features and benefits of blogs and blogging
- identify various elements of blog and tools for blogging
- explain approaches to integrating blogs in education
- describe the meaning and scope of constructivist learning
- explore the scope of 5E model in integrating ICT
- explore the different dimensions of PBL
- describe WebQuest as a learning activity
- describe the various features of social bookmarking websites.
- create and manage bookmarks
- explore the potential of WebQuest for developing twenty first century skills
- define Virtual Field Trip
- explore the uses of Virtual Field Trip in education
- create a Virtual Field Trip

### 8.3 WEB 2.0 TOOLS AND TECHNOLOGIES

We have gone through so many web sites and might have thought that how exactly we can develop a web site. Web site development has its own techniques and methods. Web 2.0 is one such technique, refers to the second generation techniques, which will have advanced options than its predecessor. Web 2.0 helps in development and improves communication and information sharing. The information sharing could be secured one and which results in improved collaboration among the users. Web 2.0 has helped in enhancing and transforming the web based communities such as chat forums, discussion forums, social networking, wikis and blogs.

The concept of Web 2.0 was developed by Tim O'Reilly, resulted in making great changes in the use of internet and interactivity. In its earlier version, though it was allowing for information sharing, the content could not be modified or edited, thus the developers or content writers were dominating the information sharing.

“A Web 2.0 site may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to Web sites where people are limited to the passive viewing of content. Examples of Web 2.0 include social networking sites, blogs, wikis, folksonomies, video sharing sites, hosted services, Web applications, and mashups “(source: [https://en.wikipedia.org/wiki/Web\\_2.0](https://en.wikipedia.org/wiki/Web_2.0))

Web 2.0 is such a platform which allows the users to interact with the content, such that they will be able to modify, write and even share the information. Thus the users are getting equal opportunity, such that the monopoly of the content developers could be democratized. More freedom for the users, initiated the philosophy for copy free or free or open source software movement. The improved and strengthened interactivity and flexibility for the users in the content, geared its application in all levels of education.

Instead of merely reading a Web 2.0 site, a user is invited to contribute to the site's content by commenting on published articles or creating a user account or profile on the site, which may enable increased participation.

The key features of Web 2.0 include

- Folksonomy - free classification of information; allows users to collectively classify and find information (e.g. tagging)
- Rich User Experience - dynamic content; responsive to user input
- User Participation - information flows two ways between site owner and site user by means of evaluation, review, and commenting. Site users add content for others to see
- Software as a service - Web 2.0 sites developed APIs to allow automated usage, such as by an app or mashup
- Mass Participation - Universal web access leads to differentiation of concerns from the traditional internet user base

(As seen in [https://en.wikipedia.org/wiki/Web\\_2.0](https://en.wikipedia.org/wiki/Web_2.0); from Hinchcliffe, Dion (2006-04-02). "The State of Web 2.0". Web Services. Archived from [the original](#) on 2007-05-15. Retrieved 2006-08-06.)

## WEB 2.0 Landscape



## Activity

**Activity:** Read the article from the link <http://firstmonday.org/article/view/2125/1972> for more details regarding the difference between Web 1.0 and Web 2.0)







invite the learners to add to the web page, correct mistakes and thus enabling fast and easy collaboration.

3. **Multimodal:** It may contain images, embedded videos, and links to other pages of the wiki or external websites.

4. The collaborative encyclopedia 'Wikipedia' is one of the best-known large scale wikis.

5. Wiki also allows the assigned individual or a user group to constantly monitor the changes done by members on the wiki.

6. **Openness:** Some wikis restrict access to a group of members, allowing only members to edit page content although everyone may or may not view it depending on how the access is granted by owner of a wiki. Others allow completely unrestricted access, allowing anyone to both edit and view content.

7. **Evolving:** A wiki is continuously "under revision" once it goes under active collaboration. The largest well known example 'Wikipedia' is an online encyclopedia with no "authors" but millions of contributors and editors.

### 8.3.1.3 Educational Applications

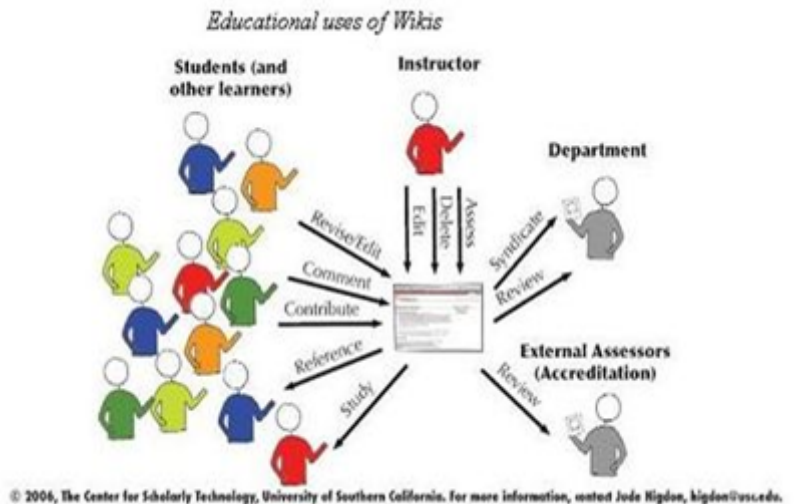
Wikis is very flexible and you can do many things with it, whether in your classroom, school, or community group.

#### Teachers can

1. Facilitate a classroom project and follow the group progress through wiki.
2. Use it to post homework assignments and organize schedules collaboratively.
3. Collaborate with an international classroom, parents or other teachers for devising appropriate strategies.
4. Provide a wiki for classroom discussion and feedback or create a forum to interact with your students.
5. Use wikis as a knowledge base, enabling them to share reflections and thoughts regarding teaching practices, and allowing for versioning and documentation.

#### Students can

1. Use a wiki to develop research projects and document their work at one single place.
2. Add summaries of their thoughts from the prescribed readings, building a collaborative annotated bibliography on a wiki.
3. Use it for publishing course resources like syllabi and handouts, and students can edit and comment on these directly for all to see.
4. Use it to map concepts. They are useful for brainstorming, and editing a given wiki topic can produce a linked network of resources.
5. Use it as a presentation tool in place of conventional software, and students are able to directly comment on and revise the presentation content.
6. Strengthen writing skills.



#### Activity:

Visit the following websites to explore the details related to Wiki

- Wikispaces: <http://www.wikispaces.com/site/for/teachers>
- PBworks: <http://pbworks.com/academic.wiki>
- Wetpaint: <http://wikisineducation.wetpaint.com>

## ? Check Your Progress 1

1. "Wiki" is a Hawaiian word for .....

- a. best
- b. fast
- c. fruit
- d. resource

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

2. Wikis are often used to create -----websites, to power community websites, for personal note taking

- a. shared
- b. editable
- c. collaborative
- d. synchronized

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

3. Which of the following is characteristic(s) of a wiki

- a. Openness
- b. evolving
- c. multimodal

d. all of these

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

### 8.3.2 BLOGS

"Blog" is an abbreviated version of "weblog," which is a term used to describe websites that maintain an ongoing chronicle of information. A blog features diary-type commentary and links to articles on other websites, usually presented as a list of entries in reverse chronological order (Source: [codex.wordpress.org/Introduction\\_to\\_Blogging](http://codex.wordpress.org/Introduction_to_Blogging))

It's a space for sharing ideas and publishing to the world or restricted target groups. The different content that the user publish could initiate discussion and comments also. Teachers can create blog easily with google blog service [www.blogspot.com](http://www.blogspot.com), or [www.wordpress.com](http://www.wordpress.com), or [www.edublogs.org](http://www.edublogs.org)



#### 8.3.2.1 Meaning

The term "weblog" was coined by Jorn Barger on 17 December 1997. The short form, "blog," was coined by Peter Merholz. A blog (a contraction of the term "weblog") is a type of website, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse-chronological order. Each post is usually 'tagged' with a keyword or two, allowing the subject of the post to be categorized within the system so that when the post becomes old it can be filed into a standard, theme-based menu system.

A typical blog combines text, images, and links to other blogs, web pages, and other media related to its topic. The ability for readers to leave comments in an interactive format is an important part of many blogs. Blogs, however, are innovative in that they require learners to interact with one another, not just the computer.

Track back (or ping back) allows a blogger (A) to notify another blogger (B) that they have referenced or commented on one of blogger B's posts. When blog B receives notification from blog A that a trackback has been created, blog B's system automatically creates a record of the permalink of the referring post.

A blog comprising videos is called a vlog, one comprising links is called a linklog, a site containing a portfolio of sketches is called a sketchblog or one comprising photos is called a photoblog. The collective community of all blogs



is known as the blogosphere. The collective community of all blogs is known as the blogosphere.

The features that make blogs different from other websites are:

1. The content is published in a reverse chronological fashion
2. Content is updated on a regular basis
3. Readers have the possibility to leave comments
4. Other blog authors can interact via trackbacks and pingbacks
5. Content is syndicated via RSS feeds
6. Free public access to content
7. Hyperlinked post structure
8. Post are automatically achieved
9. The blogs can be created in fewer steps and in less time
10. Availability of free or inexpensive weblogging services



### 8.3.2.2 Elements of a Blog

Most blogs have the following elements:

- Title - main title, or headline, of the post.
- Body - main content of the post.
- Comments - comments added by readers
- Permalink - the URL of the full, individual article.
- Post Date - date and time the post was published.
- Categories (or tags) - subjects that the entry discusses
- Trackback - links to other sites that refer to the entry



Figure 1. Basic features of a blog

### 8.3.2.3 Safe Practices

1. Plagiarism and Copyright Violation- Discussing the norms and values of academic honesty, copyright, and fair use are critical in helping students understand the law and their responsibilities.
2. Racial Comments – avoid posting racial comments. Learn to respect for other races
3. Obscene Content - Posting of obscene materials in the blog should not happen and also monitor the students from accessing inappropriate content online.
4. Cyber Bullying - Students must be taught to blog responsibly, ethically, and safely. Avoid posting very offensive and if students post threatening material online, this can lead to cyber-bullying and legal consequences.
5. Cyber Predators- For their own safety students must be taught not to post their names, addresses, phone numbers, personal information, or pictures etc. to fall victim to cyber predators. They should also not release any personal information about anyone else they know either.
6. Unauthorized Access- they should be asked not to leave blog page open and the computer unattended. Someone could step in and write something as you.

### 8.3.2.4 Blog Tools

To begin creating a blog there are two things that one would need. The first is software that is capable to write and publish the blog. The second thing is a place on the Internet to place the blog.



Free software with free hosting - This is the entirely free way of blogging. You do not pay for the software or for the hosting.

1. Edublog
2. Blogger
3. Wordpress
4. Blog.com
5. liveJournal

You can view many more blog sites from 40+ blog sites at <http://mashable.com/2007/08/06/free-blog-hosts/>

Free software with paid hosting - In this option you will use free software but will have to pay for hosting (WordPress, Geeklog) and Paid software and paid hosting - In this option you pay for both hosting and software (Typepad, BlogIt).

### 8.3.2.5 Educational Applications

If planned effectively, Blogs can be used in multiple ways to enhance learning. First of all blogs can improve classroom communication and collaboration. Since blogs can be created without much of technical skills, every student can create one with ease and start blogging. Blogging provide opportunities for the learners to share their understanding and build their knowledge about any concepts in a collaborative and unthreatening environment.

**Student Blogs-** students can create the blogs and use it for the following specific purpose:

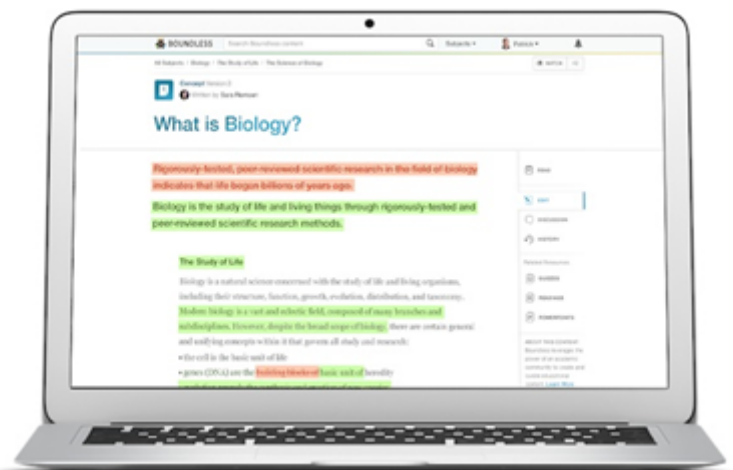
1. There are many online tutorials on how to create and use blogs. The students can use these tutorials and learn how to blog.
2. Most free blogging sites permit to put multimedia content and students can use this feature to create their online e-portfolio and showcase to the entire world.
3. There are many areas in which they can blog – the experiences that they gained in field trip, the news items that they have read about a particular issue or concept, the person that they met and the learning that occurred from them, informal learning that they have encountered etc.
4. Learning from others blogs and providing constructive comments for the fellow learners and engage themselves in collaborative discussions
5. Writing about the major class activities that they have experienced (experiments, class discussions, teacher presentations etc).
6. Plan and implement a collaborative group project using blog ( put the plan, schedule, activities, job responsibilities, and the project report in the blog)
7. Discuss group assignments, share work schedule and results of experiments and peer review each other's work
8. Students can write their assignments and post their final draft on their blog and ask other students to give feedback for improvement

**Teacher blog** – Teachers can create blog and integrate in learning in the following manner

1. Provide online readings/background reading materials and ask students to read and respond to the materials provided.
2. Gather and organise Internet resources for a specific course, providing links to appropriate sites and annotating the links to highlight their relevance. This could be collaborative work along with the students.
3. Teacher can also create separate blog to communicate with parents. This could be a place for them to know your expectations and voice their expectations and also they are in position to give certain constructive suggestions
4. Blogs can be used for building a class newsletter, using student-written articles and photos they take.

### Blogs for Assessment

Blogs can be used for both summative and formative assessment. In formative assessment, it is assessment for





learning rather than assessment of learning. Using blogs, teachers are able to feed information back to students in ways that enable the student to learn better, and engage in self-reflective process which results in high-quality learning. In case of summative assessment the product of their blogging (blogs created by them) can be used as tool for authentic assessment. A blogging rubric can be developed with the criteria such as the following:

- how well students' blogs integrated the concepts and principles from classroom learning
- how effectively students' writing conveyed their understanding of the topics
- how well students' blogging entries demonstrated applications of classroom learning
- how rich their comments of the blog postings of fellow learners
- how well they have supported their arguments/reflections with supportive evidences
- how effectively the learners have used the various features of blogs

### Activity

- View the video on "blogs in plain English" from YouTube at <http://www.youtube.com/watch?v=NN2I1pWXjXI> and have discussion about the video content.
- View the video "Blog in Education" from YouTube at [http://www.youtube.com/watch?v=i7XiCg\\_wpzE&feature=related](http://www.youtube.com/watch?v=i7XiCg_wpzE&feature=related) as an extension of this you may search for more videos on blog/blogging from youtube or other sites and create resource of video links on blogging
- Complete the tutorial on blog from <http://www.teachersfirst.com/content/blog/blogbasics.cfm> .

## ? Check your progress - 2



1. A blog (a contraction of the term "weblog") is a type of -----, usually maintained by an individual with regular entries of commentary

- a. software
- b. website
- c. search engine
- d. social network

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

2. The features that make blogs different from other websites are-----

- a. Content is syndicated via RSS feeds
- b. Free public access to content

- c. Hyperlinked post structure
- d. all of these

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

3. Which of the following is not a blog site?

- a. Facebook
- b. Edublog
- c. Blogspot
- d. word press

Correct Option

Wrong

Wrong

Wrong

### Solution

1. [Correct Option \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)



### 8.3.3 Podcasts

A podcast is a form of digital media that consists of an episodic series of audio, video, digital radio, PDF, or ePub files subscribed to and downloaded through web syndication or streamed online to a computer or mobile device.



**Activity:** Read the wiki article on Podcasting from the given link [https://en.wikipedia.org/wiki/Uses\\_of\\_podcasting](https://en.wikipedia.org/wiki/Uses_of_podcasting).

Also you can visit <https://en.support.wordpress.com/audio/podcasting/> for more details on audio podcasting.

### 8.3.4 Social Networks

Social network is a network or connectivity among individuals or organizations. The connectivity has been decided based on different interdependency and need. Individuals can get connected instantly across the globe, and share the ideas and information, which could be seen or shared by the individuals in the network. There is complete freedom for the individuals to make connections on mutual understanding for any general or specific purpose. Facebook, twitter, MySpace etc. are some of the largest social networks.



### Virtual Worlds

A virtual world is a computer based simulated environment, also known as massively multiplayer online world (MMOW). This enables the users to interact with each other



across the globe. Each user is represented by an avatar. The user preferences are the key for designing virtual world, which is available anywhere and anytime.

The Second Life developed by Linden Lab in 2003 is a classic example of a Virtual World with over 2 Million Users.

**Activity:** Read the wiki article from the link [https://en.wikipedia.org/wiki/Second\\_Life](https://en.wikipedia.org/wiki/Second_Life)

### ? Check Your Progress-3

1. Which of the following is not a characteristic of Web 2.0?

- a. Folksonomy
- b. Rich user experience
- c. Software as a service
- d. User restrictions



Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. Which of the following is not a web 2.0 tool?

- a. Wiki
- b. Blog
- c. Browser
- d. Virtual world

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

3 A wiki is essentially a ----- for creating, browsing, and searching through information.

- a. Software
- b. hardware
- c. database
- d. platform

Wrong

Wrong

Correct Option

Wrong

## Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

4 Which of the following is not a social network?

- a. Twitter
- b. Facebook
- c. Wikipedia
- d. MySpace

Wrong

Wrong

Correct Option

Wrong

## Solution

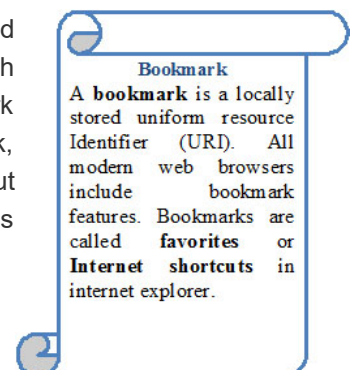
1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

### 8.3.5 SOCIAL BOOKMARKING

Social bookmarking has gained popularity in a very short time. The concept of shared online bookmarks dates back to April 1996 with the launch of it. List the features of which included public and private bookmarks. Within the next three years, online bookmark services became competitive, with venture-backed companies such as Backflip, Blink, Clip2, ClickMarks, HotLinks. However the awareness among teaching community about social bookmarking and how this tool can be integrated in to teaching learning process is the primary goal of this section.

#### 8.3.5.1 Meaning of Social Book Marking

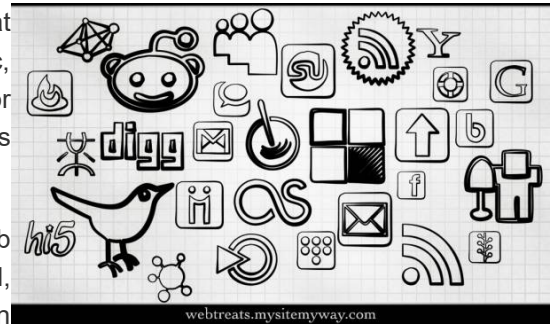
Social bookmarking is a unique service allowing its members to save, review and share websites, articles, photos and music that they discover on the Internet. Once a website is discovered, then the social bookmarking member can write a review about the website and share it with the rest of the social bookmarking community that they belong to. If a website has already been discovered by another member, then in this case the other members can visit the website and later write their own review as well as vote on the website either up or down depending on the impression that the website had left on the visitors. Descriptions may be added to these bookmark in the form of metadata, so users may understand the content of the resource without first needing to download it for



themselves. Such descriptions may be free text comments, votes in favor of or against its quality, or tags that collectively or collaboratively become a folksonomy.

In a social bookmarking system, users save links to web pages that they want to remember and share. These bookmarks are usually public, and can be saved privately, shared only with specified people or groups. The allowed people can usually view these bookmarks chronologically, by category or tags, or via a search engine.

Social bookmarking is the practice of saving bookmarks to a public Web site and “tagging” them with keywords. Bookmarking, on the other hand, is the practice of saving the address of a Web site you wish to visit in the future on your computer. To create a collection of social bookmarks, you register with a social bookmarking site, which lets you store bookmarks, add tags of your choice, and designate individual bookmarks as public or private. Some sites periodically verify that bookmarks still work, notifying users when a URL no longer functions. Visitors to social bookmarking sites can search for resources by keyword, person, or popularity and see the public bookmarks, tags, and classification schemes that registered users have created and saved.



### 8.3.5.2 Advantages

1. A social bookmarking system has several advantages over traditional automated resource location and classification software, such as search engine spiders.
2. All tag-based classification of Internet resources is done by human beings, who understand the content of the resource, as opposed to software. Also, people can find and bookmark web pages that have not yet been noticed or indexed by web spiders.
3. Additionally, a social bookmarking system can rank a resource, based on how many times it has been bookmarked by users, which may be a more useful metric for end users than systems that rank resources based on the number of external links pointing to it (although both types of ranking are vulnerable to fraud, and both need technical countermeasures to try to deal with this).
4. For users, social bookmarking can be useful as a way to access a consolidated set of bookmarks from various computers, organize large numbers of bookmarks, and share bookmarks with contacts.
5. Libraries have found social bookmarking to be useful as an easy way to provide lists of informative links to patrons.
6. A simple form of shared vocabularies does emerge in social bookmarking systems (folksonomy). Collaborative tagging exhibits a form of complex systems (or self-organizing) dynamics.
7. Although there is no central controlled vocabulary to constrain the actions of individual users, the distributions of tags that describe different resources have been shown to converge over time to stable power law distributions.

### 8.5.3.3 Disadvantages

1. From the point of view of search data, there are drawbacks to such tag-based systems: no standard set of keywords (i.e., a folksonomy instead of a controlled vocabulary).
2. No standard for the structure of such tags (e.g., singular vs. plural, capitalization), mistagging due to spelling errors, tags that can have more than one meaning, unclear tags due to synonym/antonym confusion, unorthodox and personalized tag schemata from some users.
3. No mechanism for users to indicate hierarchical relationships between tags (e.g., a site might be labeled as both cheese and cheddar, with no mechanism that might indicate that cheddar is a refinement or sub-class of cheese).

### 8.5.3.4 Educational Application of Social Bookmarking

1. Network with other educators around the globe for collaboration and sharing.
2. Create social bookmark accounts for your school's academic departments. Teachers within the department all contribute to the growing database of web resources.

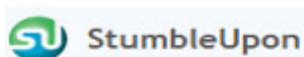
3. Contact other people for professional networking, based on their social bookmarks.
4. Allows you and your students to share bookmarks on research topics.
5. Subscribe to someone's bookmarks via RSS and receive updates whenever they add new websites.
6. Collaborate on projects with other schools, sharing bookmarks between all participating communities.
7. Search sites that have already been recommended by others. To make it even easier, you can use the Social Media Search.
8. A teacher could set up an account for each class, tag resources and make the URL available to the class. As the work is web-based it can be modified and updated from any internet connected computer. Likewise students can access the resources from any internet connected computer.
9. A specific tag (within a group of tags) could be used to direct individual students to specific readings or resources.
10. A collaborative account could be created, the user-name and password shared by a class or group of students who could then tag and share resources.
11. Library staff could maintain a list of tags specifically relevant to their school's curriculum

### 8.3.5.5 Using Social Bookmarking in the Classroom

As an educational tool, bookmarking sites can help students to find ways to search for information other than Google indexing. Students who use these sites will also be less likely to lose links that they have found valuable. Following are some reasons for using social bookmarking in the classroom.

- **Classroom Management:** Students and teachers can move from one computer to another and still have full access to their bookmarks. Students and teachers will be less likely to forget the location of the sites they have used.
- **Collaboration:** Students can share their bookmarks with their classmates. Students and teachers can also share collections of bookmarks they have found to be worthwhile.
- **News Gathering:** Social bookmarking sites can also help students to quickly find links to important current events and historical events. Some bookmarking sites allow students to subscribe to news feeds on a particular subject of interest. They can then go daily to this site to find the most current news on the subject. For a definition of news feeds go to: [http://en.wikipedia.org/wiki/News\\_feed](http://en.wikipedia.org/wiki/News_feed)

### Social Bookmarking Sites



*Online Social Bookmarking*

#### Activities

1. View the video on "bookmarking in plain English" from common craft at <http://www.commoncraft.com/bookmarking-plain-english>
2. Browse through various websites to identify various elements of social bookmarking. <http://www.social-bookmarking-sites-list.com>

Create an account in delicious site and use a screenshot of site to label various elements of social bookmarking.

“

<http://www.youtube.com/watch?v=mUn6W6ArHqo>

1. Watch the video in the given link about Social bookmarking tool

1. Video on “What is social bookmarking ”

<http://www.youtube.com/watch?v=kcecBgRd3ig>

Here are some of the top social bookmarking sites. Each group has to choose one social bookmarking site and explore it. slashdot.org, digg.com, stumbleupon.com, squidoo.com, technorati.com. Just go through the help links

- “Stumbleupon” <http://www.stumbleupon.com/help>,
- “Digg” <http://about.digg.com/faq>
- “Slashdot” <http://slashdot.org/help>
- “Squidoo” <http://www.squidoo.com/tutorialdirectory>
- “Technorati” <http://technorati.com/support/>



## Check Your Progress 4



1. URI stands for

- a. Uniform Resource Identifier
- b. Uniform Research Indicator
- c. United Resource Indicator
- d. Unified Resource Identifier

Correct Option

Wrong

Wrong

Wrong

### Solution

1. [Correct Option \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

2. The bookmarks are usually public, and can be saved privately,----- only with specified people or groups in social book marking

- a. shared
- b. linked
- c. send
- d. informed

Correct Option

Wrong

Wrong

Wrong

### Solution

1. [Correct Option \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

3. Social bookmarking is the practice of saving bookmarks to a public Web site and ----- them with keywords

- a. hyperlinking
- b. tagging
- c. marking
- d. moving

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

4. Class room application of social bookmarking include.....

- a. class room management
- b. collaboration
- c. news gathering
- d all of these

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



## 8.4 CONSTRUCTIVIST LEARNING

Regarding learning there are different theories and approaches. Some of the approaches you are aware of such as behaviorist approach, humanist approach, constructivist approach. These approaches actually give guidelines for teaching learning process.

Constructivism is getting more importance now a days, because of the prime importance for the learner. Constructivist approach considers learners as the real constructors of knowledge through the active participation and involvement in the learning process. The role of the teachers is as facilitators or co-learners.

Constructivist theory has its roots in a number of disciplines, including Philosophy, Anthropology, Psychology, Sociology, and Education. Entrenched in learning theories advanced by Dewey, Piaget, Vygotsky, Bruner, and Glasersfeld, the essential element of constructivism is active construction of new knowledge by the learner based on their experiences. In a constructivist learning situation learners bring unique prior knowledge and beliefs and knowledge is constructed uniquely and individually, in multiple ways, using a variety of tools, resources, and contexts. Learning is both an active and reflective process.

We have seen that most of the web 2.0 technologies and tools allow collaboration and co-construction of knowledge by the learners. After having understood web 2.0 technologies and tools let us see now how some of these tools can be used for creating constructivist learning designs for our students. Some of the approaches that we will be discussing here are 5E design, project based learning, web quest, and virtual field trip.

### 8.4.1 5E APPROACH

As a constructivist approach, the Biological Science Curriculum Study (BSCS) team headed by Rodger W Bybee, developed an instructional model called 5E.

"Origins of the BSCS 5E Instructional Model can be traced to the philosophy and psychology of the early 20th century and Johann Herbart. His psychology of learning can be synthesized into an instructional model that begins with students' current knowledge and their new ideas that relate to the current knowledge. The connections between prior knowledge and new ideas slowly form concepts. According to Herbart, the best pedagogy allows students to discover relationships among their experiences. The next step involves direct instruction where the teacher systematically explains ideas that the student could not be expected to discover. Finally, the teacher provides opportunities for the student to demonstrate their understanding." (from [http://www.bscs.org/sites/default/files/\\_legacy/BSCS\\_5E\\_Instructional\\_Model-Executive\\_Summary\\_0.pdf](http://www.bscs.org/sites/default/files/_legacy/BSCS_5E_Instructional_Model-Executive_Summary_0.pdf))

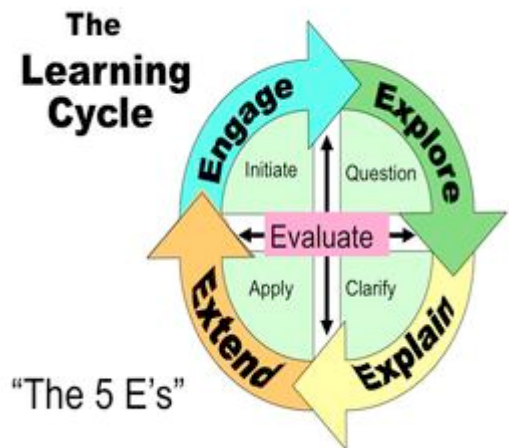
The 5Es represent five stages of a sequence for teaching and learning: Engage, Explore, Explain (or Elaborate) and Evaluate. Through this sequence the students and teachers would be able to involve in activities, which stimulate the experiences, resulting in construction of knowledge built up on the previous knowledge. Each stage is explained in detail in the following section.

**Engage:** This phase is intended to stimulate curiosity and activate prior knowledge of student. The activity should be a problem or an event or an issue that raises questions and motivates the students to discover more about the concept. Specifically this stage helps in:

- Make connections between past and present learning experiences
- Anticipate activities and focus on students' thinking on the learning outcomes of current activities. Students should become mentally engaged in the concept, process, or skills to be learnt.
- Gives an opportunity for teacher to understand misconceptions of students.

**Explore:** Students need the opportunity to actively explore the concept in a hands-on activity. This establishes a commonly shared classroom experience and allows students to share about the concept. This stage of 5E's provides students with a common base of experiences. They identify and develop concepts, processes, and skills. During this stage, students actively explore their environment or manipulate materials.

**Explain:** This stage of 5E's helps students explain the concepts they have been exploring. They have opportunities to verbalize their conceptual understanding or to demonstrate new skills or behaviors. Teachers use questioning strategies to lead students' discussion of information discovered during the Explore stage. This stage also provides opportunities for teachers to introduce formal terms, definitions, and explanations for concepts, processes, skills or behaviors.





**Elaborate:** This phase of 5E's extends students' conceptual understanding and allows them to practice skills and behaviors. Through new experiences, the learners develop deeper and broader understanding of major concepts, obtain more information about areas of interest, and refine their skills. Students are encouraged to apply, extend, and enhance the new concept and related term during interaction with the teacher and other students.

**Evaluate:** This stage of the 5E's encourages learners to assess their understanding and abilities and lets teachers evaluate students' understanding of key concepts and skill development. The teacher must create a quality assessment to gauge the learner's understanding of the topic. The students must also be able to reflect their own understanding and progress.

A sample Web 2.0 Integrated Constructivist Learning Plan

Based on the discussion above, a simple constructivist learning plan is designed using the 5E model is given below. The unit is based on the content of NCERT science text book for class IX. The topic is poultry farming under the larger unit of animal husbandry and is suitable for any secondary school class level. There are many technology integrated activities suggested under each phase of the model and the facilitator can choose and direct the learning based on the available time and resources.

The main purpose of learning this topic is to make learner aware of the poultry farming practices and its importance. The learner is also encouraged to explore the poultry farming practices in different regions of the world and current status of poultry farming in the country. This unit is also expected to give them many answers to the problem of bird flu which is very common in today's context. The learning environment created through various phases of this model encourages the learners to use web 2.0 tools. The learning environment provides the information that learners need to understand poultry farming and related concepts through text documents, graphics, video and animation resources which can be accessed through the World Wide Web. The learners are also provided with various collaborative tools such as e-mail, chat, forum, wiki, blog etc. to form learning communities to negotiate and co-construct meaning about the concepts through these tools.

Web 2.0 Mediated Constructivist Learning Design

Are: Animal Husbandry- Poultry Farming

5E Approach

Class IX

Engage

Engaging Activities for the Topic

- View the online streaming video on poultry from <http://www.youtube.com/watch?v=aJ7rrHYmFiQ>
- Collaborative digital concept map on egg/poultry farming-mind map-ise free mind (offline), bubble (online) <http://www.bubble.us/index>
- Questions that you want to ask about egg and poultry farm- on-line forums (questions like the following will emerge) <http://www.allexperts.com/> take an online web quest on Bird flu from <http://www.mofb.org/WebQuest.aspx/BirdFlu.aspx>

### Explore

Exploration activities for the topic

- Take the following virtual field trip
  1. Online visit to an organic egg farm/virtual field trip <http://www.exploratorium.com/cooking/eggs/farm/index.html>
  2. Poultry virtual farm <http://sites.ext.vt.edu/virtualfarm/poultry/poultry.html>
- Visit a Poultry farm: visit a nearby poultry farm. Take along all types of digital recording equipment. Audiotape farm sounds. Videotape farm activities. Photograph farm people, equipment, crops and animals. Show the world a unique farm in your area by adding your own farm website to the Internet.
- Differentiate poultry birds and stages/process of poultry farming- creating digital album- flicker/picasa
- Understanding poultry farming and poultry birds in different country through:
  1. Online collaboration through e-pal
  2. Viewing and discussing various streaming videos from YouTube; [http://www.youtube.com/watch?v=kOk8lcn\\_TQ](http://www.youtube.com/watch?v=kOk8lcn_TQ)
  3. Through Google Image search
- Ask an expert: Have your class e-mail (or live chat if available) and expert about question that they have poultry farm; <http://allexperts.com>, specifically <http://www.allexperts.com/el/Poultry-Farming/>, [http://en.allexperts.com/q/Poultry-Farming-3481/index\\_11htm](http://en.allexperts.com/q/Poultry-Farming-3481/index_11htm)
- Ask questions on the following forum sites
  - o <http://apps.exploratorium.edu/cgi-bin/yabb2-cooking/YaBB.pl>
  - o <http://the-coop.org/cgi-bin/UBB/ultimatebb.cgi>
- View the webcast on egg; <https://www.exploratorium.edu/cooking/webcasts/index.html>

**Explain**

Explain activities for the Topic

- Students collaborate and develop a wiki on poultry farming using wiki space; <http://www.wikispace.com>
- E-News Letter on poultry farming: Microsoft publisher or equivalent open source software
- Plan and design a digital poultry farm of your own in groups and share the design
- Discuss the difference in poultry farming in different countries using discussion board/forums/groups
- After the visit to the local poultry farm Show the world a unique farm in your area by adding your own farm website to the Internet
- Compare traditional poultry farming with modern poultry farming using discussion board/forums/groups
- Collaborative digital concept map on poultry farming- mind map- use free mind (offline), bubbl (online) <http://www.bubbl.us/index>

**Elaborate**

Elaborate activities for the topic

- Making art work using egg shell
- They analyze and develop a social bookmarking of websites related poultry farming/ animal husbandry
- Take a web quest on the following:
  - o Bird flu <http://www.modfb.org/WebQuest.aspx?BirdFlu.aspx>
  - o From egg to check <http://www.mofb.org/webquest/wq23a.htm>
  - o Adventures on aviculture <http://www.besd61.k12.il.us/webquests/8th%20Grade/sharp/birds2/studentspage.htm>
- Write a review of a poultry farming website in your blog
- Develop a collaborative podcasts on importance of poultry farms and host it in Gcast
- Explore the poultry (duck) farming in Kerala through Internet and e-mail
- Searching the net and make a database of poultry related web sites
  - o The Coop is dedicated to all the folks around the world that raise, breed or show poultry, waterfowl, gamebirds and related species. <http://www.the-coop.org/index.html>

**Evaluate**

Evaluation activities for the topic

- Create a digital portfolio on poultry farming: develop the portfolio using mahara; <http://mahara.org>
  - Portfolio artifacts
  - New Letter
  - Project Report
  - Blog post etc.
- Online reflective journal using <http://edublogs.org>
- Peer assessment
- Create digital rubrics along with students for assessing the portfolio and other activities using rubistar, <http://rubistar.4teachers.org/>
- Develop digital checklist for all other activities they are involved in and products they have created using online free form creator- zoho creator (<http://www.zoho.com/creator/html-form-builder.html>) or google docs-forms (<http://www.google.com/google-d-s/forms>)
- Develop and conduct a traditional multiple choice online test using Easy Test Maker, <http://www.easytestmaker.com>

**8.4.2 PROJECT BASED LEARNING (PBL)**

Project-based learning is a pedagogical method in which students working as a team are given a "driving question" to respond to or answer, then directed to present their gained knowledge as writings, art, drawings, three-dimensional representations, videos, or technology-based presentations. Proponents of project-based learning cite numerous benefits of these strategies including a greater depth of understanding of concepts, broader knowledge base, improved communication and interpersonal/social skills, enhanced leadership skills, increased creativity, and improved writing skills. When students use technology as a tool to communicate with others, they take on an active role vs. a passive role of transmitting the information by a teacher, a book, or broadcast. The student is constantly making choices on how to obtain, display, or manipulate information.

The basis of PBL lies in the authenticity or real-life application of the research and is considered an alternative to paper-based, rote memorization, teacher-led classrooms.



### 8.4.2.1 Elements

The core idea of project-based or inquiry based learning is that real-world problems capture students' interest and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context. The teacher plays the role of facilitator, working with students to frame worthwhile questions, structuring meaningful tasks, coaching both knowledge development and social skills, and carefully assessing what students have learned from the experience. Typical projects present a problem to solve (What is the best way to reduce the pollution in the schoolyard pond?) or a phenomenon to investigate (What causes rain? ).

There are often three phases in a project-based learning activity:

- **Phase 1:** Discuss the project topic and ask the students' what they already know about the topic.
- **Phase 2:** In teams, students gather information from a variety of sources and synthesize, analyze, and derive knowledge from it. They also talk to experts and visit the site involved (if applicable).
- **Phase 3:** The teams then put together a presentation showing what they have learned (the answer to the question) and make a presentation to the rest of the class. Assessment is based on how much they've learned and how well they communicate it. Students also evaluate their peers for collaboration and presentation skills.

Following are the Steps to Designing Activity or Project

1. Identify Learning Objectives
2. Construct Assessment
3. Design the Activity
4. Design the Process
5. Plan Classroom Management Related to the Use of Technology
6. Pre-teach concepts and provide any tool the students will need at the computers before they get to the lab or to the classroom computers.

### 8.4.2.2 Examples

At the high school level, classroom activities may include making water purification systems, investigating service learning, or creating new bus routes. At the middle school level, activities may include researching trash statistics, documenting local history through interviews, or writing essays about a community scavenger hunt. Classes are designed to help diverse students become ready for college and career after high school.

### 8.4.2.3 Roles

When students use technology as a tool to communicate with others, they take on an active role vs. a passive role of transmitting the information by a teacher, a book, or broadcast. The students are constantly making choice on how to obtain, display, or manipulate information. Technology makes it possible for students to think actively about the choices they make and execute. Every student has the opportunity to get involved either individually or as a group.

Instructor's role in Project Based Learning is that of a facilitator. They do not relinquish control of the collaborative classroom or student learning but rather develop an atmosphere of shared responsibility. The Instructor must structure the proposed question/issue so as to direct the students' learning toward content-based materials. The instructor must regulate student success with intermittent, transitional goals to ensure student projects remain focused and students have a deep understanding of the concepts being investigated. The students are held accountable to these goals through ongoing feedback and assessments. The ongoing assessment and feedback are essential to ensure that student stays within the scope of the driving question and the core standards the project is trying to unpack.

### 8.4.2.4 Outcomes

Students learn to work in a community, thereby taking on social responsibilities. The most significant contributions of PBL have been in schools languishing in poverty stricken areas; when students take responsibility, or ownership, for their learning, their self-esteem soars. It also helps to create better work habits and attitudes toward learning. Although students do work in groups, they also become more independent because they are receiving little instruction from the teacher. With Project-Based Learning students also learn skills that are essential in higher education. The students learn more than just finding answers, PBL allows them to expand their minds and think beyond what they normally would. Students have to find answers to questions and combine those using critically thinking skills to come up with answers.

ICT are effective tools for project-based learning. Students can use tools such as word processing software, spreadsheets and databases to perform tasks such as drafting essays, analyzing numerical data, and keeping track of collected information. In addition, students can use the Internet for research and use online applications and tools, such as e-mail, e-forums, wikis and blogs to facilitate communication and collaboration with others. They can also utilize online journals for developing their ideas, and can create websites and presentations to display what they have learned.



### Activity



#### Activity:

1. You can go through the link and explore the different options of problem based learning <http://www.techforteachers.net/planning-a-unit.html>
2. Visit the links and explore PBL Sample Units
  - University of Delaware-<http://www.udel.edu/pbl/problems/>
  - Dan Tries Problem- Based Learning: <http://www.udel.edu/pbl/dancase3.html>



### Check Your Progress-5



1. The essential element of constructivism is active construction of new knowledge by the learner based on -----

- a. students experiences
- b. students knowledge
- c. students talents
- d. teachers knowledge

Wrong

Wrong

Wrong

Correct Option

#### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. The basis of PBL lies in authenticity or real-life application of the research and is considered an -----  
-----

- a. alternative to teacher-led classrooms.
- b. alternative to paper-based class room
- c. alternative to rote memorization
- d. alternative to assessment free class room

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

3. Which of the following is not a step of designing an activity or project?

- a. Identify Learning Objectives
- b. Construct Assessment
- c. Design the Activity
- d. Implement the activity

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



### 8.4.3 WEBQUEST

You are already familiar with many Web 2 tools and their application in education by now. This section introduces WebQuest which is a learning strategy. A combination of conceptual understanding and hands on practice has been included in this section. A conceptual understanding on WebQuest which discusses its meaning, its development in detail and explores its educational applications, helps to understand the concept of WebQuest. The activities designed provide the hands on experience to enable you to be comfortable with designing it and using it in education.

#### 8.4.3.1 Meaning of WebQuest

WebQuest is a strategy/learning design/lesson plan format to use Web effectively in teaching learning process on the basis of sound learning theory and instructional design. Professor Bernie Dodge of San Diego State University developed the concept of WebQuest in 1995. Professor Bernie Dodge defined WebQuest 'as an inquiry oriented activity in which some or all the information that learners interact with comes from the internet'.



#### 8.4.3.2 WebQuest and non WebQuest

A WebQuest has three essential stages: Input stage, transformation stage and outcomes stage. At the Input stage all the information is collected from the web. At the second stage the learners' understanding of the information collected is essential and critical. At the third stage the understanding gained by the learner/s is presented in different forms. Thus WebQuests essentially demand higher order thinking.

Many learning activities may need collecting information from the Web. Mere collection of information from the Web and presenting it does not qualify a learning activity to be a WebQuest. When learner/s is facilitated to transform the information collected from the Web into newly constructed and assimilated understanding, then the learning activity becomes a true WebQuest. In order to understand a true WebQuest the definition given by Tom March would be useful.

Tom March (2003) has defined "WebQuest as a scaffolded learning structure that uses links to essential resources on the World Wide Web and an authentic task to motivate students' investigation of a central open-ended question, development of individual expertise, and participation in a final group process that attempts to transform newly acquired information into a more sophisticated understanding. The best WebQuest do this in a way that inspires students to see richer thematic relationships, facilitate a contribution to the real world, and reflect on their own metacognitive processes."

On the basis of this definition the features of a WebQuest can be identified as:

- Scaffolded learning,
- Authentic task for learners,
- Open ended question for the inquiry,
- Development of individual expertise,
- Participation in group process,
- Transformation of information into a sophisticated understanding.

A WebQuest requires accessing and collecting information on the Web, collaboration among learners and teachers, and connecting with the real world. All this demands sharing of online space. Various Web 2 tools facilitate sharing of online space making a WebQuest an important learning activity to integrate technology in education.

#### 8.4.3.3 Types of WebQuests

WebQuests can be classified on the basis of period required and the disciplines/subject areas covered.

- **Short term WebQuest:** It requires approximately one to three teaching periods. The key learning process engaged by the learners is accessing a considerable information and deriving meaning from it.
- **Long term WebQuest:** It requires a longer period of a week or even a month. The key learning process engaged by the learners is accessing a large body of knowledge, analysing it, transforming it in another form, and demonstrating their understanding of the material by presenting in another form to which others can respond to on line or off line.

#### 8.4.3.4 Key Elements of a WebQuest

The key elements of WebQuest as designed by Bernie Dodge	Some dimensions of WebQuest presented by Tom March
<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Task</li> <li>3. Process</li> <li>4. Evaluation</li> <li>5. Conclusion</li> <li>6. Teacher's Page</li> </ol>	<ol style="list-style-type: none"> <li>1. Engagements</li> <li>2. Brainstorming</li> <li>3. Information Gathering</li> <li>4. Learning Paths</li> <li>5. Emerging Expertise</li> <li>6. Contribute innovation</li> <li>7. Reflection</li> </ol>

#### 8.4.3.5 Advantages of WebQuest

1. It incorporates the constructivist approach to learning.
2. It facilitates development of twenty first century skills in learners.
3. It provides a platform for effective integration of Web in classroom instruction.
4. It provides a design of a learning experience/lesson format for learner centred approach to learning.
5. It enhances critical thinking.
6. It develops problem solving ability.
7. It motivates students by assigning them authentic tasks.
8. It develops skills for collaboration and team work.

WebQuest as a strategy for using resources on the web has the potential to be used in learning and professional development. It provides a lesson plan format for problem based learning. It also provides opportunities for using Web 2 tools in learning process. The teachers can also employ the strategy of WebQuest to address the professional practice/s at their school. A database of various WebQuests also would facilitate teachers to develop/modify WebQuests for their learners.



### Activity



#### Activity

1. For strengthening the understanding of WebQuest you may take the tutorial on WebQuest with your learning partner. Place on discussion board any significant observation you wish to make about WebQuest. Follow link- This website offers a step by step tutorial on WebQuest



- <http://www.zunal.com/>
- <http://www.thirteen.org/edonline/concept2class/webquests/index.html>

2. Go through the following link for the details of design of a web quest by Bernie Dodge

- <http://webquest.sdsu.edu/designsteps/index.html>
- <http://webquest.org/index-create.php>
- <http://tommarch.com/learning/webquest.html>

3. Go through the following link for the details about how to create a WebQuest

- [http://tommarch.com/writings/wq\\_design.php](http://tommarch.com/writings/wq_design.php)



## Check Your Progress-6



1. A WebQuest is ----- oriented activity in which some or all the information that learners interact with comes from the internet

- a. an enquiry
- b an inquiry
- c. a discovery
- d. a questioning

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. Which of the following is not an essential stage of a WebQuest?

- a. Input stage
- b. transformation stage
- c. outcomes stage
- d. Interaction stage

Wrong



Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

3 Which of the following is feature of a WebQuest?

- a. Authentic task for learners
- b. Open ended question for the inquiry
- c. Development of individual expertise
- d. all of these

Wrong

Wrong

Wrong

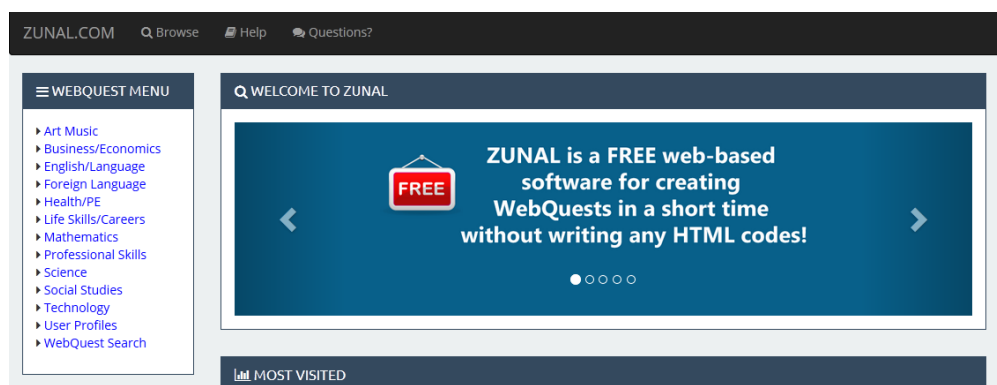
Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



## 8.4.4 VIRTUAL FIELD TRIP



Developments in technology opened tremendous possibilities in teaching and learning. One of the significant contributions is that it has provided access to remote locations and facilitated breaking the walls of classroom. A Virtual

Field Trip is a learning experience which explores the potential of internet. It gained popularity in 2000.

#### 8.4.4.1 Meaning of Virtual Field Trip

Virtual Field Trip has been defined in various ways. Foley (2003) describes it as, “a guided exploration through the Web that organizes a collection of prescreened, thematically based web pages into a structured online learning experience.” Nix (1999) describes it as, “ an inter related collection of images, supporting text and / or other media delivered electronically via the World Wide Web in a format that can be professionally presented to relate to the essence of visit to a time or place.”

Virtual Field Trip then is a simulated real time field trip. Stevenson (2001) explains it as computer generated environments that offer media rich interactions with a particular location such as laboratories, museums, parks, zoos and/or other countries. Some other terms used to suggest Virtual Field Trip are online tours and eFieldTrip.

#### 8.4.4.2 Formats of Virtual Field Trip

There are various formats of a Virtual Field Trip. Some of them are mentioned below.

- It consists of links on a web page.
- It can be a photo tour of a particular site like a museum or a monument.
- It consists of use of a navigator to move through the tour.
- It can be a real time guided field trip which uses interactive pages on the web which have been selected by the teacher and arranged in a particular order to guide the search by learners. The live links with experts on site is important to provide a real time experience to the learners. The live links can be provided by using videoconferencing, audio conferencing. This type of Virtual Field Trip is quite, detailed and complex with provision of interactivity.

Thus, Virtual Field Trip can be a simple photo tour of a particular site or a complex one with additional links and interactive facility.

In terms of organizing the content for a Virtual Field Trip, the formats can be as follows.

- Chronological for example, a scientific expeditions, journey
- Topical place or subject for example, museum
- Archived which describes a real time event stored online.

Virtual Field Trips can be prepared by learners, teachers and experts. The following table indicates the application of these virtual field trips:

Virtual Field Trip Prepared by	Application
learners	<ul style="list-style-type: none"> <li>■ After the real field trip activity - It helps to consolidate the understanding gained during a real field trip</li> <li>■ Before the real field trip activity - It helps to prepare for the upcoming field trip</li> </ul>
teachers	<ul style="list-style-type: none"> <li>■ Teachers' travels to various places can be employed as a useful resource for developing a Virtual Field Trip. It can be used as a teaching learning resource to be used by the teacher, shared with other teachers and shared online with learners/teachers of the world</li> </ul>

**experts**

- Learners can view the Virtual Field Trips available as online resources. These could be prepared by experts or other teachers. This activity could be a pre field activity or a post field activity.

### 8.4.4.3 Components of Virtual Field Trip

A Virtual Field Trip has various components. These are mentioned below.

- **Content background information-** This may contain the title of the Virtual Field Trip. It may be an introduction to the topic of the Virtual Field Trip and an idea of what will be viewed by the learners.
- **Images/animation** - This provides the pictures related to the topic. The pictures can be still pictures and/or clips of video. The pictures can be taken by the creator of the VFT (learner or the teacher) or it can be taken from the resources available on the internet. It is essential to acknowledge the source from where the pictures/images are taken, especially if they are taken from the internet
- **Sound/music-** The addition of sound/music provides a sense of reality to the field visited virtually. The sound can be of the animals if the VFT is to a Wild Life Sanctuary, or it can be of the sound of wind or heavy rain if the VFT is to a geographical location.
- **Interactivity/Online forums-** This element brings in the interactivity in a VFT. The learners can ask questions or have a dialogue with scientists working in remote areas. This interactivity thus provides the learners an access to experts who may be normally inaccessible to them. Access to the experts can be obtained through e-mail, discussion boards and chats.
- **Additional links** - It is necessary to enhance the information about the topic of VFT. This can be provided through additional links which the learners can access. This facility helps the learner to navigate through the vast amount of information available on a topic.
- **Educational material-** Pre VFT, during VFT and post VFT- This is in the form of worksheets. The learners can note their observations during a VFT in the worksheets. The nature of questions asked in the worksheet will depend upon the nature of VFT-is it a pre field trip or a post field trip. The worksheet should have questions which will enable the teacher to determine if the learners have been involved in the VFT and what have they understood. The worksheets will help the teacher to decide if the learning objectives of the VFT have been realized.

### 8.4.4.4 Flow of a Virtual Field Trip as a lesson plan

#### Stage I

General introduction of the upcoming Virtual Field Trip by teacher

- Learners work on the worksheet stage 1(before the Virtual Field Trip).
- At this stage learners' curiosity about the upcoming Virtual Field Trip is aroused.
- Learners also recollect the known facts about the site to be visited in the upcoming Virtual Field Trip

#### Stage II

Viewing the Virtual Field Trip

1. Learners view the Virtual Field Trip
2. Learners work on the worksheet simultaneously (Worksheet for stage II 'during the Virtual Field Trip')
3. This is the stage of exploration and observation

#### Stage III

Consolidation

1. Learners work on the worksheet (Worksheet for Stage III, 'after the Virtual Field Trip')
2. This stage is to check-

- the overall understanding gained by the learners
- if the learners have navigated properly to the intended web links

This is the essential flow of the lesson plan of the Virtual Field Trip. It may be modified a little if desired but the essential stages need to be covered.

### Tasks for teacher to use Virtual Field Trip as a learning experience

Based on the flow of the Virtual Field Trip the tasks for the teacher can be listed as mentioned below:

1. Decide a topic
2. Search for relevant web links and images. If you wish to add pictures that you have clicked you may do so.
3. Classify the web links as essential to understand the topic and as additional links for further exploration
4. Decide the logical arrangement of the content for the Virtual Field Trip (thematic, chronological ...etc.)
5. Create the Virtual Field Trip in Power Point by
  - Creating a title slide with index of the various sub topics. Use hyper link for easy navigation through the various slides.
  - Arrange the images and text appropriately. The text needs to provide a context for the image, some facts about it and may be a question to make the learners think about the image. Keep the text brief.
  - Provide additional links on every slide for further exploration of information related to the topic.
  - Develop Worksheets. Three types of worksheets need to be developed: worksheet for before viewing the Virtual Field Trip, worksheet for making observations while viewing the Virtual Field Trip and worksheet for consolidation after the Virtual Field Trip is viewed.
  - View the Virtual Field Trip yourself to check the functioning of all web links.
  - Implement the Virtual Field Trip.

#### 8.4.4.5 Advantages of Virtual Field Trip

1. It helps to string together a list of websites which follow a particular theme or a story.
2. The content on a web site can be contextualized for the learners as per their age and grade by the teacher's comment in the narration window on the web site.
3. Once developed, a Virtual Field Trip can be used as often as required.
4. It allows learners to explore the various sites at their own pace and the depth they desire.
5. It takes the learners to the places which are not easily accessible.
6. It involves active learning.
7. It takes learners away from classrooms to the field reality.
8. It is safe from hazards of journey to difficult terrains/locations.
9. It is inexpensive.

#### 8.4.4.6 Disadvantages of Virtual Field Trip

- It is stated that it lacks the sensory experience of the field. This disadvantage may be reviewed as the VFT provides visual and auditory experience.
- It may be one sided presentation. The learners' questions may not be answered as the teacher may not know all aspects of the topic/site of Virtual Field Trip. However, the interactive additions on a Virtual Field Trip in terms of audio conferencing, video conferencing and forums may solve this problem.
- The updated versions/latest additions to a site like museum may not be updated on the web site so the learners may not know about the latest developments.

It requires internet connectivity and multimedia computer lab.

### 8.4.4.7 Educational Applications

Virtual Field Trip is a learning experience which has multiple uses in school.

In the teaching learning process, it has the following uses for a teacher:

- Use as an educational tool when visit to a particular location is not possible.
- Use as a preparatory activity before the real field trip.
- Present to learners as a reflective activity after a real field trip.
- Use as a collaborative learning experience to connect with learners from different parts of the country and/or globe. For this, learners can exchange the Virtual Field Trip prepared by them.
- Use as a learning experience for engaging learners in inquiry based learning.
- Use as a tool for learners for self-learning.
- Use as a tool for learners for self-paced learning.
- Use as a tool for addressing multiple intelligence of learners.
- Use as a tool to develop among learners a sense of responsibility for community as the learners' record the aspects of society in the form of a Virtual Field Trip.

Students can use the Virtual Field Trip in the following ways:

- Create Virtual Field Trips collaboratively with other learners. One group or a section of class can develop a Virtual Field Trip and the other group or section of learners can be the viewers. At the end, there can be a discussion between the two groups.
- Document the real field trip which can be submitted/used for assessment.
- Use picture and texts from the Virtual Field Trips developed for other presentations and assignments

For Professional development of teachers it has the following uses:

- Share VFT as a learning resource with other teachers.
- Enrich and enhance knowledge in a particular topic.
- Conduct action research on aspects of VFT such as challenges faced in creating VFT and influence of VFT on learners.



### Activity



#### Activity:

- View the Virtual Field Tour of the Tower of London. Follow link
- <http://www.toweroflondontour.com/>
- [http://www.internet4classrooms.com/links\\_grades\\_kindergarten\\_12/virtual\\_field\\_trips\\_collections.htm](http://www.internet4classrooms.com/links_grades_kindergarten_12/virtual_field_trips_collections.htm)
- <http://surfaquarium.com/newsletter/vfts.htm>



### Check Your Progress 7



1. A guided exploration through the Web that organizes a collection of prescreened, thematically based web pages into a structured online learning experience is.....

- a. Virtual Tour
- b. Virtual Trip

- c. Virtual Field Trip
- d. Virtual Picnic

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

2. In terms of organizing the content for a Virtual Field Trip, which of the following cannot be a format?

- a. Chronological
- b. Topical
- c. Topical
- d. Archived

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

3. Which of the following is not a component of a VFT?

- a. Sound
- b. Dialogue
- c. Interactivity
- d. online forum

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

4. Which of the following is advantage(s) of VFT?

- a. It involves active learning.
- b. It takes learners away from classrooms to the field reality.
- c. It is safe from hazards of journey to difficult terrains/locations.
- d. All of the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



## 8.5 LET US SUM UP

- The concept of Web 2.0 was developed by Tim O'Reilly, results in making great changes in the use of internet and interactivity.
- Web 2.0 has helped in enhancing and transforming the web based communities such as chat forums, discussion forums, social networking, wikis and blogs.
- The key features of Web 2.0 include; Folksonomy, Rich User Experience, User Participation, Software as a service, Mass Participation.
- A wiki is a website which allows collaborative modification of its content and structure directly from the web browser.
- "Blog" is an abbreviated version of "weblog," which is a term used to describe websites that maintain an ongoing chronicle of information.
- Social network is a network or connectivity among individuals or organizations. The connectivity is been decided based on different interdependency and need. Individuals can get connected instantly across the

globe, and share the ideas and information, which could be seen or shared by the individuals in the network.

- Constructivist approach considers learners as the real constructors of knowledge through the active participation and involvement in the learning process. The role of the teachers is as facilitators or co-learners.
- Project-based learning is a pedagogical method in which students working as a team are given a "driving question" to respond to or answer, then directed to present their gained knowledge as writings, art, drawings, three-dimensional representations, videos, or technology-based presentations.

## 8.6 UNIT END EXERCISES

1. List Web 2.0 technology tools
2. Explain the concept of constructivist learning
3. What are the different dimensions of PBL
4. Describe WebQuest as a learning activity
5. Explain the potential of WebQuest for developing twenty first century skills
6. Describe the scope of Web 2 technology in WebQuest
7. Define Virtual Field Trip
8. Identify the uses of Virtual Field Trip in education
9. Explain the different formats of Virtual Field Trip
10. Differentiate between real field trip and Virtual Field Trip
11. Define Social Bookmarking
12. Identify various social bookmarking sites
13. Describe the various features of social bookmarking websites.
14. Recognize the meaning of Wiki
15. Explore the uses of Wiki
16. Define blog and various terminologies associated with it
17. Describe the features and benefits of blogs and blogging
18. Identify various elements of blog and tools for blogging
19. Explain approaches to integrating blogs in education
20. Explain the educational applications of Web 2.0 tools

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- 

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## Unit - 9 : ICT in assessment

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**Unit - 9 : ICT in assessment**

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#### Structure

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9.1 INTRODUCTION



Assessment plays a major role in student learning. There are many new approaches to assessment with an emphasis on the process of learning along with the product of learning. Performance based authentic assessment is emphasized world over. In India also there is an emphasis on continuous and comprehensive evaluation of students' learning. Development in information and communication technology has thrown open numerous possibilities for assessing student learning and providing feedback.

This unit on ICT in Assessment discusses about the basics of assessment practices and explores how various technology tools can be integrated effectively for assessing student learning. The concept map below gives an overview of how ICT can be used for assessment.



9.2 OBJECTIVES

After studying this Unit, you will be able to

- revise the basic concepts related to assessment
- explain the role of ICT in assessment
- explain the concept of computer assisted and computer adaptive testing
- list various technology tools and possibilities for assessment of student learning
- design and create digital assessment portfolio
- create tests/ quizzes/rubrics using online and offline software tools
- explore various digital online and offline assessment alternatives available
- describe the current and future trends in technology based assessment practices

### 9.3 MEANING AND TYPES OF ASSESSMENT

Assessment is the process of identifying, gathering and interpreting information about students' learning. Assessment involves using wide variety of methods and tools to evaluate, measure, and document the student learning. Assessment basically helps one to improve learning and also set direction for ongoing teaching and learning process.

Activity: View the video on assessment from the following link.

<https://www.youtube.com/watch?v=TZtOkKqldCY> After viewing the video explore and define assessment and write it in your Blog.....

<https://www.youtube.com/watch?v=TZtOkKqldCY>

#### 9.3.1 Types of Assessment

Assessment can be classified in to various types or approaches based on the purpose for which it is designed. It can be classified as follows:

**Formative Assessment:** Formative assessment provides feedback and information during the instructional process, while learning is taking place, and while learning is occurring.

**Summative Assessment:** Summative assessment takes place after the learning has been completed and provides information and feedback that sums up the teaching and learning process.

**Diagnostic Assessment:** Diagnostic assessment can help you identify your students' current knowledge of a subject, their skill sets and capabilities, and to clarify misconceptions before teaching takes place. Knowing students' strengths and weaknesses can help you better plan what to teach and how to teach it.

**Authentic Assessment:** The term **authentic assessment** describes the multiple forms of assessment that reflect student learning, achievement, motivation, and attitudes on instructionally relevant classroom activities. It emphasizes what students know, rather than what they do not know or requires students to develop responses instead of selecting

them from predetermined options. An **authentic assessment** usually includes a task for students to perform and a rubric by which their performance on the task will be evaluated.

**Performance Assessment:** Performance assessment is one which requires students to demonstrate that they have mastered specific skills and competencies by performing or producing something.

The Following Activities will help you to understand more and reflect about the assessment and its types.

Open the following link of the video and View this video on assessment and types of assessment

<https://www.youtube.com/watch?v=1gLhJAEQxoY>

#### After watching.....,

1. Reflect on the assessment practices that you currently follow/difficulties that you face/how technology might help you in the process – Blog
2. Reflect: recollect the assessment practices used by your teachers in the school- how did it facilitate your learning process?
3. Read the following article on assessment and types of assessment <http://www.edu.gov.mb.ca/k12/assess/wncp/section2.pdf>

## ? Check Your Progress-1



1. Assessment is.....

- The process of identifying, gathering and interpreting information about students' learning.
- The systematic collection of information about student learning, using the time, knowledge, expertise, and resources available, in order to inform decision about how to improve learning.
- The primary purpose of assessment is to improve students' learning and teachers' teaching.
- All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. Assessment which requires students to demonstrate that they have mastered specific skills and competencies by performing or producing something.

- Summative assessment
- Authentic assessment
- Performance assessment
- Formative assessment

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

### 9.3.2 Current Trends in Assessment

Traditional multiple-choice tests have come under a great deal of criticism in recent years, but whatever their flaws, they are a mature technology that offers some distinct advantages. They tend to be reliable, as noted. Also, in comparison to some other forms of assessments, they do not require a lot of time or cost a lot of money to administer, and they generate scores that are familiar to educators. It is likely that multiple-choice tests will continue to be widely used for some time to come, as evidenced by the fact that the most of the entrance examinations and board examinations continue to include items of this type in addition to some new item types.

However the recent trend in assessment initiatives by NCERT and CBSE the reach of assessment is more expansive and complex, designed to produce a well-educated, well-rounded student, not just one who could demonstrate discrete literacy and numeracy skills. Thus, for example, they included not just academic content knowledge, but also outcomes that related to thinking, creativity, problem solving, and the interpretation of information.

Some of the major features of assessment are:

- Integral to classroom culture
- Oriented toward clear learning goals
- Incremental and interactive
- Providing feedback that is timely and specific
- Focused on the process of learning as much as the outcome
- Using varied methods to deepen learning and meet diverse student needs

### 9.4 ROLE OF ICT IN ASSESSMENT

Technology has a vital role to play in effective and efficient assessment of learning. Modern technology offers educators a variety of new tools that can be used in the classroom. Technology can help teachers assess their students' learning as well as their performance in the classroom. Use of ICT in assessment involves the use of digital devices to assist in the construction, delivery, storage or reporting of student assessment tasks, responses, grades or feedback.

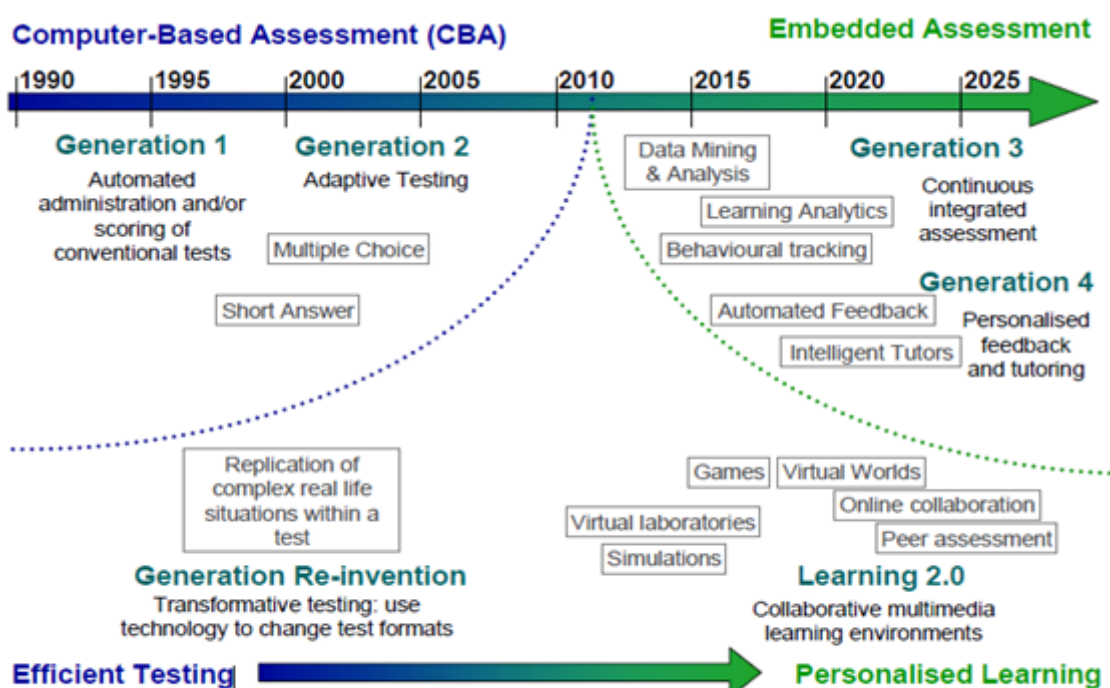
Geoffrey Crisp (2011) in the Teacher's Handbook on e-Assessment stated that the ICT based assessment can be undertaken with many devices, such as traditional desktop computers or laptops, with portable communication devices such as smart mobile phones, with digital devices such as iPads or through the use of electronic gaming devices. ICT based assessment can use a multitude of formats, including text documents or portable document formats, multimedia formats such as sound, video or images; it can involve complex simulations or games; it can also be undertaken by students in groups or individually and it can occur with large numbers of students in a synchronous or asynchronous manner.

Teachers can use computers to construct their assessment tasks, to deliver these tasks to relevant students and to record and provide feedback and grades to these students. Computers can also be used to analyse students' responses, both to provide feedback to the student on the quality and relevance of their response, as well as to provide feedback to the teacher on whether the task can differentiate between students with different abilities. ICT based assessment can be used to test many different capabilities and skills that are developed by students. There are only a few tasks that might not be suitable for completing and recording electronically, but the number of such tasks is rapidly diminishing as technology becomes more sophisticated and widespread. In many disciplines laboratory equipment can be manipulated remotely and students can undertake real time physical performances that are able to be recorded and used for assessment purposes. We are quickly approaching the stage where our imaginations will be the limiting factor in designing e-assessment tasks.

Christine, R. (2013) identified two conceptually different approaches to assessing Key Competencies using ICT. On the one hand, Computer-Based Assessment (CBA) approaches have been employed for more than two decades and now go beyond simple multiple choice test formats. With this new "Generation Re-Invention" or "transformative" testing, questions are increasingly integrated into more complex and authentic problem contexts, so that the full range of Key Competencies can be assessed. Additionally, due to technological advances, a wider range of answer formats, including free text and speech, can be automatically scored.

On the other hand, technology-enhanced learning environments offer a promising avenue for embedded assessment of the more complex and behavioral dimensions of Key Competencies, based on Learning Analytics. Many of the currently available technology-enhanced learning environments, tools and systems recreate learning situations which require complex thinking, problem-solving and collaboration strategies and thus allow for the development of generic skills. Some of these environments allow learners and teachers to assess performance, understand mistakes and learn from them.

Christine, R. (2013) provided an overview of developments and trends in technology-enhanced assessment by elaborating the work of Bunderson (1989), Martin (2008) and Bennett (2010)) in the following figure



**Figure 3: Overview of developments and trends in technology-enhanced assessment**

Source: Elaborated by the author on the basis of Bunderson (1989), Martin (2008) and Bennett (2010)



**Activity:** Open the following link of the video and View this video on role of technology in Assessment <https://www.youtube.com/watch?v=OnBPNn9yLcY> . Then reflect on the role of technology in assessment in your Blog.

**9.4.1. Computer Assisted Assessment (CAA):** Computer-assisted assessment refers to the use of computers to assess students learning and performance. Computer-assisted assessment is a term that covers all forms of assessments, whether summative or formative, delivered with the help of computers. This covers both assessments delivered on computer, either online or offline, and those that are marked with the aid of computers, such as those using Optical Mark Reading (OMR).

Computer Assisted Assessment is typically formative, in that it helps students to discover whether they have learned what the educator intended and provide timely feedback on how best to teach a subject. Increasingly, it can be summative, with limited feedback typically being given at the end of a course and serving to grade and categorize the student's work. It can also be diagnostic, e.g. by testing for pre-knowledge.

#### Advantages

- Computer assisted testing is more likely to be objective testing; testing that can be marked objectively and thus offer high reliability.
- The benefit is that the tests can be marked quickly and easily, and adapted to meet a wide range of learning outcomes.

#### Disadvantages

- It is usually associated with testing knowledge and skills rather than conceptual understanding, because of the frequent use of multiple choice questions (MCQ) formatting, which is believed to test at a lower level of understanding when related to Bloom's Taxonomy;
- Construction of good objective tests requires skill and practice and so is initially time consuming;
- Hardware and software must be carefully monitored to avoid failure during examinations;
- Security issues can be a problem in Web based CAA;
- Students require adequate IT skills and experience of the assessment type.

#### Activity:

Open the following link and View the file on Computer Assisted Assessment.....

[https://economicsnetwork.ac.uk/handbook/printable/caa\\_v5.pdf](https://economicsnetwork.ac.uk/handbook/printable/caa_v5.pdf)

Define Computer Assisted Assessment and explain the nature and importance of Computer Aided Assessment and reflect it in your Blog.

#### 9.4.2. Computer Adaptive Testing

One of the recent advancements in assessment is the design and use of computer-adaptive tests, which add a great deal of efficiency to the testing process. Depending on the student's responses, the software will automatically adjust the level of difficulty of the questions it poses (after a number of correct answers, it will move on to harder items; too many incorrect responses, and it will move back to easier ones), quickly zeroing in on student's level of mastery of the given material. Further, the technology makes it a simple matter to include items that test content from previous and subsequent grades, which allows measurement of a very wide distribution of knowledge and skills (from below grade level to far above it) that might exist in any given class or testing group.

**CAT components:** There are five technical components in building a CAT.

1. Calibrated item pool
2. Starting point or entry level
3. Item selection algorithm
4. Scoring procedure
5. Termination criterion



## Advantages

- Adaptive tests can provide uniformly precise scores for most test-takers.
- An adaptive test can typically be shortened by 50% and still maintain a higher level of precision than a fixed version.
- This translates into a time savings for the test-taker.
- Test-takers do not waste their time attempting items that are too hard or trivially easy.
- Like any computer-based test, adaptive tests may show results immediately after testing.

## Disadvantages

- The first issue encountered in CAT is the calibration of the item pool.
- Although adaptive tests have exposure control algorithms to prevent overuse of a few items, the exposure conditioned upon ability is often not controlled.
- In a CAT with a time limit it is impossible for the examinee to accurately budget the time one can spend on each test item and to determine if he/she is on pace to complete a timed test section.

Open the following link and View the file on Computer Adaptive Testing.....

[http://www.ccsso.org/Documents/2011/Guide\\_to\\_Computer\\_Adaptive\\_2011.pdf](http://www.ccsso.org/Documents/2011/Guide_to_Computer_Adaptive_2011.pdf)

Define Computer Adaptive Testing and explain the nature and Importance of Computer Adaptive Testing and reflect it in your Blog.

## Check Your Progress-2



1. Computer Assisted Assessment is.....

- Formative
- Diagnostic
- Summative
- All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. The process used to measure certain aspects of information for a set purpose where the assessment is delivered via a computer connected to a network is called.....

- Computer Assisted Assessment
- Computer Adaptive Testing
- Online Assessment

All the above

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)



## 9.5 ASSESSMENT: DIGITAL TOOLS AND OPTIONS

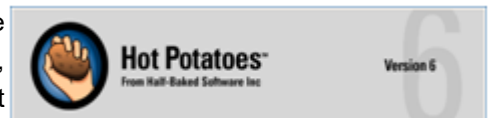
LMS based assessment option: There are a large number of ICT tools and services supporting various kinds of assessment activities. Some of these are offered as specific modules of learning management systems (LMS) like Moodle that enable the management of question banks and items together with the administration and internet-based delivery of tests. The various assessment question types which are available in LMS like moodle are calculated, description, essay, matching, embedded answers (cloze test / gap fill), multiple choice, short answer, numerical, true/false, drag and drop, jigsaw, ordering, multi select, short answer etc.

**Standalone assessment systems:** There are comprehensive assessment management systems with specific focus on summative and formative assessment, like Rogō. It is the University of Nottingham e-Assessment management system used to create and deliver online assessments. This online system supports the full process from question and paper creation (including peer and external examiner reviews) to the analysis of exam results and creation of reports. It has support for formative quizzes, summative exams, surveys and several other paper types. Authentic assessments can be created using any combination of 15 question types together with graphics, audio files and video. The question types are area, dichotomous, multiple choice questions (MCQ), multiple response, extended matching, flash interface, fill-in-the-blank, image hotspots, labelling, likert scales, ranking, script concordance test (SCT), text boxes, true/false



TAO is another such tool which provides an open architecture for computer-assisted test development and delivery, with the potential to respond to the whole range of evaluation needs. It provides to all the actors of the entire computer-based assessment process a comprehensive set of functionalities enabling the creation, the management, and the delivery of electronic assessments.

The Hot Potatoes suite includes six applications, enabling you to create interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the World Wide Web. Hot Potatoes is freeware, and you may use it for any purpose or project you like.



OSCATS: Open Source Computer Adaptive Testing System: The OSCATS library implements Item Response Theory (IRT) and cognitively diagnostic (latent classification) models and item selection algorithms used in Computerized Adaptive Testing (CAT). OSCATS facilitates the development of CATs and simulations of CATs by providing ready-to-use code for running the CAT item selection and ability/classification estimation in an extensible, modular framework.



**Concerto-platform(R-based Adaptive Testing platform):** Online Adaptive Testing Platform Concerto is a web based, adaptive testing platform for creating and running rich, dynamic tests. It combines the flexibility of HTML presentation with the computing power of the R language. It's totally free for commercial and academic use, and it's open source.



**E-Box:** E-Box is a Technology Enabled Active Learning and Assessment platform. Apart from the basic LMS components like quizzes, assignments, lesson components, resource components etc, it has numerous activity components pertaining to technology and engineering concepts that could be used for design and analysis oriented learning. These components are also used for assessing the design and analysis skills of candidates, apart from the regular knowledge level testing.



**2. myexambox:** Create your own online exams and share privately for free. Share your quality online exams publicly. Fine tune your online exams based on user performance, feedback and ratings. Solve publicly available quality online exams anytime.

Activity: Visit the websites of some of this assessment tools and make a comparative analysis of the features of these tools and share this in your blog.



Assessment embedded in authoring tools: Most of the authoring software tools allow teachers to create, compile, administer and grade electronic tests, including, for example eXelearning, xerte, adapt and Learner Activity Management System (LAMS). All these four tools are open source authoring tools and can create many assessment types like cloze, multi select, multi choice, true false, fill in the blanks, matching, drag and drop etc.

## 9.6 E-PORTFOLIO

An **electronic portfolio** (also known as an e-portfolio, e-portfolio, digital portfolio, or online portfolio) is a collection of electronic evidence assembled and managed by a user, usually on the web. Such electronic evidence may include inputted text, electronic files, images, multimedia, blog entries, and hyperlinks. E-portfolios are both demonstrations of the user's abilities and platforms for self-expression and if they are online, they can be maintained dynamically over time.

An e-portfolio can be seen as a type of learning record that provides actual evidence of achievement. Learning records are closely related to the learning. To the extent that a personal learning environment captures and displays a learning record, it also might be understood to be an electronic portfolio.

### 9.6.1 Meaning and Types

#### What is Portfolio Assessment?

Portfolios are used in many disciplines and although there are numerous definitions in the literature, in general a portfolio can be described as, "a purposeful compilation and reflection of one's work, efforts and progress". In addition there are different types of portfolio including assessment, employment, learning, and teaching portfolios, the format ultimately depending on the purpose for which it is developed. Portfolios are considered as a learning and assessment tool.

Portfolios are viewed both as reflective tools to document students' academic progress as well as organized digests of artifacts documenting professional development. Portfolios include artifacts supporting evidence of personal reflection on and embodiment of outcomes. Other uses of portfolios include program exit assessment, demonstration of competency, achievement, and documentation of personal growth and social development.

**Electronic Portfolio-** An electronic portfolio (also known as an e-portfolio, digital portfolio, or online portfolio) is a collection of electronic evidence assembled and managed by a user, usually on the Web. Such electronic evidence may include inputted text, electronic files, images, multimedia, blog entries, and hyperlinks. E-portfolios are both demonstrations of the user's abilities and platforms for self-expression, and, if they are online, they can be maintained dynamically over time.

#### Types of e-portfolio

**Developmental Portfolios:** Demonstrate the advancement and development of student skills over a period of time. Developmental portfolios are considered works-in-progress and include both self-assessment and reflection/feedback elements. The primary purpose is to provide communication between students and faculty.

**Assessment Portfolios:** Demonstrate student competence and skill for well-defined areas. These may be end-of-course or program assessments primarily for evaluating student performance. The primary purpose is to evaluate student competency as defined by program standards and outcomes.



**Showcase Portfolios:** demonstrate exemplary work and student skills. This type of portfolio is created at the end of a program to highlight the quality of student work. Students typically show this portfolio to potential employers to gain employment at the end of a degree program.

Self-reflection is an important component of electronic portfolio development. If you do not require participants to self-reflect on the artifacts they add to the portfolio, they will not gain from the rich learning experience that e-portfolio development can provide!

**Activity :** The following activities will help you to understand more and reflect about the e-portfolio.

1. View the video on e –portfolio <https://www.youtube.com/watch?v=5N7KZFRL7ml> . After Viewing..... Reflect on the e-portfolio that how it might help in the process of evaluation.
  2. Also work on....
- Browse through some sample online e-portfolio  
 Reading on e-portfolio  
 Social bookmarking of portfolio tools

### 9.6.2 Tools for Creating e-portfolio

There are many online and offline portfolio tools. A simple portfolio can be created using presentation software like power point. There are many advanced portfolio systems currently available.

- Asymetrix Toolbook (<http://www.asymetrix.com/products/>)
- SuperLink(<http://www.alchemediainc.com/>)

Some commercially available electronic portfolio templates

- Macromedia Authorware (<http://www.macromedia.com/software/authorware/>)
- Macromedia Director (<http://www.macromedia.com/software/director/>)
- Adobe Page Mill (<http://www.adobe.com/products/pagemill/main.html> FileMaker/
- Home Page ([http://www.filemaker.com/products/hp\\_home.html](http://www.filemaker.com/products/hp_home.html) Macromedia/
- DreamWeaver <http://www.macromedia.com/software/dreamweaver/>
- Netscape Composer (<http://home.netscape.com/communicator/composer/v4.0/Adobe>
- Acrobat portable document format (PDF) files (<http://www.adobe.com/products/>)

- **E-portfolio Tool: Mahara:** Mahara is a fully featured web application to build your electronic portfolio. You can create journals, upload files, embed social media resources from the web and collaborate with other users in groups.

- You can Download it from <https://mahara.org/>



### 9.6.3 Advantages of e-portfolio

- A well-executed e-portfolio program is a very good tool for higher education.
- It builds learners' personal and academic growth as they complete complex activities.
- It facilitates the integration of learning as students connect learning across courses a
- It helps students plan their own academic pathways as they understand what they know and are able to do and what they still need to learn.

#### Activity:

1. Have a discussion in the course forum about how portfolio can help learning

Please read the article on how to use blog for creating portfolio from this link <https://www2.le.ac.uk/offices/careers-new/apps/online-networking/creatingaeportfolios.pdf> and create your portfolio using word press OR reorganise your blog as an e-portfolio

2. For the Complete concept of portfolio view the following video

[https://www.youtube.com/watch?v=kTCISU\\_md10](https://www.youtube.com/watch?v=kTCISU_md10)

### ? Check Your Progress-3

1. The type of portfolio which is created at the end of a program to highlight the quality of student work.

- Developmental.
- Showcase.
- Assessment.
- None of the above

Wrong

Correct Option

Wrong

Wrong

#### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

## 9.7 DIGITAL RUBRICS

A rubric is a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria. It is clear that rubrics have two major aspects: coherent sets of criteria and descriptions of levels of performance for these criteria. It can be used to assess and articulate specific components and expectations for an assignment. Rubrics can be used for a variety of assignments: research papers, group projects, portfolios and presentations.

Rubrics let students know what is expected of them before the activity, and demystify grades by clearly stating the expectations for a project or assignment. They also help students see that learning is about gaining specific skills and they give students the opportunity to do self-assessment to reflect on the learning process. During self-assessment, students reflect on the quality of their work, judge the degree to which it reflects explicitly stated goals or criteria, and revise. Self-assessment done using rubric is formative—students assess works in progress to find ways to improve their performance. Teachers can either provide a rubric or create one with students. Rubric could also be used as a peer assessment tool. A sample rubric by Stevens, D. D. & Levi, A. J. (2005) is given below

### Sample Rubrics for Presentation

Task Description: Each student will make a 5 minute presentation on the changes in one Portland community over the past 30 years. The student may focus the presentation in any way s/he wishes, but there needs to be a thesis of some sort, not just a chronological exposition. The presentation should include appropriate photographs, maps, graphs, and other visual aids for the audience.

	Excellent	Competent	Needs work
Knowledge/ Understanding  20%	The presentation demonstrates a depth of historical understanding by using relevant and accurate detail to support the student's thesis.  Research is thorough and goes beyond what was presented in class or in the assigned texts.	The presentation uses knowledge which is generally accurate with only minor inaccuracies, and which is generally relevant to the student's thesis.  Research is adequate but does not go much beyond what was presented in class or in the assigned text.	The presentation uses little relevant or accurate information, not even that which was presented in class or in the assigned texts.  Little or no research is apparent.
Thinking/ Inquiry  30%	The presentation is centered around a thesis which shows a highly developed awareness of historiography or social issues and a high level of conceptual ability.	The presentation shows an analytical structure and a central thesis, but the analysis is not always fully developed and/or linked to the thesis.	The presentation shows no analytical structure and no central thesis.
Communication  20%	The presentation is imaginative and effective in conveying ideas to the audience.  The presenter responds effectively to audience reactions and questions	Presentation techniques used are effective in conveying main ideas, but a bit unimaginative.  Some questions from the audience remain unanswered.	The presentation fails to capture the interest of the audience and/or is confusing in what is to be communicated.

Use of visual aids  20%	The presentation includes appropriate and easily understood visual aids which the presenter refers to and explains at appropriate moments in the presentation.	The presentation includes appropriate visual aids, but these are too few, in a format that makes them difficult to use or understand, and/or the presenter does not refer to or explain them in the presentation.	The presentation includes no visual aids or visual aids that are inappropriate, and/or too small or messy to be understood.  The presenter makes no mention of them in the presentation.
Presentation skills  10%	The presenter speaks clearly and loudly enough to be heard, using eye contact, a lively tone, gestures, and body language to engage the audience.	The presenter speaks clearly and loudly enough to be heard, but tends to drone and/or fails to use eye contact, gestures, and body language consistently or effectively at times.	The presenter cannot be heard and/or speaks so unclearly that s/he cannot be understood.  There is no attempt to engage the audience through eye contact, gestures, or body language.

Though rubrics are very useful, developing this is time consuming and this need to be prepared well in advance. However use of technology in developing rubrics will be able to save time of teachers. There are many digital rubric creating tools available currently for the teachers and learners to create rubrics on the go.

#### Activity:

1. Go through this video on what and how of a rubric and develop a rubric for any activity of your choice <https://www.youtube.com/watch?v=2vEldvPK6rc>
2. Also take this tutorial on how to make a rubric [http://health.usf.edu/publichealth/eta/Rubric\\_Tutorial/default.htm#step1](http://health.usf.edu/publichealth/eta/Rubric_Tutorial/default.htm#step1)

#### Rubric Development Guidelines

- Examine an assignment for your course.
- Outline the elements or critical attributes to be evaluated (these attributes must be objectively measurable).
- Create an evaluative range for performance quality under each element; for instance, "excellent," "good," "unsatisfactory."
- You can reinforce a developmental approach by students by using a developmental scale in your rubric, like "Beginning", "Emerging" and "Exemplary."
- Add descriptors that qualify each level of performance:
- Avoid using subjective or vague criteria such as "interesting" or "creative"; instead, outline objective indicators that would fall under these categories.
- The criteria must clearly differentiate one performance level from another.
- Assign a numerical scale to each level.
- Give a draft of the rubric to your colleagues for feedback.
- Train students to use your rubric and solicit feedback; this will help you judge whether the rubric is clear to them and will identify any weaknesses.
- Rework the rubric based on the feedback.

#### 9.7.1. Tools for Creating Digital Rubrics:

R-Campus: R-Campus is a comprehensive Education Management System and a collaborative learning environment. At RCampus, you can do all your school-related work from building personal and group websites to managing your courses, e-portfolios, academic communities, and much more.





**R-campus** has a digital rubric feature known as iRubric and can be accessed from here <http://www.rcampus.com/rubricshellc.cfm?mode=studio&sms=build&#REQUEST.rsUrlToken#>. iRubric is a comprehensive rubric development, assessment, and sharing tool. Designed from the ground up, iRubric supports a variety of applications in an easy-to-use package. Best of all, iRubric is free to individual faculty and students. iRubric School-Edition empowers schools with an easy-to-use system for monitoring student learning outcomes and aligning with standards.

**EasyTagger** is another digital rubric creation tool available online and can be accessed from <https://www.essaytagger.com/commoncore>



**RubiStar** does away with the tedium of creating rubrics from scratch by allowing us to customize one of many template rubrics. You can use the rubrics as is, or modify the templates to better serve your particular students' needs. You can choose from six skill categories: Multimedia, Products, Experiments, Oral Projects, Research and Writing, and Work Skills. <http://rubistar.4teachers.org/index.php>



### **Annenberg Learner**

The site will walk you through seven steps to build a rubric that assesses any writing assignment. You can use this with any grade level because you select the guidelines. This is a good tool for teachers who would like to work with students to develop a rubric or even have students create their own.



[http://www.learner.org/workshops/hswriting/interactives/rubric/?](http://www.learner.org/workshops/hswriting/interactives/rubric/?utm_campaign=elearningindustry.com&utm_source=/the-5-best-free-rubric-making-tools-for-teachers&utm_medium=link)

[utm\\_campaign=elearningindustry.com&utm\\_source=/the-5-best-free-rubric-making-tools-for-teachers&utm\\_medium=link](http://www.learner.org/workshops/hswriting/interactives/rubric/?utm_campaign=elearningindustry.com&utm_source=/the-5-best-free-rubric-making-tools-for-teachers&utm_medium=link)

**Quick Rubric** is exactly what its name implies -- a quick, intuitive way to create rubrics on any subject. Every piece is customizable from the categories to the content to the scoring. Once created, they can be saved, printed, and edited with ease. <http://www.quickrubric.com/>



**Activity:** Create a rubric using any one of the software mentioned above for any activity of your choice and share it with your friends and on your blog

## ? Check Your Progress-4



1. Rubrics can be used for a variety of assignments.....

- Research Papers.
- Group Projects.
- Portfolios and Presentations.v
- All the above

Wrong

Wrong

Wrong

Correct Option

### **Solution**

1. Wrong (Feedback)
2. Wrong (Feedback)



3. Wrong (Feedback)
4. Correct Option (Feedback)



## 9.8 DIGITAL ASSESSMENT ALTERNATIVES

Several digital assessment alternatives are available for assessing students' performance. Some of the Web 2.0 tools available today can serve as alternative assessment tools for student learning. They can engage students as they reflect, share and demonstrate what they have learned or are learning. Some of the digital assessment alternatives are considered here.

**9.8.1 Online Assessment:** Online assessment is the process used to measure certain aspects of information for a set purpose where the assessment is delivered via a computer connected to a network. Most often the assessment is some type of educational test. With the emergence of read write web and the development in software as a service ( SaaS), it is possible to design and conduct online assessment with ease. There are many online service providers both free and paid for designing and developing online tests and quizzes.

**Activity:** Open the link at <http://www.uwec.edu/CETL/resources/upload/online-assessment.pdf> and view the file on Online Assessment. Define Online Testing and explain the nature and importance of Online Testing and reflect it in your Blog

**Digital Concept Map:** Digital concept maps can be created by using offline tools like VUE, freemind or can be created using online tools like bubbl.us, or weismap. Concept maps can be used formatively to make student thinking visible. When students construct and submit their understanding of key concepts and their linkages through a concept map, it becomes clear whether the students understand the conceptual framework around a topic of study. Concept maps also provide immediate visual data to faculty on student misconceptions and their level of understanding

**Online Forum:** Forum is an asynchronous communication tool. There are many standalone forum tools like vanilla or php bb. Forum or discussion board is also an integrated feature of all the learner management system. This can be used in many ways as an assessment tool. Learners could be asked to brainstorm on a topic by posting their ideas in a forum. There can be question answer forum where every learner needs to post their answer in order to see the other learners' response to the question. Teacher can create many topic specific discussion forums and this could be used to evaluate learners' level of understanding and misconceptions if any.

**Survey Tools:** There are many online survey tools like survey monkey, poll daddy or lime survey. These tools can be used as an assessment tool and also to collect feedback from learners. In situations where you may have a bipolar set of opinions, it is helpful to surface that in a non-threatening way. Anonymous online polls can be used to gather and demonstrate the two sides without revealing individual attitudes. A survey can be useful for measuring the entire class's grasp of course concepts, since survey answers are aggregated. Because of their anonymous and aggregated nature, surveys may also be particularly handy for course evaluation.

**Wikis:** A wiki is a website that allows users to collaboratively edit and create content. The most prominent example of a wiki is Wikipedia, a collaboratively created online encyclopedia. Wikis have become very popular environments for collaborative projects in formal education and training. The learners' contribution in wiki can be assessed by the teachers. This can also be a tool for self and peer assessment.

**Blogs:** In general, the learning journal is a way of documenting learning and collecting information for self-analysis and reflection. Learning journals help students reflect on how they learn best. Learning journals also help students reflect on their knowledge, skills and behaviours as they learn. Journals are used to:

- improve writing by helping students to practice and refine writing knowledge, skills and behaviours accumulated over time

- define personal learning goals as students can reflect and plan for future learning and progress
- record experiences so students can reflect on experiences to develop critical thinking, a questioning attitude, and creative and emotive responses
- provide a representation of understanding for students to connect the experience to the learning
- Online, blogs provide a convenient tool for journaling.

**Activity:**

1. Open the following link and view the file on web 2.0 tools for assessment [http://wiki.cetis.ac.uk/images/d/de/Assessment\\_2\\_v2.pdf](http://wiki.cetis.ac.uk/images/d/de/Assessment_2_v2.pdf) . Reflect on the nature, types and importance of web 2.0 Tools for Assessment in your Blog
2. View the following video and reflect on the use of web tools for assessment in your blog <https://www.youtube.com/watch?v=ly5QGZVaQqk>

**9.8.2 ICT for Self and Peer Assessment**

Students can become better learners when they engage in deliberate thought about what they are learning and how they are learning it. In this kind of reflection, students step back from the learning process to think about what they have learned, how they have learned and why they have learned. Such awareness, evaluation and regulation will encourage students to become independent learners and can increase their motivation. Another way in which students internalize the characteristics of quality work is by evaluating the work of their peers. Peer assessment requires students to provide either feedback or grades (or both) to their peers on a product or a performance, based on the criteria provided by the teachers or may developed by them with the support of the learners. Mostly peer assessment is used for formative purposes to encourage students to help each other plan their learning, identify their strengths and weaknesses and in turn sharpen their meta-cognitive skills.

ICT can support peer and self-assessment process. The use of electronic learning environments and web-based interfaces provide a good scope for peer and self-assessment in reflection and feedback. The advent of dedicated web-based tools like WebPa, Teammates, peerwise, sparkPlus allows the frequent and efficient implementation of self and peer assessment activities even in large classes. Wikis and other collaborative tools and environments can also help in peer and self-assessment. When learners are in an e-learning environment using LMS have many opportunity for self and peer assessment.

**WebPA** is an online peer assessment system, or more specifically, a peer-moderated marking system. It is designed for teams of students doing group-work, the outcome of which earns an overall group mark. Each student in a group grades their team-mates (and their own) performance. This grading is then used with the overall group mark to provide each student with an individual grade. The individual grade reflects the students' contribution to the group.



Students use PeerWise to create and to explain their understanding of course related assessment questions, and to answer and discuss questions created by their peers.

**9.8.3 Mobile Apps for Assessment:** The increasing capacity of wireless communication and the growing number of mobile devices (e.g. smartphones and tablets) on the one hand as well as modern Internet technologies like JavaScript, HTML5 on the other hand provide new possibilities for mobile based learning and assessment. There are a variety of mobile assessment tools that can be used to engage students and provide enhanced feedback before, during, and after a daily lesson or semester-long unit

**Socrative** is mobile app which engages the entire classroom with educational exercises and games while capturing student results in real-time. Teachers can interact with the data to further student understanding in the moment and review the reports to prepare for future classes.



**Plickers** is a powerfully simple tool that lets teachers collect real-time formative assessment data without the need for student devices.

**9.9 THE TRENDS IN TECHNOLOGY BASED ASSESSMENT**

The National Education Technology Plan of the U.S. Department of Education (2016) has detailed out how technology

is transforming learning and assessment as follows:

**Enhanced Question Types:** Technology-based assessments allow for a variety of question types beyond the limited multiple-choice, true-or-false, or fill-in-the-blank options that have characterized traditional assessments. Examples of enhanced question types include the following:

- Graphic response, which includes any item to which students respond by drawing, moving, arranging, or selecting graphic regions
- Hot text, in which students select or rearrange sentences or phrases within a passage
- Equation response, in which students respond by entering an equation
- Performance-based assessments, in which students perform a series of complex tasks

Technology-enhanced questions allow students to demonstrate more complex thinking and share their understanding of material in a way that was previously difficult to assess using traditional means.

### **Provide Real-Time Feedback**

Technology-based formative assessments can offer real-time reporting of results, allowing stakeholders to understand students' strengths and weaknesses, while guiding them to make valid, actionable interpretations of the assessment data. Such assessments can enable educators to see, evaluate, and respond to student work more quickly than can traditional assessments. Similarly, learners and their families can access this information almost in real time. Technology-based summative assessments also facilitate faster turnaround of results.

### **Increase Accessibility**

Advances in technology grounded in Universal Design and systems that align to Universal Design for Learning (UDL) have made assessments more accessible and valid for a greater number of students, including those with diverse abilities and language capabilities. These advances have allowed a greater proportion of the population access to assessments. Special features include the ability to increase font sizes and change colour contrast, text-to-speech, bilingual dictionaries, glossaries, and more. Similarly, assistive technology, such as text-to-speech, alternate response systems, and refreshable braille, supports students with disabilities in accessing learning.

### **Adapt to Learner Ability and Knowledge**

Computer adaptive testing has facilitated the ability of assessments to estimate accurately what students know and can do across the curriculum in a shorter testing session than would otherwise be necessary. Computer adaptive testing uses algorithms to adjust the difficulty of questions throughout an assessment on the basis of a student's responses. For example, if the student answers a question correctly, a slightly more challenging item is presented next; if the student answers incorrectly, he or she receives another opportunity to demonstrate knowledge in a different manner.

### **Embedded With the Learning Process**

Embedded assessments are woven directly into the fabric of learning activities students undertake. Such assessments may be technology driven or simply a part of effective instruction, and they may appear in digital learning tools and games. They are generally invisible to the instructional process because they are embedded in the regular classroom activities. Embedded assessments have the potential to be useful for diagnostic and support purposes in that they provide insights into why students are having difficulties in mastering concepts and provide insights into how to personalize feedback to address these challenges.

### **Assessment for On-going Learning**

Technology provides students with multiple pathways to create assessable work throughout the year. To demonstrate their understanding, students can create multimedia productions, construct websites to organize and analyze information, and design interactive presentations to serve as products for assessment. These pathways allow teachers to understand how students access and understand information across given categories.

Technology has transformed the assessment practices by providing several soft wares. Now software features have become an integral part of the test design, validation, norms etc. Assessment information is now linked to multiple systems and reused. Several technology enabled assessment models are available online. These models can be used for making an effective assessment of students' learning and performance.



## Check Your Progress-5



### I Choose the correct alternative

1. Embedded assessments are.....

- Activities or exercises that are done as part of a class, but that are used to provide assessment data about a particular learning outcome.
- The course instructor and/or other evaluators can evaluate the student work, often using a rubric.
- Neither a or b is correct.
- Both a and b are correct.

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

2. Learning analytics is.....

- The measurement, collection, analysis and reporting of data about learners and their contexts.
- The use of data and models to predict student progress and performance, and the ability to act on that information.
- The use of intelligent data, learner-produced data, and analysis models to discover information and social connections, and to predict and advise on learning.
- All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)

## 4. Correct Option (Feedback)

**II Answer the following**

1. Define Assessment

Show/hide answer

2. List the types of Assessment

Show/hide answer

3 Define Computer Assisted Assessment

Show/hide answer

4 List the advantages and disadvantages of Computer Assisted Assessment

Show/hide answer

5 Why is Computer Adaptive Testing called tailored Testing?

Show/hide answer

6 List the advantages and disadvantages of Computer Adaptive Testing

Show/hide answer

7 Define Online Assessment

Show/hide answer

8 List the free and open source software of online assessment

Show/hide answer

9 Define portfolio

Show/hide answer

10. Describe types of e-portfolio

Show/hide answer

11 What is Rubrics

Show/hide answer

12 List out the Rubric development guidelines

Show/hide answer

13 Describe embedded assessment

Show/hide answer



## 9.10 LET US SUM UP

- The primary purpose of assessment is to improve students' learning and teachers' teaching.
- Formative assessment provides feedback and information during the instructional process, while learning is taking place, and while learning is occurring. Summative assessment takes place after the learning has been completed and provides information and feedback that sums up the teaching and learning process. Diagnostic assessment can help you identify your students' current knowledge of a subject, their skill sets and capabilities, and to clarify misconceptions before teaching takes place. Knowing students' strengths and weaknesses can help you better plan what to teach and how to teach it. Authentic assessment describes the multiple forms of assessment that reflect student learning, achievement, motivation, and attitudes on instructionally relevant classroom activities. Performance assessment is one which requires students to demonstrate that they have mastered specific skills and competencies by performing or producing something.
- Computer-assisted assessment is a term that covers all forms of assessments, whether summative or **formative**, delivered with the help of computers. This covers both assessments delivered on computer, either online or offline, and those that are marked with the aid of computers, such as those using Optical Mark Reading (OMR).
- There are five technical components in building a Computer Adaptive Testing: Calibrated item pool, Starting point or entry level, Item selection algorithm, Scoring procedure and Termination criterion
- Most often the online assessment is some type of educational test, with the emergence of read write web and the development in software as a service ( SaaS) it is possible to design and conduct online assessment with ease there are many online service providers both free and paid for designing and developing online test and quizzes.
- An electronic portfolio (also known as an e-portfolio, digital portfolio, or online portfolio) is a collection of electronic evidence assembled and managed by a user, usually on the Web.
- Rubrics can be used for a variety of assignments: research papers, group projects, portfolios and presentations. Rubrics help instructors: Assess assignments consistently from student-to-student, save time in grading, both short-term and long-term, give timely, effective feedback and promote student learning in a sustainable way, clarify expectations and components of an assignment for both students and course, and refine teaching skills by evaluating rubric results. Rubrics help students: understand expectations and components of an assignment,

become more aware of their learning process and progress and improve work through timely and detailed feedback.

- Some of the Web 2.0 tools available today can serve as alternative assessment tools for student learning. They can engage students as they reflect, share and demonstrate what they have learned or are learning.
- Some of the digital assessment alternatives are Online assessment, Digital concept maps, Online forum, Survey tools, Wikis and Blogs.
- ICT can support peer and self-assessment process. The use of electronic learning environments and web-based interfaces provide a good scope for peer and self-assessment in reflection and feedback.
- Mobile Apps for Assessment are Socrative, Plickers etc.
- The future trends for technology based assessment is Learning analytics which is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.
- Role of Technology in Education has detailed out how technology is transforming learning and assessment through enhanced question types, real time feedback, increased accessibility, adaptation to learner ability and knowledge, embedding with learning process, and assessment of on-going learning.

### 9.11 UNIT END EXERCISES

1. What is Assessment?
2. Explain the types of Assessment
3. What is Computer Aided Assessment?
4. Describe the nature and use of Hot Potatoes software in Computer Aided Assessment.
5. Explain the concept of Computer Adaptive Testing
6. Describe the nature and use of OSCART software in creating and developing Computer Adaptive Testing.
7. Describe the nature and use of Online Concerto platform software in creating and developing Computer Adaptive Testing.
8. Explain the nature and advantages of online assessment.
9. Describe the nature and use of myexambox software in creating and developing online Assessment.
10. Define E-portfolio
11. Distinguish the types of e-portfolio
12. Explain the advantages of e-portfolio
13. Describe the advantages of Rubrics to Instructors and students
14. Explain learning analytics
15. Develop a concept map on ICT in Assessment using offline tools like- freemind, VUE or online tools like wisemap or bubble.us and share it in your blog
16. Make social bookmarking of all the online assessment tools available annotate each one using social bookmarking account that you may have in delicious or stumble upon or Diigo. If you do not have a social bookmark account please create one in any of the above providers.

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## Unit - 10 : ICT for Educational Management

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## 10.1 INTRODUCTION

ICT makes dynamic changes in society. It is influencing all aspects of life. The influences are felt more and more at schools. Because ICT provides both students and teachers with more opportunities in adapting learning, teaching and managing the individual needs, society is forcing schools to aptly respond to this innovation. It provides newer and more effective ways of mitigating some of the challenges being faced by the educational system of the country. These technologies distinguish themselves by their rapid evolution and revolution, continuously changing the modes of engagement with them. A decade long infusion of computers, and more recently ICT, has demonstrated varying impacts on learning. In the current information age, educational institutions are expected to play a crucial role as the engine for knowledge generation and learning environment. In this regard ICT becomes the vital means to facilitate this task. ICT has become an essential part of our everyday life, accordingly this integration in school improvement is not only for the purpose of teaching and learning, but also for educational management use, it has become one of the most effective factors in the school improvement. ICT plays a vital role in improving the functional effectiveness of school system. In this unit we will be discussing about how ICT can help the school administrators improve various administrative tasks of schools.

## 10.2 OBJECTIVES

After studying this Unit, you will be able to

- give an overview of applications of ICT for school administration and management
- describe the role of ICT in school record keeping and its maintenance
- use various technologies for record keeping and scheduling
- use technology effectively for communicating with parents
- explain the role and functions of school management systems
- list the different types of assistive technology
- explain the role of assistive technology in inclusive education
- explore the application of UDL approach in class room
- use variety of digital assistive technologies in the class room
- explain how to plan, manage and implement appropriate ICT infrastructure
- develop a technology plan for a school

## 10.3 ROLE OF ICT IN SCHOOL ADMINISTRATION

Change has been happening at an uneven pace in any growth-oriented industry, and the education sector is no exception. Rapid growth in the field of education has made governance in academic sector a very complex task. The 21<sup>st</sup> century has witnessed tremendous advancements in technology which has led to far-reaching developments in the administrative system. Cost-effective technology combined with the flexibility in learning and administrative activities is essential to enhance efficiency.

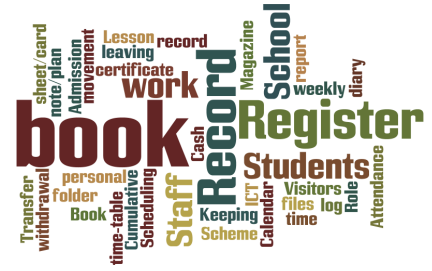
Information and Communication Technology (ICT) plays a vital role in supporting powerful, efficient management and administration in education sector. It is specified that technology can be used right from student administration to various resource administration in an education institution

Table-1: The administrative information.

Sl. No.	Construct	Content categories
1	Student Administration	Usage of electronic media by students to apply for admissions
		Usage of computers for student registration / enrolment
		Availability of time table / class schedule in electronic form
		Usage of computers for maintenance of attendance of students
		Communication of academic details of students to their parents / guardians through e-media
		Usage of e-media for notifications regarding hostel accommodation
		Usage of e-media for notifications regarding transportation
2	Staff Administration	Usage of computers for recruitment and work allotment of staff in the institution
		Automation of attendance and leave management of staff members in the institution
		Usage of electronic media for performance appraisal
		Communication with staff using e-media
		e-circulars from the institution regarding official matters
		e-kiosks are available in the institution
3	General Administration	Usage of e-media for scheduling / allocation of halls for examinations
		Dissemination of information in the institution through e-kiosks
		Usage of e-media by students to apply for university examinations
		Usage of e-media for the processing and display of results of students
		Facility for students to make fee payments electronically

### 10.3.1 Record Keeping

School records are books, documents, files and CD ROM in which is embodied information on what goes on in school (e.g. scholastic, co-scholastic, non-scholastic activities and important events etc), the school plant as well as other relevant information focusing on the growth and development of the school.



The school records are official transcripts or copies of proceedings of actions, events, other matters kept by the school administrator, school records could be viewed as authentic registers or instruments or documents of official accounts of transaction or occurrence which are preserved in the school's office. Therefore, every school must keep certain specified records.

**Importance of school records:** School records keeping includes the fact that school records tell the history of the school and are useful historical sources.

1. Tell the history of the school and are useful historical sources.
2. Facilitate continuity in the administration and management of a school.
3. Facilitate and enhance the provision of effective guidance and counselling services for students in the social, academic career domains.
4. Provide information needed on ex-students by higher and other related institutions and employers of labour for admission or placement.
5. Facilitate the supply of information to parents and guardians for the effective monitoring of the progress of their children/wards in schooling or performance.
6. Provide data needed for planning and decision making by school heads, ministries of education and related educational authorities.
7. Provide a basis for the objective assessment of the state of teaching and learning in a school, including staff and student performance by supervisors and inspectors.
8. Provide information for the school community, the general public employers as well as educational and social science researchers for the advancement of knowledge.
9. Enable school heads to collate information on pupils and staff for decision making by higher authorities, the law courts security agencies and other related government agencies when occasion demands.
10. Provide a mechanism such as the school timetable for the productive management of time and coordination of school work and activities.
11. Serve as data bank on which both the school head and staff and even students can draw on.

#### Some Important School Records

- Admission and Withdrawal Register: This is a permanent record book into which is entered information regarding the entry and exit, including the details of the education and progress of each pupil that ever passes through the school.
  - Attendance Register: An attendance register is a book in which the presence or absence of students in a school is recorded on a daily basis. It is a statutory record that must be kept by every school. This record is kept on individual class basis. The class teacher is the custodian of this record.
  - Log Book: The log book is a historical record of events that have significant effects on the schools' activities.
  - The Visitors Book: The book is meant for recording the visits of important personalities, including officials and from the ministries of education or other related government agencies or any other school related visitors.
  - Staff and Students' Personal Files: It is necessary that the school should have as much information on every teacher and student as possible without violating their privacy.
  - Cumulative Record Folder: Students' cumulative record folder is a storehouse of information on students' cognitive, affective and psycho-motor development.
- Students' Report Sheet/Card
    1. It keeps data on students' academic performance in termly basis.
    2. It assists in monitoring students' academic progress.
    3. It is a compliment to cumulative record folders.
  - Lesson Notes/Plan
    1. It gives information on what a teacher plans to teach the students at a period of time.

2. It clearly shows the teachers' level of preparedness and their level of competence.
3. It challenges teachers for the task ahead.

- **Scheme and Record of Work Book:** It reflects estimate of academic work which teachers expect to accomplish in each subject based on number of lessons they will have during each term. Pertinently it shows the ability of the teacher to organize the year's work and his/her resourcefulness and enthusiasm regarding the progress of the pupils.

- **Staff Time Book and Movement Book**

1. They provide information on when staff report and or close at work.
2. They promote regular attendance and punctuality
3. They help checking truancy and gross indiscipline in staff.

- **Transfer and Leaving Certificate:** Transfer and leaving certificate is the formal exit of the student after completion of study or leaving during the course of study in a school.

- **Library records:** The library will have many records like stock register, issue register etc. Many of the routine function of the library can be automated using library management software.

- **Stock register:** it is the record of all equipments and materials available in the school including the laboratories

- **Cash Register**

1. It is a record of financial transactions in schools.
2. It gives information about income and expenditures.
3. It promotes accountability and prevents corrupt practices.

### Potential of ICT in Record Keeping

The usefulness of keeping school records with Information and Communication Technologies (ICT) is for the following reasons:

- **Administrative Efficiency:** One major setback in achieving the educational objective of the secondary education is inefficiency of the principal in keeping some records. With the introduction of information and communication technologies such as computers, digital libraries, e-mail, internet and so on where information are stored and disseminated, principals can do better in keeping records, and become effective and efficient in performing their prescribed roles as administrators.

- **Availability of Information:** Information and Communication Technologies will help maintain adequate and accurate records in our schools and make it available with ease.

- **Easy Retrieval:** It also leads to easy accessibility and dissemination of information on school records, will become available for national planning, financial budgeting, effective implementation of the educational programs and policies.

School record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination for the purpose of enriching communication, decision-making and problem solving ability in the school system. It is therefore necessary that this process be as accurate and accessible as possible. Using ICT in keeping school records will help to facilitate and enhance the administration of the school towards achieving the goals of the secondary education.



### Check Your Progress-1



1 School records are important because they

- a) are useful historical sources
- b) provide information needed on ex-students
- c) only b) is correct

- d) both a) and b) are correct

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2. Attendance register is

- a) not an important document to be maintained in schools
- b) only the concern of a class teacher
- c) an important school record
- d) None of the above is correct

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)



### 10.3.2 Scheduling

Creating a schedule that will maximize instructional time, provide time to meet the needs of the school's students, provide time for staff to meet and plan, organise various curricular and co-curricular activities of the school is very important for any school. Use of ICT helps to ensure that such scheduling happens smoothly.

Some of the important activities of the school that need to be planned and scheduled are

- School calendar
- Teaching time table
- Examination time table
- Meetings including PTA

There are many software tools which help in such scheduling. Google calendar and FET time table software are two such commonly used tools.

**Google Calendar:** Google Calendar is an internet-based time and task-management online application that allows for access to calendars via web browsers. Calendars can be created by schools and shared with parents, teachers, and students. Reminders of scheduled activities can be sent via email, text message, or pop-up messages within a web browser. Users are allowed to create as many calendars as they choose. One can have day, week, month, and year view of the calendar.

Google calendars can be used by individuals like students, teachers, and principals in scheduling their personal time. Apart from this schools can use Google Calendar to manage time, coordinate projects, and share events with others. Academic departments, student clubs, and study groups can create and share Google Calendars.

Teachers can provide current information on meeting times, deadlines and office hours with students, as well as post document or presentation files to their calendars. These features can ease the management of students by providing timely information and reminders. Dissemination of readings or homework can be accomplished via the attached files. For learners, Google Calendar offers a way to view up to date class information and helps in collaborating with others.

Some more uses of it are given below:

1. It provides information on when classes begin, when school opens and closes
2. It shows activities to be performed by the teachers and students.
3. It assists in regulating the activities of students and staff of a particular school.
4. It facilitates and enhances student interest and attention and prevents mental and physical strain.

**Activity:** Watch the quick start tutorial to Google Calendar from here <https://www.youtube.com/watch?v=NombARISmC8>

School Time Table: Generation of time tables is one of the difficult tasks in school management. It takes time and effort of many school administrators. ICT can be used effectively in this job. There are various time table generator soft wares which can be used in schools.

The following are some time table generating software.

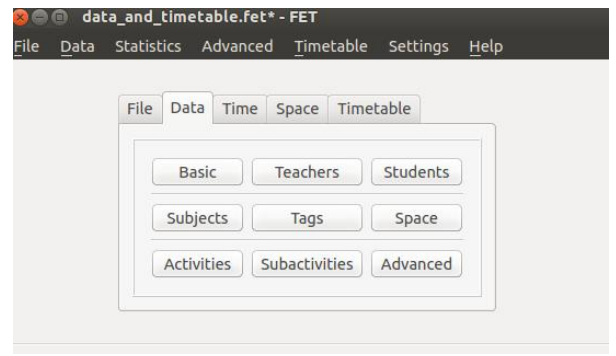
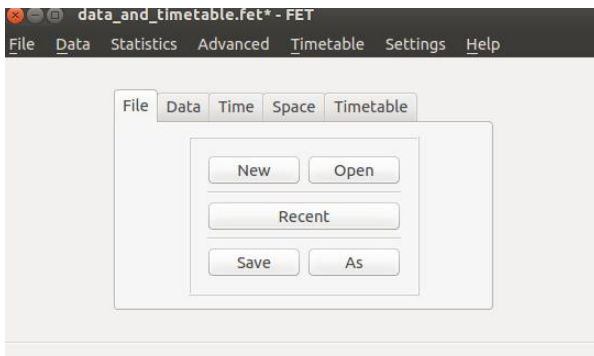
1. FET : Free Evolutionary Timetabling for Linux platform can be downloaded from ubuntu software centre.
2. Automatic Time Table .com : Asc timetable is a fully automatic school time table scheduling software. <http://www.automatictimetable.com/>
3. [aSctimetables.com](http://aSctimetables.com) which comes under proprietary soft ware whose trail version for windows and Mac is free now

**FET:** FET is free software for automatically scheduling the timetable of a school, high-school or university. It uses a fast and efficient timetabling algorithm. It is free software, open source, licensed under GNU/AGPL 3. The term FET is the abbreviation of Free Evolutionary Timetabling at the beginning stage, as it is no longer evolutionary, the E in the middle can stand for anything the user prefers.

It is based on C++. Liviu Lalescu of Romania developed this timetable generator in 2003. By 2007 it become user friendly and fast. Since FET has a very large palette, it can care data of all groups (classes/courses/ students).

**Working with FET:** FET can be downloaded from Ubuntu software center as timetable generator. First task to generate a time table using this software is to input data. The data contain the Basic settings, Activities and Constraints.

**Basic setting:** Once you open time table generator a pop up window like the one below (left) will open. For a new file we have to enter data using the following steps. Once you select data in the above mentioned window we will get the pop-up window as shown below (right)



Basic contains institution name & comments which are optional data. Comments will be printed at the beginning of the timetables (before table of content). Use the comment to write about problems, latest added constraint, missing constraint "Free Evolutionary Timetabling"; as it is no longer evolutionary, the E in the middle can stand for anything the user prefers or constraints that should be modified.

Teachers, subjects, activity tags & rooms: Add teachers, subject, activity tags, rooms and buildings, by selecting corresponding fields. Things to be taken care while entering years, groups and subgroups:

FET has defined

- Year (form): A set of students at the same stage of their schooling.
- Group, Class, course and division: A set of students who visit the same activities. So they meet the same teachers to study the same subjects at the same time.
- Category: A set of groups that might have activities simultaneously.
- Class (division of the first category): A set of students who meet (nearly always) for the same activities.

FET avoids using the term class, because this term is used different in colloquial language. Depending on the context a students say that he visit class 1A. In this example FET will call 1 as year, A as division of a category and 1A as group.

**Activities:** an activity contains normally a subject, a student set, a teacher and duration. It can also contain activity tags, more student sets or more teachers. It can be splitted into several (sub)-activities. Also pseudo activities are possible (They don't have any teacher or student). To add an activity you just need to add (double click with the mouse, or select and press enter) students, subject and teachers. Normally an activity contains 1 teacher, 1 group and 1 subject. You should always enter the number of hours that this activity is instructed. Subject mathematics is instructed 4 periods per week. The periods should be at different days, but they must not be at different day. But they are not allowed to be consecutive if they are scheduled at the same day. Add the teacher, the group, the subject, split this activity into 4 activities per week, keep weight 95% (or modify like you want) and don't check the force consecutive box. For allotting activities we have to do the following steps. We have to select teacher, students, subject and activity tag in the pop up window. If we select Add button we will go to the following window.





**Generating time table:** There are two different ways to generate timetables:

- timetable → generate new
- timetable → generate multiple variants

Generating a timetable is very random process. Once all data added we can generate the time table by selecting timetable button from data window.

**View a timetable:** If you generated a single timetable by timetable → generate new, you can view the timetables by:

- timetable → view (students)
- timetable → view (teachers)
- timetable → view (rooms)

Timetables can be viewed with a web browser. They are saved in html format. On Linux systems they are stored in ~/fet-results/ and on Windows systems they are stored in subdirectory/results/ of the FET directory. For detailed reading: <http://timetabling.de/manual/FET-manual.en.html>

**Activity:** please see the FET guide from the link here <http://marvelsoft.co.in/wp/wp-content/uploads/2012/03/Creating-Time-Table-in-FET.pdf>

## ? Check Your Progress 2

1 Google Calendar

- a) is an internet-based time and task-management online application
- b) can be created by teachers, students and principals
- c) can be used for sharing with parents, teachers and students
- d) all the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

2 FET

- a) is a proprietary software
- b) uses a fast and efficient timetabling algorithm
- c) can't take data of all groups
- d) uses the term class

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)



3 What is the Potential of ICT in Record keeping?

- 
- 
- 

4 List the ICT tools for Communicating with Parents

### 10.3.3 Communicating with Parents



Communication is important to inform parents about school activities. It is also a vehicle for developing awareness and understanding among parents of their role in the learning and development of their children. It is also an opportunity to learn about the children in your classrooms. Communication between schools and families is essential for building trusting relationships that foster parental involvement. Parental involvement in schools and social institutes is necessary for youngsters to develop successfully and to make decisions that will have positive

outcomes for their future. The role of new ICTs in improving parental involvement in schools and social institutes and uncovers barriers that prevent usage of technology to promote communication. As society becomes increasingly dependent on technology, schools are investing more time and money in technological means of communication. Access to computer and Internet technologies is increasing all over world in work places and schools. Both educators and parents are provided with access to electronic communication. It is well established that building home-school partnerships is a powerful avenue for increasing the satisfaction of parents and the community with schooling and for improving schools. Parents' involvement in their child's education is a key factor in the child's scholastic success. Parental participation ranges from paying little or no attention to too much attention. As the teacher, he/she must help manage the parental participation so that students are accountable for their own learning.

#### Areas of Communication

Parental involvement encompasses direct contact with teachers, parental actions at school, and parental actions at home. Following are the different kind of communications and involvement expected of parents:

- Basic obligations of parents, includes the obligation of parents and families to provide safe, healthy home environments. The school can aid parents by providing workshops, presentations, and general information about health and safety issues. Schools are also expected to provide parents the information needed to assist their children with homework and other assignments.
- The schools are expected to communicate regularly with parents and keep them informed about school programs and their children's progress in school.
- Parents are expected to participate in school activities and provide ample volunteer services for the betterment of the school. Giving parents the information they need about opportunities to volunteer is one way to increase family involvement.
- The parents involvement in decision making, means giving parents the tools they need to become active members in the governance of the school.

ICT can play a vital role in communicating and collaborating with parents and the community. Some of the tools and technologies which help in this process are outlined below.

#### Tools and Technologies for Connecting with Parents

**E-mail:** Schools can create and send out a classroom newsletter to keep parents up to date by e-mail. They can collect the e-mail addresses in the beginning of the school year or give parents the opportunity to sign in for the newsletter on the school website. Individual teachers can send e-mails when there are problems in the classroom or for giving parents good news about the learning process of their children. E-mails can be sent individually or in group. It is very easy to make groups of addresses in the most common e-mail programs. Parents can read and respond to e-mails whenever they have time. E-mails are also available in the LMS and students contributions in terms of chats and forum postings get e-mailed automatically by the system.

**Website or Blog:** On the school website all information of the school such as contact information, expectations, school rules, about the school and the teachers, how to use the internet at home, etc can be showed. The website can also have a calendar with useful information about school trips, parental evenings, and a map with pictures of activities with



learners, etc. A school or class can make its own website on hired web space or can use free hosting web sites. Many schools are using free blogging services from Google and wordpress to provide information to parents, students and public in general.

**Online Survey:** Technology currently permits to get quick feedback from parents through online survey. Tools like Google form and survey monkey can be easily set up to get the



information from parents and community members. These tools not only collect the information but perform the basic analysis and the outputs are provided automatically for quick decision making.



**Virtual Learning Environments:** A virtual learning environment (VLE) is a software system designed to support teaching and learning in an educational setting. A VLE will normally work over the Internet and provide a collection of tools such as those for assessment (particularly of types that can be marked

automatically, such as multiple choice) or self-evaluation, communication through discussion boards , uploading of content, return of students' work, peer assessment, administration of student groups, collecting and organizing student grades, questionnaires, tracking tools, etc. New features in these systems include wikis, blogs, RSS and 3D virtual learning spaces. It can be seen that the VLE or the Learner Management Systems (LMS) have its own inbuilt communication modules to interact with the learners which in turn can be monitored by parents at home. MOODLE is one of the popular open source LMS. You can review the features of MOODLE from its website at [www.moodle.org](http://www.moodle.org)

**Media Sharing:** currently it is possible to share various kinds of media online. Most popular one is sharing of videos through online video sharing sites like YouTube. Schools can use this to communicate with parents by sharing school programme related videos, videos for training parents on child rearing practices, helping students manage stress, time etc. School related audio programme could be podcasted using online podcasting sites. Presentations by teachers and others could be shared with parents through slide sharing sites. Images can be shared using flickr.

**Social Networks.** It is possible to use social networks like Facebook, Twitter or MSN to communicate with parents. It is possible to make groups in Facebook and share information with the parents. Parents can communicate with each other of the class of their children. They can share pictures, important information, etc. Facebook is not so difficult to work with and a lot of parents already have a Facebook account. An interesting website to teach parents to use Facebook is <http://facebookforparents.org/>

**Online Groups and Forums:** Communicating with parents are made easy using forum and e-mail groups like Google groups and Yahoo groups. The school can create specific group of parents using Google or Yahoo services to communicate each other and among parents. It is also possible to share files among the group members.

**SMS and Instant Messaging:** School can send SMS to the parents when the child is not at school. So the parents will immediately know if their child is playing truant. When the school has to send an urgent message for parents, school can send a collective SMS, warn parents or an individual SMS to contact a specific parent. Now days instant messaging service like whatsapp is very popular among teachers, students, and parents. The simplicity of this tool makes it easy for sending information to parents. Specific Whatsapp group could also be formed for taking up discussion on a specific issue.

**Activity:** Create a whatsapp group of your friends and discuss about how ICT can be used for communicating with parents.

**Google chrome extensions and apps:** Many teachers deploying Chrome and Chrome Devices for Education want to force install or recommend Chrome web apps on their students' devices. However, given the thousands of Chrome web apps available, it's not always apparent which ones are the best for your class. Google has created Chrome App Packs, which are groups of popular applications from the Chrome Web Store that are tailored to meet students' needs.

These curated apps save teachers time, offer discounts for bulk app purchases, and help teachers find the best apps

by category and grade level. Many of these apps integrate with Google Drive to provide an easy way to turn in homework, and many of these apps offer lesson plans for teachers. App Packs are only available for Google Apps for Education customers. These App Packs are of three types. Some of them are free, some are freemium (These apps are provided free of charge, but a premium is charged for advanced features) and many are paid.

Most children today are familiar with the mobile apps even from their pre-school days. Now a day's many schools are developing their own mobile apps, depending on their needs. It may be giving learning modules or may be connecting school with community.

Mobile apps offer meaningful ways to engage teachers, students and parents. An app can provide ready in hand news and event updates concerning schools. It can further inform guardians regarding courses, timings, class schedules, school policies, etc. Apps can also provide a platform to get results and also individual student information. Parent can always remain updated on your ward's education. Active School Apps is one example for school app whose trail version is available in the following link <http://www.activeschoolapps.com.au/>

**Activity:** Install chrome extension and practice on your chrome browser and practice

### 10.3.4 School Management Tools

Interactions sharing ideas and communications with teachers, parents, alumni and community members become the major part of school management. School management includes admission of students to various courses, assigning subjects and classes to teachers, maintaining records, communicating with parents, preparing various certificates, analyzing various data etc. It should help all the stake holders in participating actively in decision-making process. The functions of a school manager are to manage the school and formulate policies that best suit the needs of the school as well as the overall interests of the students. A manager is responsible for school planning with a view to creating learning environment for their students and nurturing talents. Hence, aside from the time and energy spent in school management, a school manager should have a good understanding of the school itself as well as the trend of education development.

Going without school administration software could be costing your time and effort. Earlier times school administration was run without softwares. But present day we are living in a digital world and needs are changed. Luckily, there are lot of school administration software available free of charge. Some of them are listed below with special reference to Open Admin for Schools.

- **FeKara:** FeKara, is an all-round school admin software which cannot be treated as a free software completely. It covers modern school administration and management software option. It can be used to conduct exams, assignments, budgeting and internal messaging. Major drawback for FeKara is that it is meant for small schools only. Additional data storage and other features are available on payment basis. Website : <http://fekara.com/>
- **SchoolTime:** SchoolTime is also a similar type of school administration software .It is also can be upgraded to non-free software to get more benefits. website : <https://school-time.co/#>
- **TS School:** TS School short form of Time Software School is a classic powerful tool that offers the basics for schools of all sizes. TS School is good for managing your workforce. TS School offers a student management system and an exam module. Again like the SchoolTime and FeKara TS School also has a paid version which gives more features. website : <http://www.ts-school.com/>
- **Fedena:** Fedena or project Fedena is an open-source school administration software that largely focuses on handling records. It is based on Ruby on Rails. It was initially developed by a team of developers at Foradian Technologies. The project was made open source by Foradian, and is now maintained by the open source community. Website : <http://www.projectfedena.org/>
- **Ascend SMS:** Ascend SMS is an entirely free full-program school administration software made for Catholic and Independent schools. Ascend SMS offers a complete package. From offering a health management system for the school nurse to a mobile app for parents to a simple discipline reporting system. Even though Ascend SMS is free for many schools, to avail that facility school has to be listed in their system. Website : <http://www.ascendsms.com/>
- **SchoolTool:** SchoolTool is a cloud-based open-source school administration software made for schools in the developing world. It provides educators gradebooks, skill assessment documents, class attendance sheets, and daily participation journals along with organization features including applications like Google Calendar , and a great report

card generator. SchoolTool was made with Python, and is run on Linux Ubuntu. SchoolTool comes with its own web server and database. To make sure all the necessary components are installed correctly, it is distributed , through Ubuntu Linux. But there is a draw back for SchoolTool. It is far more a tool for teachers than it is for administrators. Website : <http://schooltool.org/> (Can be downloaded from Ubuntu software center).

• **Open Admin for Schools:** Open Admin for Schools is once again open source. It is a freely available, open source software package and is licensed under the GNU General Public License. Open Admin for Schools offers software features like attendance, reports, management system; Open Admin for Schools is one of the most comprehensive free and open-source school administration software options available. The owners of the site offer free support for schools in developing countries. Website : <http://richtech.ca/openadmin/index.html> .

## Open Admin for *Schools*

Open Admin for Schools is entirely web based tool. Currently several schools use this approach. It is designed to be lightweight both in server resource requirements and in communication bandwidth. It currently has the following features:

- o Demographics - It stores student and family information that can be viewed and printed in a variety of ways.
- Attendance - Attendance can be entered either by secretaries in the school office or by teachers in the classroom.
- Report Card System - a flexible reporting system with per subject objectives (up to 20), integrated attendance reporting, etc. All report cards are printed as PDF reports and may include a school logo.
- Online Gradebook to allow teachers to enter marks and assessments online from school or home.
- Parent/Student Viewing scripts to allow parents to view attendance and report cards
- A Fees System (along with Lunch program) to allow charging of student fees, printing of invoices, payments, invoices and export summary transactions to external accounting programs.
- Export/Import Modules - to allow students to easily transfer schools within divisions without re-entry of demographic information. Export of data to other programs via an automated XML based transfer mechanism.
- An Online Daybook to allow teachers to plan and view their lessons/days. Currently, only a very rudimentary function.

Activity: Please go through the different manuals available at <http://richtech.ca/openadmin/docs/>

### ? Check Your Progress-3



1 Which of the following survey tool can be used for performing the basic analysis and get the automatic output?

- a) E-mail
- b) Survey monkey
- c) Blog
- d) All the above

Wrong

Correct Option

Wrong

Wrong

## Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

2 VLE stands for

- a) Value Loaded Environment
- b) Virtual Learning Environment
- c) Value Learning Environment
- d) Virtual Learning Error

Wrong

Correct Option

Wrong

Wrong

## Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

3. MOODLE is a

- a) Online survey tool
- b) Open Source Learner Management System
- c) Both a) and b) are correct
- d) Only a) is correct

Wrong

Correct Option

Wrong

Wrong

## Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)



Whatsup is a

- a) Instant messaging service
- b) Survey tool
- c) School admin tool
- d) All the above

Correct Option

Wrong

Wrong

Wrong

### Solution

1. [Correct Option \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

## ? 5 Match the following

Read and complete

1) Face book	<input type="text"/>
2) Youtube	<input type="text"/>
3)SMS	<input type="text"/>
4) School Time	<input type="text"/>
5) SchoolTool	<input type="text"/>

### 10.4 ASSISIVE TECHNOLOGY (AT) AND INCLUSION

Inclusive classroom is an important part of equal opportunity in education. Demands for inclusive education have increased and fostered major changes to schooling and education. Students with disabilities are educated alongside their peers within the local community therefore mainstream schools are required to adapt to accommodate a diverse group of students with a variety of needs. Approaches to the inclusion of children and young people into mainstream classrooms, and the identification and recognition of special educational needs, is an integral part of daily school work. The wellbeing and actualization of developmental and learning potential within a diverse student population is





challenging. Digital literacy is considered as one of main enablers for the participation in the knowledge society and has to be provided based on the principal of equal opportunity. The educational technology has an important role in facilitating digital literacy of students and teachers. Within the renewal of the Educational Technology Curriculum, the ICT competences had been recognized as important in the process of the formation of teachers' professionalism which is based on autonomy, inquiry, creativity and innovation.

The changes in the student population of students with special needs such as students with disabilities and language issues are having a major impact on changing the learning goals, the teaching methods, and the means of assessment for all students. Teachers today, more than ever before, are teaching more students with special needs, such as students with physical or learning disability, emotional disabilities etc. These teachers working with these populations are not just the special education or special English language acquisition teachers, instead more and more of these students are placed in the general student population with regular teachers. Teacher preparation programs then need to ensure that teachers are educated in special needs pedagogy and assistive technologies as they relate to general education. The educational environment needs to be designed or adapted for all students to have the opportunity for success, even those students who may need modifications and accommodations.

**Assistive Technology (AT)** devices can decrease students' isolation and allow them to become part of regular subject area classrooms. Assistive technology then becomes a tool that provides a method for an individual who is experiencing a disability or other issue to still participate in a classroom. The application of assistive technology in schools for students classified as having a disability is required through laws such as Individual with Disabilities Education Act (IDEA). As the inclusive education of all students occurs more frequently within the standard classroom, then it becomes important that the knowledge/experience base for all teachers needs to be expanded to incorporate assistive technology approaches and accommodations.



#### 10.4.1 Assistive Technology - Meaning and Nature

Assistive technology (AT) means any piece of technology that helps a student with or without a disability to increase or maintain his/her level of functioning. These often include laptops with specialized programs, like speech to text, text to speech, graphic organizers and word prediction software.

Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability.

Assistive Technology helps people with a various range of cognitive/ learning, and physical disabilities, be it in the home, classroom, workplace and/or community. Assistive Technology is enabling all individuals, of all ages, including those with disabilities, to be more independent, self-confident, productive and better included in every day life, education, employment and living. A list of digital assistive technology is given in the graphics.

#### Nature of Assistive Technology

- AT compensates for a student's skills deficits, needs and/or area(s) of disability.
- AT is used to lessen or remove barriers faced by persons with disabilities.
- AT refers to both high- and low-tech tools that allow people of all ages to be more independent self-confident, productive and better included in every day life, education, employment and living.
- AT offers a wide range of equipment to support participation and learning.
- Improve the speed and accuracy of students' work.
- Reinforce effective classroom instruction and strengthen skill development of students with learning disabilities.

- Help students to 'fit in' with classroom learning and routines
- Motivate students with LDs to set high goals for themselves and to persevere

### 10.4.2 Types of Digital Assistive Technology

It is important to understand that not all technologies are appropriate for all individuals. People have their own unique set of strengths, weaknesses, interests, experiences and special abilities. Therefore, a technology that may be a blessing for one person may be useless for another. Similarly, a technology that is appropriate for one purpose in a particular setting may be of little value in another situation. So, when choosing an assistive technology, consider the specific individual, the setting and the task(s) to be performed.

Low-tech Assistive Technology: Pencil grips, Graph paper, Highlighting pens, Planners, Audio books, Digital clocks and Calculators, Erasable pens, Coloured coding systems and overlays, Tactile and Manipulative learning products and Tape.

Mid to Hi-tech Assistive Technology:

- Digital recorders
- Digital books
- Graphing calculators
- Electronic math worksheets
- Portable or adapted keyboards
- Mobile technology, e.g. tablets, iPods, iPads, smartphones, MP3 players, etc.
- Reading systems that utilize a computer, scanner, and software to "read" scanned book pages out loud, e.g. Kurzweil
- Speech recognition software that allows a computer to operate by speaking to it, e.g. Siri
- Speech recognition system that turn oral language into written text, e.g. Dragon
- Software that predicts and edits words for students who struggle with spelling, e.g. WordQ
- "Talking" calculators that assist students with math challenges
- Mind mapping/outlining software
- Global Positioning System (GPS)

### 10.4.3. Choosing of AT

From the developmental point of view, the early manipulation of objects and use of tools are of particular importance. The possibility of a cognitive impairment must be taken into account when evaluating the user's level of cognitive functioning: careful attention should be given to the evaluation of the cognitive demands that the AT device places on the person. Motivation is very important to support an effective use of AT, for this reason the goals of the potential user should be carefully defined, so that the device application can become meaningful and motivating to the person.

AT is to be successfully used by the end-user when it is appropriate:

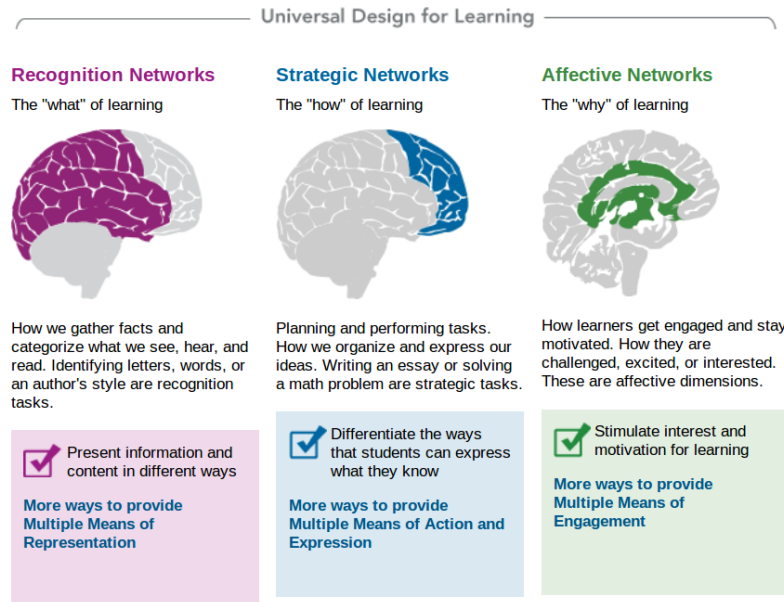
- Effectiveness or how well the technology enhances the user's capability
- Affordability or how much it costs to purchase, maintain, and repair
- Operability or how easy the technology is to employ
- Dependability or how long the technology operates without reduced performance or breakdown

### 10.4.4 Universal Design for Learning (UDL) and Inclusion

The origin of the term Universal Design for Learning (UDL) is generally attributed to David Rose, Anne Meyer, and colleagues at the Center for Applied Special Technology (CAST). Rose and Meyer (2002) reveal the basis of UDL is grounded in emerging insights about brain development, learning, and digital media. They observed the disconnect between an increasingly diverse student population and a "one-size-fits all" curriculum would not produce the academic achievement gains that were being sought. Drawing on the historical application of universal design in architectural (e.g., curb cuts), CAST advanced the concept of universal design for learning as a means of focusing research, development, and educational practice on understanding diversity and applying technology to facilitate learning.

CAST's philosophy of UDL is embodied in a series of principles that serve as the core components of UDL:

- Multiple means of representation to give learners various ways of acquiring information and knowledge
- Multiple means of expression to provide learners alternatives for demonstrating what they know
- Multiple means of engagement to tap into learners' interests, challenge them appropriately, and motivate them to learn.



The term "universal design" means a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly usable (without requiring assistive technologies) and products and services that are made usable with assistive technologies.

#### 10.4.5 Advantages and Limitations of AT

##### Advantages of AT

Assistive technology can help to support and enable people with memory problems including Alzheimer's disease and other forms of dementia to live more independently.

For example, assistive technology and telecare can help to:

- Remind the persons to take their tablets at the right time.
- Help locate a lost item.
- Orientate the person that it is day time or night time.
- Assist the person to phone a relative or friend using preprogrammed numbers or pictures.
- Switch on the lights automatically if the person gets up at night time.
- Switch off the gas automatically if it has been left unlit.
- Alert a career or monitoring centre that the person needs assistance.

Assistive technology may also help to support and reassure careers. For example, it may free careers to spend better quality time with the person. Or it may enable a career to get a good nights rest, knowing that if the person gets up at night they will be alerted.

##### Limitations of AT

Assistive technology may not be the answer for everybody. People have different additional career support or services rather than using technology at all.

If assistive technology does not meet the individual needs and preferences of the person it may be ineffective or may even cause additional confusion or distress.

For example, assistive technology and telecare may not be the answer if:

- the person switches off or unplugs the equipment
- the person is confused or distressed by any alarm sounds or recorded messages
- there are insufficient careers or care workers to respond to an alert.

Assistive technology on its own cannot provide human contact and personal care. Many older people experience loneliness and social isolation. Technology should only be provided as an addition to contact and care, not as a replacement.



## Check Your Progress-4



1. AT is the abbreviation of

- a) Assisted Teaching
- b) Assistive Technology
- c) Assistive Teaching
- d) Assisted Technique

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

2. Dragon is the example of

- a) Speech recognition software that allows a computer to operate by speaking to it.
- b) "Talking" calculators that assist students with math challenges
- c) Speech recognition system that turn oral language into written text
- d) Mind mapping/outlining software

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

3. The term 'universal design' includes

- a) Designing and delivering products and services that are usable by people.

- b) Products and services that are directly usable  
 c) Products and services that are made usable with assistive technologies.  
 d) All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

### ? 4 Match the following



1) Highlighting Pens	<input type="text"/>
2) UDL	<input type="text"/>
3) Digital Books	<input type="text"/>
4) Assistive Technology	<input type="text"/>

Check



5 Mention any four Digital Assistive Technology

6 Define UDL.

## 10.5 MANAGING ICT INFRASTRUCTURE OF THE SCHOOL

Managing the ICT infrastructure is a key element in any organization. This infrastructure is composed by a set of hardware, software, services, procedures, processes and persons. It considers ICT Infrastructure as an organization, with a great number of elements, with persons that interact with these elements and with other persons, with complex processes, with a great number of procedures, etc. This infrastructure should interact with its environment, should adapt to it and should evolve. With this vision we have to consider the ICT infrastructure as a complex system.

### 10.5.1 Automated and ICT Managed School Processes

School will adopt or adapt an e-governance and automated school administration programme for schools, build capacities for its implementation and deploy school based Management Information Systems (MIS). These MIS will be integrated with the proposed state wide web based School Education Management Information System.

A school wide local area network enables automation of a variety of processes. Beginning with library automation, locally cached offline access to internet resources, office automation, maintenance of records, student tracking, resource planning, using the existing ICT infrastructure will increase efficiencies. At the same time, savings in cost, time and effort will also accrue. The school wide local area network will be used to facilitate this automation.

### 10.5.2 School Management Information System

- A nation wide network will be established in which schools, teachers, students, school managers, and the community at large participate. This implementation will include the School Management Information Systems (School MIS); digital repositories of tools, content and resources; professional development and continuing education platforms; and guidance, counselling and other student support services.
- School MIS will emerge as a single window clearing house on all information related to the secondary school system. The information will facilitate research and analysis activities and guide decision making at different levels in the education system, contributing to enhanced efficiencies.
- The scope of information to be collated by the MIS will be broad and include student and teacher tracking, particularly for their academic needs. The norms will also define standards of technology including language fonts, word processors, technical dictionaries, etc. Open standards facilitating universal access to information, content and resources will be ensured.

### 10.5.3 ICT Infrastructure and its Maintenance



## Concept of ICT Infrastructure

Our concept of the ICT infrastructure is not only a set of equipment or elements. The ICT infrastructure enables to share the ICT capabilities which provide services for other systems of the organization. These capabilities require the complex combination of the technical infrastructure (cabling infrastructure, hardware platform, base software platform), ICT shared services (as communications services), ICT applications (as WEB services), the human operators and the managerial expertise to guarantee reliable services. All these resources are designed, developed and managed over time. In the system ICT infrastructure does not include the specific computer applications, but the teachers or other users should experience and innovate using specific computer applications on the ICT infrastructure.

## Hardware

- The Schools will establish state of the art, appropriate, cost effective and adequate ICT and other enabling infrastructure in all secondary schools
- Based on the size of the school, needs of the ICT programme and time sharing possibilities, States will define an optimum ICT infrastructure in each school. Not more than two students will work at a computer access point at a given time. At least one printer, scanner, projector, digital camera, audio recorders and such other devices will be part of the infrastructure.
- Each school will be equipped with at least one computer laboratory with at least 10 networked computer access points to begin with. Each laboratory will have a maximum of 20 access points, accommodating 40 students at a time. The ratio of total number of access points to the population of the school will be regulated to ensure optimal access to all students and teachers.
- In composite schools, exclusive laboratories with appropriate hardware and software will be provided for the secondary as well as higher secondary classes.
- In addition, at least one classroom will be equipped with appropriate audio-visual facilities to support an ICT enabled teaching-learning.
- Appropriate hardware for Satellite terminals will be provided to selected schools in a progressive manner.
- Computer access points with internet connectivity will be provided at the library, teachers' common room and the school head's office to realise the proposed objectives of automated school management and professional development activities.
- ICT enabled education can be significantly enhanced and the range of classroom practices expanded with the introduction of digital devices like still and video cameras, music and audio devices, digital microscopes and telescopes, digital probes for investigation of various physical parameters. These will also form a part of the infrastructure.

## Network and Connectivity

- All computers in the school will be part of a single local area network to enable optimum sharing of resources. In addition to the laboratory, internet connections will also be provided at the library, teachers' common room and the school head's office.
- Each school will be serviced with broadband connectivity capable of receiving streaming audio and video, a range of digital learning resources and interactive programmes. The number of computers given internet connectivity will be governed by the available bandwidth, in order to ensure adequate speeds. A mechanism to have offline access to internet content will be set.
- Teachers and students will be educated on issues related to the safe use of internet Firewalls and other security measures will be implemented to guard the school network against cyber attacks and misuse of the ICT facilities. Appropriate guidelines for network security will be developed.
- An EDUSAT network will be planned at each state with interactive terminals (SIT) and receive only terminals (ROT)

## Software

- A software environment favouring pedagogy of learning which promotes active learning, participatory and collaborative practices and sharing of knowledge is essential to nurture a creative society. Free and Open Source Software – operating system and software applications will be preferred in order to expand the range of learning, creation and sharing.

- A wide variety of software applications and tools, going well beyond an office suite is required to meet the demands of a broad based ICT literacy and ICT enabled teaching learning programme. Graphics and animation, desktop publishing, web designing, databases, and programming tools have the potential of increasing the range of skills and conceptual knowledge of the students and teachers. A judicious mix of software applications will be introduced in schools.
- Creation and widespread dissemination of specialised software for different subjects, software compilations, including simulations, virtual laboratories, modelling and problem solving applications will be encouraged. These will be distinct from multimedia packages and digital learning resources.

### **Enabling Infrastructure: its maintenance**

- The enabling infrastructure required to efficiently maintain the ICT facility will be defined, established and maintained.
- Regular and regulated supply of electricity, appropriate electrical fixtures, adequate power backup and support, including alternate sources of energy, where needed, will be ensured. Students and teachers will also be trained in the safe use of electrical outlets and fittings.
- Physical facilities like an adequately large room, appropriate lighting and ventilation, durable and economic furniture suitable for optimisation of space and long hours of working will be established. Alternate layouts and arrangements facilitating interactions amongst students and with the teacher will be encouraged.
- Adequate safety precautions and rules for use will be established. Each laboratory will be equipped with a portable fire extinguisher and students and teachers trained in its use. An appropriate fire drill will also be implemented.
- All the equipment and resources will be secured from theft and damage. They will also be covered under an appropriate insurance policy against theft and damage.

### **10.5.4 Technology Plan for the School**

In pursuit of excellence, the school mission is to educate, guide, and challenge all students to develop lifelong learning skills necessary to successfully contribute and compete in a rapidly changing global community.

Principals and program leaders have sufficient technology available to support curriculum, instruction, and assessment.

### **Building Schools of the Future**

The following conditions are recognized as critical elements of future schools:

- Schools of the future must be open and flexible, focusing on learning
- New communication should promote new collaborations and a higher level of cooperation and creative problem-solving
- Educators must be supported in their use of new technologies for learning and also in their use of technology for professional development and collaboration
- Learners (students, educators, parents, etc.) must be able to use technology to achieve new levels of learning and to acquire new information age skills and abilities
- Educational managers need to use technology as a tool for managing schools and learner communities
- Free from one geographic location: anywhere, anytime, anyplace
- Supportive of all learning styles
- Educators must be researchers and mentors
- New skills required in info-society: abilities to quickly adapt to new situations and new technologies and to be able to process vast amounts of information
- All staff members must receive adequate training and support to effectively use the technology
- Principals, superintendents and school boards need to understand how the current structure of a educator's and learner's day impact on their effective use of the technology. In effect, managers must provide the vision of change that includes empowering teachers and learners in new ways and then must learn how to effectively manage these empowered educators and learners.
- New on-line communities



**Students will be able to use technology in an ethical manner to:****1. Communicate Globally**

- Students will use appropriate resources to communicate with others (e-mail, chat, video conference, text-messaging, etc.)

**2. Locate Information**

- Students will use appropriate resources (library, Internet, CD-ROM, laser disc, simulations, videos, etc.) to locate information.

**3. Gather Research Data**

- Students will use research skills to investigate specific topics using various technological media.

**4. Organize Information**

- Students will organize knowledge by using keyboarding, word processing, database, spreadsheet, etc.

**5. Utilize Decision Making**

- Students will make decisions to effectively present the information they have researched and the knowledge they have organized.

**6. Produce Presentations and Projects**

- Students will organize research into a multimedia format to communicate information.

**7. Evaluate Presentations or Projects**

Students will critically review, assess, and revise presentations and projects.

**Check Your Progress 5**

1 State the meaning of ICT Infrastructure

2 Mention the Components of a school technology plan

- 

- 

- 

-

- 
- 
- 
- 

### 3 What is School MIS?




## 10.6 LET US SUM-UP

- School record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination for the purpose of enriching communication, decision-making and problem solving ability in the school system.
- Using ICT in keeping school records helps to facilitate and enhance the administration of the school towards achieving the goals.
- Role of ICT in keeping school records includes the fact that school records tell the history of the school. Google Calendar can schedule meetings and events with your co-workers, just as old calendar application.
- ICT plays a vital role in supporting powerful, efficient management and administration, It is specified that technology can be used right from communication, student administration to various resource administration in an education institution
- Technology provides increase of quick and frequent communication between teachers and parents, much more than can be accomplished through conventional means.
- Assistive Technology (AT) means any piece of technology that helps a student with or without a disability to increase or maintain his/her level of functioning; these often include laptops with specialized programs, like speech to text, text to speech, graphic organizers and word prediction software.
- Schools need to ensure that ICT is used to support students with special educational needs in the most effective and appropriate way. Schools need to ensure that they match students' needs to the most appropriate technology available, and that ICT is used to support not only the acquisition of literacy but the widest range of students' needs.
- The term UDL emphasizes the special purpose of learning environments. They are not created to provide information or shelter but to support and foster the changes in knowledge and skills that we call learning.
- School MIS will emerge as a single window clearing house on all information related to the secondary school system.

## 10.7 UNIT END EXERCISES

1. What roles can ICT play in the administration of schools?
2. Justify the need for Assistive Technology for Inclusion
3. List the different types of assistive technology
4. Prepare ICT infrastructure plan for the school

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## Unit - 11 : ICT for Teacher Professional Development

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11.7 Let us Sum up

## 11.8 Unit End Exercises

## 11.9 References

### 11.1 INTRODUCTION

Thippeswamy is a school teacher in Surapura block of Yadgir District. He has been appointed to the upgraded elementary school under Sarva Shiksha Abhiyan in the year 2005. He usually teaches from class 5 to 8. He has a professional degree, a B.Ed. During his B.Ed. study, most of his explorations and learning were about secondary students. But now he is teaching with elementary students. Many a times he feels whatever he has learnt during his professional education is not sufficient to meet the needs of his professional requirement. As a graduate teacher, the content of the elementary classes is not difficult for him to learn, but how the content needs to be presented so that this younger bunch of students understands it is a challenge.

In the year 2015, Thippeswamy encountered another challenge. The textbooks for the classes he teaches were re-written. The new textbooks are written in a different style. The textbooks have lot more activities. Moreover, the preface of the textbook is using new terminology, namely constructivism, facilitating learning, collaborative learning etc. None of these was part of his B.Ed. study.

The Block Education Office of Surapura regularly organizes training programs for the teachers regularly to meet many of these challenges. Thippeswamy attends all the training without missing any. He gets to know from his other colleagues how they deal with the similar issues.

Recently he attended a workshop organized by an NGO working with teachers in Surapura. The workshop was on how to use ICT in classrooms. Thippeswamy found the workshop interesting, as many of his concerns were raised in the workshop in addition to learning integrating ICT in teaching. He is actively contributing in the online forum for the workshop participants.

Thippeswamy is an excellent example for a teacher wanting to engage in his professional development. In this unit, we will discuss various opportunities available for teachers to engage in their professional development. The focus will be on ICT platforms that provide such opportunities.

### 11.2 OBJECTIVES

After studying this Unit, you will be able to:

- explain the meaning of Teacher Professional Development concept in the context of ICT
- review the scope of ICT as a tool assisting in teaching and managing school activities
- identify professional development avenues, specifically the ones which use ICT
- initiate development of e-portfolio of their professional practice

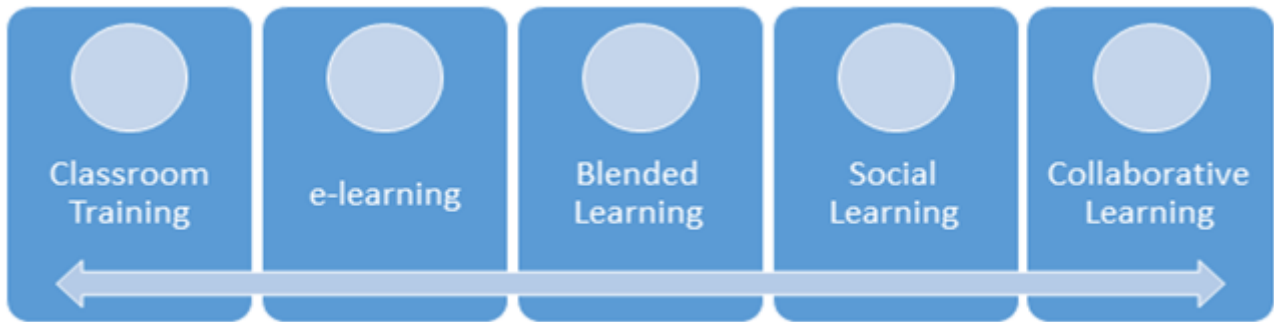
### 11.3 TEACHER PROFESSIONAL DEVELOPMENT - CONCEPT

As teachers we all know that learning about educational practice in general and teaching in specific is an ongoing activity. The field of educational practice is ever emerging and hence there is always something new to learn. Most of us start learning about our profession through a formal teacher preparation program. Since, any such preparation is incomplete without practicing the profession, the learning continues even after starting the practice of teaching. Additionally, it is not practical to expect to learn everything through formal learning in an ever emerging field like teaching. Starting from the initial teacher preparation program to ongoing teacher learning activities, teacher professional development can be seen as a continuum. It is in this sense the teacher professional development is defined as follows:

Teacher Professional Development (TPD) is *'a systematized, initial and continuous, coherent and modular process of professional development of educators in accordance with professional competency standards and frameworks'*. Teacher professional development would also include training in the adaptation to the evolution of change of the profession of teachers and managers of education systems.

From the definition we understand that it consists of systematic activities with clear purpose. The purposes are concurrent with the needs of teachers that arise from time to time. With the evolution of professional practice, the professional competency standards and frameworks that are to be developed in tune with the philosophies that govern the educational theory and practice. All these would happen on a continuous but in modular process, but always coherent when seen together. The course you are presently studying is an example of your professional development activity.

The teacher professional development is now a developing area in teacher education. There are different models that are in practice for this purpose. One model proposed by Hart J (2010) that speaks of workplace learning looks useful to understand various avenues for teacher professional development in the context of ICT.



### 5 Stages of Workplace Learning - Hart J (2010)

The classroom training here refers to formal professional education programs available for would be teachers. E-learning in this context refers to the teacher development materials available in digital form and learning happening mostly through online mode. Though the content for the e-learning is same as in classroom transactions, the major difference is in the absence of face-to-face learning. E-learning is said to be more flexible. The blended learning brings together the strengths of both face-to-face and e-learning modes. There will be face-to-face learning as well as e-learning components in this model. Social learning will include a social aspect to the blended mode. Instead of individual learning, here people learn through social interaction platforms. Social media takes the role of mediating among the learners. In the last stage of learning in a workplace, one has to collaborate with others as a part of learning. Here learning and working are assumed to take place together. Additional assumption is that in this stage learning in the flow of work needs to be enabled, supported and encouraged; not designed or managed. For this, learner needs to be autonomous, independent and inter-dependent, and self-directed.

One obvious feature of this model is that it looks professional development as a continuum, starting from initial formal programs. Apart from this, two other elements are important in this model.

The first one is that the model is also a continuity from top-down control in the extreme left to bottom-up control in the extreme right. In the formal programs, the program itself is a package with limited opportunities to pick from. On the other hand, the bottom up control in the collaborative format allows one to be highly selective, as per the need. The other feature of this model is formal-informal continuum. The classroom learning platforms are highly formal where as the collaborative platforms are highly informal.

In this unit, we are interested in the role of ICT in these. ICT is becoming increasingly prominent in the process of teacher professional development. If we see this continuum of teacher development models, we would see that ICT is more and more important for these models as some of them are partially and others are completely organized through ICT tools.

### ? Check Your Progress-1



List any one platform for teachers' professional development opportunity for each of the models discussed earlier:





Model	Example of an opportunity
Classroom learning	

	<input type="text"/>
e-learning	<input type="text"/> <input type="text"/>
Blended learning	<input type="text"/> <input type="text"/> <input type="text"/>
Social learning	<input type="text"/>
Collaborative learning	<input type="text"/>

## 11.4 ICT IN TEACHER PROFESSIONAL DEVELOPMENT

Researchers have identified many uses of ICT in relation to TPD that can be grouped in three categories:

- **A focus of study** that develops teachers' abilities to use specific ICT tools, such as online platforms
- **A delivery system** providing teachers with information to improve pedagogy and content mastery,
- **A catalyst for new forms of teaching and learning**, such as inquiry-based learning, collaborative learning, and other forms of learner-centered pedagogy (infoDev, 2005).

In other words, professional development in the context of ICT can be placed under three broad headings, namely

- Learning How to use ICT
- Learning through ICT
- Integration of ICT in teaching and teacher learning

### 11.4.1 Learning How to Use ICT

ICT with its versatile nature has found its application in every activity related to educational practice. Some typical questions you may have to address while learning how to use ICT are as follows:

- How do I use ICTs? (Technical)
- What can ICTs help me do? (Functional)
- How can I use ICT tools with so many students? (Logistical)
- Will these ICT tools and technologies replace me as a teacher? Will my students lose respect if they think the ICT platforms have repositories of knowledge that I don't have? (Affective)
- How do I organize my classroom to support the use of ICTs? How can they be used as part of what I already do in the classroom? (Organizational)
- How can I learn from and with ICTs? (Conceptual)
- How can ICTs help my students learn in different ways? How can they support the curriculum? How can they support my teaching? How should I teach using ICTs? (Instructional)
- How do I assess student learning in ICT-based projects? (Evaluation related)

Another way to look at learning about ICT use in educational purposes is to see the various applications of ICT in educational setting. Following is a non-exhaustive list giving an indication on various areas of ICT application.

- Learning ICT use for instructional planning
- Learning ICT use for facilitating learning
- Learning ICT use for assessment
- Learning ICT use for school management
- Learning ICT use for inclusive classrooms
- Learning ICT use for strengthening school community relationship

In all these areas of educational practice, ICT can be meaningfully integrated. But, one must know the ICT in the first place. For example, to develop digital lesson plans, one must learn word processing. In order to develop student record database, one need to learn some database management tools. A teacher needs to learn a spreadsheet application so that data can be organized, processed and analyzed. These are only few examples for what you have already discussed in various earlier units.

Following figure gives a glimpse of illustrative Free and Open Source Software (FOSS) tools that are available for educational purposes:



Figure1: An illustrative concept map of FOSS tools useful for educational purposes (Pic Courtesy: Prof. M. U. Paily, CC BY SA)

### ? Check Your Progress-2

For each of the educational practices listed below, give an example of specific practice and the relevant ICT tool/application useful. One example is given for your help.

Educational Practice	Specific Example of a Practice	ICT tool/application
Instructional planning	<input type="text"/>	<input type="text"/>
Facilitating learning	Developing worksheet for -	Word processor to -



	-facilitating working in group	-develop worksheet template
Assessment	<input type="text"/>	<input type="text"/>
School management	<input type="text"/>	<input type="text"/>
Inclusive educational practice	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
School community relationship	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>

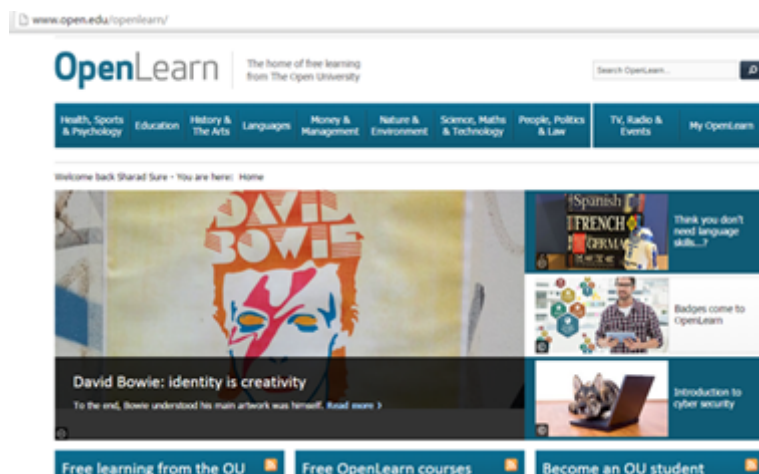
### 11.5 TEACHER PROFESSIONAL DEVELOPMENT THROUGH ICT

Emergence of new technology, especially web 2 technologies have given many platforms for teachers to learn. In this section, we explore various opportunities available for professional development of a teacher through ICT.

#### 11.5.1 Online Learning Platforms

Internet is a host for a large number of learning opportunities. Some of them give learning opportunities by offering complete online courses. There are free as well as paid courses that one can choose from. The online learning platform may supply the reading materials as well as opportunity to post your learning. Following are some examples of online learning opportunities.

- The Open University, London is offering various courses that are useful for teachers. Registration for these courses is free. You could see a course title "Learning to teach: becoming a reflective practitioner" one of the most popular courses offered in "Education" section accessed from <http://www.open.edu/openlearn/education>. There are other courses that might be of your interest in this platform. In order to take any of these free courses you need to enroll yourself first.



- Commonwealth of Learning offers a free online course of "Teacher ICT Integration" for teacher training institutions at Commonwealth countries. Resources and online materials of the same can be downloaded from the link <http://cctionline.org/>

Other online learning platforms that you might be interested in are here:

- Khan Academy - <https://www.khanacademy.org/>
- Saylor - <https://learn.saylor.org/>
- EdTech Leaders Online - <http://www.edtechleaders.org/>
- iEARN - <http://www.iearn.org>



### Check Your Progress-3

Connect to any one online learning forum (You could also use the links given above). Select a course/topic for study. Go through the material. List how learning experience is different from the one that we get in a traditional classroom. Following dimensions would help you structure your response.

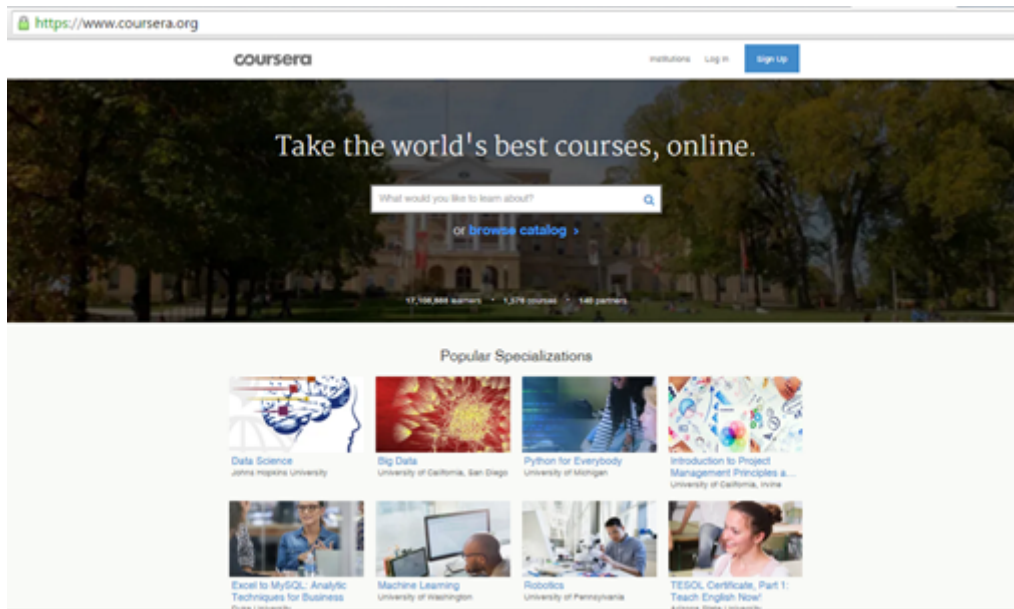
Area/Dimension	Experience
Content	<input type="text"/>
Assessment	<input type="text"/>
Activities	<input type="text"/>
Multi-media experience	<input type="text"/>
Interactivity	<input type="text"/>

### 11.5.2 Massive Open and Online Courses (MOOCs)

Today a host of platforms is available which offers open and online courses, again many of them are free. The essential feature of MOOC is that it is offered through online learning platforms, to anyone interested in learning, to any number of participants, at a fixed given timeframe in a modular form. Usually, a course in a MOOC would long anywhere between 6 to 16 weeks. The course contents are structured on a weekly basis. The course participants are expected to go through the readings, videos, workshops, activities, assessment exercises to complete a course. The MOOCs are different from the online learning platforms in a sense that in MOOCs, one would be able to enroll into a full-fledged course, consisting of course structure, instructional video, guided interaction, monitored evaluation, grading of the tasks completed etc. In other words, the MOOCs provide a complete learning experience online. An online learning platform, might only provide e-content, assessment tasks which are not graded, and an interaction platform.

There are many MOOC platforms. Here is a non-exhaustive list of free and paid courses.

**Coursera:** Coursera is a for-profit, educational technology company that offers MOOCs. Coursera works with top universities and organizations to make some of their courses available online and free, and offers courses in many subjects. This can be accessed at the following link: <https://www.coursera.org/>



An example of a course in Coursera is "The Art of Teaching History: A Global Conversation for Secondary Educators" an open and free course offered by Rice University. For obtaining a certification, one has to pay; otherwise the course is open and free. Following link will take you to the course. You have to sign up for the course by providing your e-mail id. <https://www.coursera.org/course/teachinghist>

**edX:** edX is a MOOC provider. It hosts online university-level courses in a wide range of disciplines to a worldwide student body, including some courses at no charge. It also conducts research into learning based on how people use its platform. edX differs from other MOOC providers, such as Coursera in that it is a nonprofit organization and runs on open source software. Following link would take you to edX home site. <https://www.edx.org/>

Other popular MOOC platforms are:

- Open learning - <https://www.openlearning.com>
- NPTEL - Managed by IITs and IISc - <https://onlinecourses.nptel.ac.in/explorer>
- Future Learn - <https://www.futurelearn.com/>
- Stanford Online - <http://online.stanford.edu/>
- European School Net - <http://www.europeanschoolnetacademy.eu/>
- NovoEd - <https://novoed.com/>
- MOOC-Ed - <https://place.fi.ncsu.edu/>



### Check Your Progress-4

Enroll yourself into any one course in a MOOC platform. From an exposure of the first week, share your new learning.

Area/Dimension	New Learning
Content	<input type="text"/>
Assessment Practice	<input type="text"/>
Activities in the lesson	<input type="text"/>
Multi-media experience	<input type="text"/>

### 11.5.3 Social Media Networks

Social media networks provide teachers with opportunities to get connected with people who are working in areas connected with educational practice. Most highly valued use of such a network is sharing ideas. Spaces such as Twitter ( <https://twitter.com/>), LinkedIn ( <https://in.linkedin.com/>), Facebook ( <http://www.facebook.com/>) and Google+ ( <https://plus.google.com/>) offer instant opportunities to follow and learn from authors, educators, educational leaders and professional heroes who not only share information and resources but frequently initiate and invite direct engagement. Simply following people who would otherwise only be names in textbooks or journal articles is one legitimate way to be in these spaces. Through social media networks, we also have legitimate opportunities to engage with these individuals and to learn directly from them.

Social media-based platforms provide access to professional organizations and resources of value to adult learners. Online communities created in these social media spaces provide opportunities to share resources, spark questions that expand collective learning and make connections that sometimes lead to employment offers, consulting requests and collaboration opportunities.

Some educators compile much learning from social networking and organize them in Personalized Learning Networks (PLN). An example for such PLN see the link for Educator PLN ( <http://edupln.ning.com/> ) which is an exclusive educator PLN.



### ? Check your Progress-5

List out the various provisions in Educator PLN for interacting with other professional colleagues




### 11.5.4 Web 2.0 Technologies (Blog, Wiki, and Podcasts)

Web 2.0 technologies such as blogs, wikis, and podcasts have been considered as 'social software' because they are perceived as being well connected, allowing users to develop web content collaboratively and open to the public. Web 2.0 tools are easy to use and quickly developed and organized. Thus, they allow powerful information sharing and straightforward collaboration. Further, these tools have advantage of requiring minimum technical skills to use their features. Hence users can focus on the information exchange and collaborative tasks without bothering about technical knowledge.

**Blog:** Following a blog written by others in the profession is a good way for one's professional development. Since, blog also provides opportunities to interact asynchronously, there is a possibility of social learning. Since interaction is

asynchronous, responses would be more reflective rather than spontaneous.

Writing blog is another way of engaging in professional development. Systematic, articulated writing is only a product of thoughtful engagement in the profession.

**Wiki:** Wiki is another web 2.0 technology where teacher could contribute and hence engage in professional development. Wiki is a type of interactive website where the webpages are editable by the users of the site. Users are able to edit existing pages and add new pages to the site. This allows groups to collaborate on the creation of web based information. The wiki users can keep the content improving till the members of the community are satisfied with the content. Since putting together information on a particular topic requires research, synthesis and presentation of the idea for others that helps teachers develop their knowledge on the area they are exploring, makes a wiki a powerful tool for professional development.

Useful wiki for teachers:

- Wikipedia - <https://en.wikipedia.org/>
- Wikimapia - <http://wikimapia.org/>
- WikiHow - <http://www.wikihow.com/>

**Social bookmarking:** Social bookmarking, an online service through which adding, annotating, editing and sharing bookmarks of online resource is possible. Let us illustrate its use for teachers. Indian Freedom Movement is one of the topics of History in Social Sciences. A teacher could identify various online sources and shortlist the most useful ones. Now, the teacher could give an annotation (brief description) for each of the sources. This collection of sources is useful to every teacher teaching the topic. Sharing such a collection of sources is easy when social bookmarking service is used. Since there is no one good collection, collaboration among teachers would help in reviewing the collections, adding new sources to the list of annotations. Some of the most popular social bookmarking service providers are Diigo, stumble upon, delicious. Please see links of few social bookmarking service providers.

Diigo - <https://www.diigo.com/>

StumbleUpon - <http://www.stumbleupon.com/>

Delicious - <https://delicious.com/>

**Online groups:** As we mentioned in the beginning of this Unit, WhatsApp groups are popular among teachers. WhatsApp group is an example of online groups. There are other ways to connect people through formation of groups. One of them is a mail group. People having mail ids in a common domain can be brought together. For example people having g-mail account can be grouped together to form a google group. Similar mail groups can also be formed among people with mail id in yahoo domain. Another category of online groups is instant messaging. WhatsApp and Hike are popular instant messaging groups. Instant messaging service is very popular among communities for two reasons. First, it is available in the form of a smartphone application (app), hence easily accessible to many. Second, it has a feature of providing real time interaction. In other words synchronous interaction feature of instant messaging makes interaction very lively and hence very popular. All these online groups help teachers to share information and provide platforms for conversations.

Every member of a group can post information to the group in variety of forms. The posting could be a text message, image, video, or even an audio file. Documents are frequently photographed and posted in groups. This flexible feature of online groups is its strength as well its weakness. Since posts can be in many formats, there is wider participation in the group interaction. Since there is no scrutiny while posting, there would be indiscriminant posting in the groups. For example, a Science Teachers' WhatsApp group is expected to interact on issues of Science teaching and learning. Posting a joke in such a group would be inappropriate. Group members could arrive at certain norms for posting in groups so that interaction is fruitful.

**Podcast:** Podcasts are another web 2.0 technologies that are useful for teachers. Since the archives of the resources are always available for use, podcasts become very handy when they are in need. Since the audio format can be played on mobile phones, they are available for teachers for convenient professional development, i.e., teachers can select what, when and where they learn.

Here are some podcast links useful for a teacher:

- A History of the World in 100 Objects - <http://www.bbc.co.uk/programmes/b00nrtd2/episodes/downloads>
- ISTE podcast - on how technology is changing the classroom -
- Grammar Girl - <http://www.quickanddirtytips.com/grammar-girl>
- Radio Lab - <http://www.radiolab.org/>
- How stuff works - <http://www.radiolab.org/>
- Teacher Created Materials - <http://www.teachercreatedmaterials.com/podcasts/>
- Math Mutation - <http://mathmutation.blogspot.co.uk/>
- NASA Science Cast - <http://science.nasa.gov/science-news/sciencecasts/>

Website:Podcasts are another web 2.0 technologies that are useful for teachers. Since the archives of the resources are always available for use, podcasts



## Check your Progress-6

Explore any one web 2.0 technologies that are listed above. List your learning from your exploration in the following dimensions:

Area/Dimension	Learning from the exploration
What you knew about this before?	<input type="text"/>
What new you learnt?	<input type="text"/>
How useful is this to you?	<input type="text"/>

### 11.5.5 Web-conferencing:

Web conferencing allows us to connect and communicate in real-time with people in different locations through internet. It allows people to reach in a conversation crossing state, national and international boundaries, crossing various time zones. Web conferencing combines graphics, such as Power Point Presentations, with voice and/or video. It also includes a range of interactive tools such as polling/voting, chat and a 'hand raising' feature to indicate that you have a question or comment. It may also include document sharing, a whiteboard and web surfing features. As a participant, we see information on our computer screen and hear the presenter and other participants through telephone or internet.

No additional equipment is required to organize a web-conference. A computer to browse and a relatively high speed internet connectivity like broadband are sufficient. Participants will be given a web address. Participants can register and join the session. Web conferencing combines the power of visuals with the voice and has the advantage of being accessible to anyone who has an Internet connection.

Web conferencing differs from webcasting. Webcasting refers to a session that is recorded and streamed to participants at a time of their choice. Hence webcasting does not happen in real time. A live web conferencing session can be recorded and provided as a webcast after the event. Web conferences are often referred to as webinars, a term derived from the combination of web and seminar. Web conferencing is most effective when used with individuals who are in different locations. The interactive features are designed to allow individuals to respond.

Some of the better known services of webinar are provided by Elluminate, WebEx, Centra (now Saba) and Adobe Connect. Dimdim, Yugma and WizIQ are currently popular free services.



Web conferencing has become popular for delivering professional development to teachers. Whenever an expert, be it a subject expert, pedagogic expert or a teacher expert needs to be invited from a far off place, webinars are found to be a good tool for hosting such interactions.

## 11.6 TEACHER PROFESSIONAL DEVELOPMENT IN INTEGRATING ICT

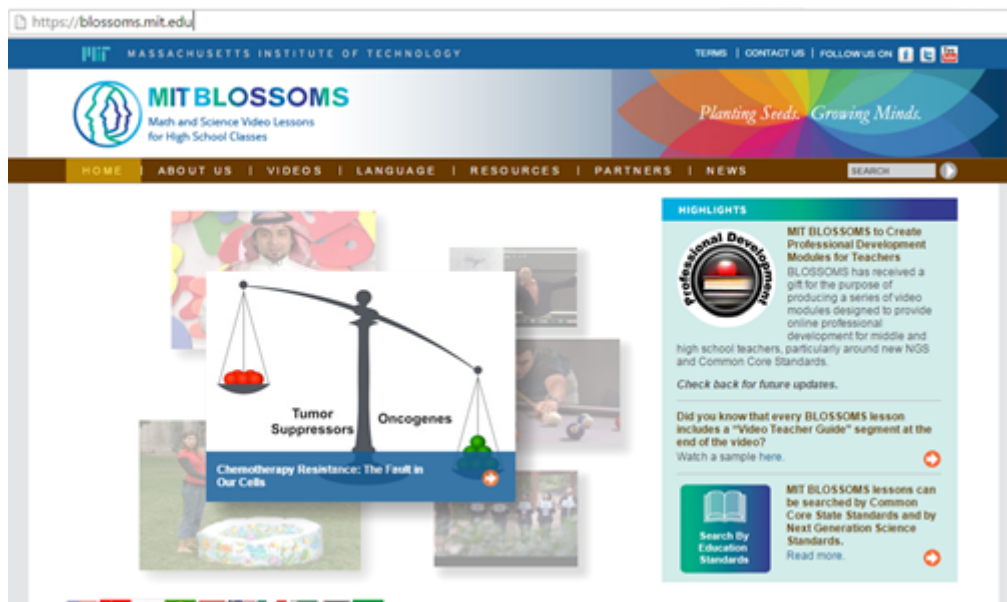
ICT integration refers to the use of ICTs (specifically, computers and the Internet) to support teaching and learning across the curriculum. Integrated use of technology may involve students working with computer productivity tools to complete learning tasks or searching the Internet for learning, but it is always tied directly to student mastery of their school subjects.

This definition of ICT integration requires teachers not just learn with basic ICT skills, but should learn how meaningfully strengths and versatility of technologies can be translated into learning opportunities for students. This shift from knowing basic skills to integrating ICT in teaching and learning is a slow and evolving process. In the following paragraphs we shall see few examples of ICT technologies which lend themselves for easy integration in teaching and learning.

### 11.6.1 Online Videos/ Teaching Channels

There are many platforms like YouTube (<https://www.youtube.com/>) which provide thousands of videos which can be embedded in the lesson. They are popularly known as teaching channels. These not only enrich the content for teachers but also provide a rich learning experience by exposing students to professionally made educational videos.

Another video lesson platform is MIT Blossoms (<https://blossoms.mit.edu/>). This source provides rich learning experiences to students of high school. This video Library contains over 100 math and science lessons, all freely available to teachers as streaming videos and Internet downloads and as DVDs and videotapes.



Here is a list of such teaching channels that you can explore:

- TED Ed (<http://ed.ted.com/>)
- Stellarium <http://www.stellarium.org/>)
- Vimeo Teaching Channel - <https://vimeo.com/teachingchannel>
- TeacherTube - <https://www.teachertube.com/>
- Pro Teachers Video - <http://www.proteachersvideo.com/Home.aspx>
- Edutopia videos - <http://www.edutopia.org/videos>
- Teaching channel (<https://www.teachingchannel.org/>)

### 11.6.2 Teacher Portfolio

In earlier unit on ICT and assessment we have discussed the concept of portfolio and portfolio assessment. Portfolios are also good tools for teacher professional development, as they can be used to record, display, analyze and reflect on individual teachers' professional journey.

In a portfolio, as teachers we can assemble records, documents and details of our teaching and their result in a very creative and systematic way. These documented details give us an opportunity to look at them at a different point of time. Thus teaching can be seen as an ongoing process of inquiry, experimentation and reflection.

Since the teacher portfolios give in addition to the experience of a teacher, a reflection on the experience, it gives an opportunity to improve upon one's own teaching. Thus, portfolio management gives teacher an explicit opportunity to reflect on teaching experience and learning, making a teacher a reflective practitioner. Teachers could also come together to develop a shared portfolio, for which teachers have to collaborate together.

### E-portfolio

Teacher portfolios maintained in digital form are called electronic portfolio, e-portfolio in short. E-portfolios have advantage over other forms of documentation.

- **Accessibility:** An e-portfolio can be easily stored and shared without any additional cost. To add to this, it can be uploaded online in embedding in a website or as a part of the blog. By this e-portfolio becomes universally accessible.
- **Multimedia:** Digitization allows multiple forms of experiences and evidences stored in a portfolio. For example, teacher can include one's own video footage or audio record of teaching in a classroom. Photographs of students being engaged in classroom tasks, snapshot of a blackboard organization, typical student response in a worksheet etc. can be easily included.
- **Non-linear presentation:** The web presentation of the portfolio need not follow a linear order. For example, e-temporal sequence of a classroom is one way of presenting but the components of this lesson can also be presented based on what teacher did, what students did, how were students assessed etc. can be presented in separate links so that people interested in specific component can directly go to that section.

### Components of a Teacher Portfolio

Following are few components that are commonly used in teacher portfolios:

- **Thoughts About Teaching**
  - A reflective "teaching statement" describing one's personal teaching philosophy, strategies, and objectives.
  - A personal statement describing one's teaching goals for the next few years
- **Documentation of Your Teaching**
  - A list of courses taught and a description of responsibilities
  - Course descriptions with details of content, objectives, methods, and procedures for evaluating student learning
  - Reading lists, references used
  - Assignments
  - Exams and quizzes, graded and ungraded
  - Handouts, problem sets, lecture outlines
  - Descriptions and examples of visual materials used
  - Descriptions of uses of computers and other technology in teaching
  - Video/audio records of teaching
- **Teaching Effectiveness**
  - Summarized student evaluations of teaching
  - Written comments from students on class evaluations
  - Comments from other teachers teaching the same course
  - Letters from students, preferably unsolicited
  - Statements from alumni
- **Materials Demonstrating Student Learning**
  - Test/exam scores
  - Students' workbooks
  - Students' essays or creative works
  - Graded work from the best and poorest students, with teacher's feedback to students
  - Written feedback on student work
- **Activities to Improve Instruction**
  - Participation in seminars, workshops training programs or professional meetings on teaching



- Use of new methods of teaching, assessing learning, grading

- **Honors, Awards, or Recognitions**

- Teaching awards from department, community etc.
- Invitations based on teaching reputation to consult, give workshops, train other teachers etc.
- Requests for advice on teaching by other teachers

- **Teacher Reflections**

- Reflective notes written on regular basis
- Plans changed based on the reflections

Here is an example of e-portfolio of a teacher available online:

Ms. Van Patter's Teaching Portfolio <http://eduportfolio.org/3160>

## ? Check Your Progress-7

List any one example of digital form of the evidence that can be put up in an e-portfolio. One is done as an illustration.

Component	Example of the digital form
Lesson plan	<input type="text"/> <input type="text"/>
Learning material	<input type="text"/> <input type="text"/>
Teaching	<input type="text"/>
Student learning	<input type="text"/> <input type="text"/>
Teacher feedback	<input type="text"/> <input type="text"/>
Student feedback to teacher	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Teacher reflection	<input type="text"/> <input type="text"/>

Submit



### 11.6.3 ICT integrated Action Research:

Action research is an example of a reflective practices of teacher. Action research refers to a practice in which teacher investigate teaching and learning so as to improve their own teaching and their students' learning. One popular action research model proposes four cyclic phases. Look, Plan, Act and Reflect. The Look phase is an analytical phase where one identifies the problem. During the plan phase teacher starts devising a plan to overcome the problem. In the act phase, the plan is implemented and during the reflect phase one again looks at the situation and see to what extent the problem has been addressed. This leads to another cycle of look plan, act, and reflect.

ICTs are helpful to teacher in every phase of action research. Apart from being a tool for the teacher in taking up action research, ICTs provide many opportunities to integrate it in teaching learning process and make learning effective.

Let us take an example for an action research on ICT integrate in teaching and learning. These days, GeoGebra free software for learning mathematics has become very popular. The software is very useful in visualizing mathematical concepts. A mathematics teacher who has started using GeoGebra would like to know to what extent students are benefitted by the use of software. She decides to take it up as an action research to find the effect of Use of GeoGebra on her students' understanding of mathematics concepts taught through GeoGebra.

Following link gives you more examples for action research topics for school teachers:

[http://wikieducator.org/ACTION\\_RESEARCH\\_AND\\_RESEARCH\\_IN\\_GENERAL](http://wikieducator.org/ACTION_RESEARCH_AND_RESEARCH_IN_GENERAL)

Action research does not restrict to investigating into teaching and learning processes and its outcomes. It would be useful to document the action research. ICTs are very useful in this documentation process. This documentation of the process and resulting report can be presented in teacher seminars and shared with the wider community.

### 11.6.4. e-Publications (Blog, websitesandKOER):

Professional writing is one of the professional development activities which has been explored to the least extent. Writing, even of a paragraph, requires organizing ideas and presenting them in a coherent way. Hence the writer need to understand the idea even before writing, writing leads to higher level of understanding. Since writing also allows others to comment on it, collaboration on developing an understanding is a possibility. Since there is no alternative to start writing to become a good writer, there is a need for space for writing and interact with others on the product of writing. With the advent of internet, there are many such spaces where one can write and communicate with other members of the community.

The term e-Publication has been used in the sense a broad sense of publishing in an online platform in the online. It could range from publishing in a professional journal to publishing content in a website. It is considered as a range since publication in a journal needs a prior review. On the other hand, publishing in a website doesn't require this review in advance. As readers comment and express their views, the content could be revised and further developed.

There are many avenues to create blogs and websites. Some of the service providers to publish blogs and websites are:

Wordpress: <https://wordpress.com/>

Blogger - <https://www.blogger.com>

SimpleSite - <http://www.simplesite.com/>

GoogleSite - <https://www.google.com/sites/overview.html>

Karnataka Open Education Resource (KOER) is another such platform where teachers can present their work. KOER initiative has created a community of practitioners for various school subjects. Through this platform, various subject teachers have started to share insights they have on teaching and learning specific subjects. The interaction thus generated has helped teachers, participants as well as many others, in gaining deeper understanding of the content under discussion.

Following link takes you to the KOER main page. Also access the specific subject group to get an understanding of the kind of interaction happening in the group:

[http://karnatakaeducation.org.in/KOER/en/index.php/Main\\_Page](http://karnatakaeducation.org.in/KOER/en/index.php/Main_Page)

### 11.6.5 Tele-conferencing: EDUSAT Experiment

EDUSAT is an educational satellite dedicated to serve the educational sectors offering an interactive satellite based distance education system for the country. EDUSAT was launched in the year 2004.

It was intended to provide connectivity to schools, colleges, and other similar institutions. Initially it was proposed to use the facilities in four different states for reaching different target groups. In Karnataka State the EDUSAT was used to supplement classroom teaching in all the elementary and secondary schools. Students and Teachers of Elementary and Secondary Education were the target groups of the program.

For support, the classroom teaching and learning interactive radio program and interactive video lessons were developed. Teachers were trained for using these lessons. It is in this context teacher professional development in integrating ICT was attempted and achieved. Teleconference mode was used for reaching maximum number of teachers.

Teleconference refers to an arrangement of reaching out to multiple centers from a central place through satellite connectivity. The centers could have audio and video outputs or only audio output. The experts located at the central position interact with participants located at various centers through video or dedicated telephone connection.

During EDUSAT experiment, school teachers were given intensive training in the content area as well as using radio and television as a teaching tools. The content based training was focused on ensuring that teachers find it easy to handle student queries related to the radio and video lessons. These trainings were in teleconference as well as face-to-face mode. Apart from the content, model radio and video lessons were used to help the teachers to get a sense of how to lead the lesson in interactive radio instruction (IRI) and interactive video instruction (IVI).

IRI and IVI trainings helped the teachers since the lessons were developed based on activity based instruction. The lessons embedded space for student activities, teacher talk, interaction among the students, and evaluation exercises. In a way, these lessons exposed teachers to more student centric lessons. Since the lessons were structured around the activities, teachers were leading the classes around these preplanned activities. This is a good example of ICT being used for professional development of teachers for integrating ICT in classroom.

EDUSAT also facilitated the launch of dedicated Live television channels, GyanDarshan 1 and 2 and a radio channel Gyanvani. The channels have helped in offering the distance education through virtual classroom mode.

## Check Your Progress-8

List out the ICT tools used in EDUSAT experiment for teacher professional development.









### 11.7 LET US SUM UP

In this Unit, we have discussed various opportunities for a teacher for professional development. Our focus was on those opportunities that are provided by ICTs. We have discussed three broad threads under this. The first one is learning to use ICTs. Most of these are covered in various units earlier to this. Hence we have summarised such a list for you. The second one is teacher professional development through ICT. In this section we have explored various avenues including online learning platforms, MOOCs, social media networks, web 2.0 technologies and web conferencing for providing teacher professional development. In the third thread we briefly explored how ICT integration in teaching and learning leads to professional development, taking examples of teaching channels, e-portfolios and teleconferencing mode employed in EDUSAT experiment. We have learnt in this unit that various dimensions like content, pedagogy, technology, technology integration can be addressed by using ICT for teacher professional development.

### 11.8 UNIT END EXERCISES

- Explain various models in a continuum available for professional development of teachers.

- How does learning about ICT tools help teachers improve their professional practice?
- Compare the opportunities available through online courses, MOOCs and social media networks for teachers' professional development.
- What role do web 2.0 technologies play in improving teacher practices?
- Develop a design of an e-portfolio of your own.
- How did EDUSAT experiment help in teacher professional development?

## 11.9 REFERENCES

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## Unit - 12 : E-content and open educational resources

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**Unit - 12 : E-content and open educational resources**



#### Structure

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## 12.1 INTRODUCTION

Asha is a teacher in a remote rural school where students are highly deprived of learning resources. She has been struggling to collect and organize learning resources from where ever they are available. She used to discuss with her colleagues that her students have tremendous capability and motivation but she is unable to do much for them. Then it so happened that during one of the training programs she was introduced to Open Educational Resources, E-content, Massive Open Online Courses etc. and their availability and features. The training made her realize that the ICT has solutions to the problem she was facing in her school. Now she is empowered in such a way that she can find apt and sufficient resources for her students. She is also able to uses, reuse, revise, remix the OERs and shares them with her students, colleagues and friends. She has helped her students in getting the required latest books, learning material, resources and information and helped them in fulfilling their aspirations. She has now started inspiring many a teachers who are also in the same position as she was once.

Today the entire world is moving speedily towards digitization and we have to learn new things using new technologies. The evolution of computers especially the internet has affected all spheres of our life. Ten to fifteen years back we used to spend our time in the library for information in books, magazines and journals. Now a day we search for the information in the web sites. Access to information has become very easy because of information sharing on World Wide Web (www). Quality of teaching and students' learning are determined by the teachers who teach them. Well trained teachers with required knowledge, skills and commitment can develop scientific and critical thinking, promote tolerance, and develop cultural and social values in them. Innovative technologies will make it possible to achieve these by providing new ways to teachers. But these new technologies are placing more demands on teachers to learn how to use them in their teaching and learning processes. This great transformation is posing challenges to teachers and teacher educators in using technologies in creative and productive ways. Hence, we as teachers have to meet these new challenges by continuously acquiring new knowledge and skills to discharge our duties effectively.

ICT can offer tremendous opportunities for capturing, storing, disseminating and communicating a wide variety of information. Rapid expansion of knowledge and availability of variety of ICT has made knowledge, inclusion and integration of ICT in teaching and learning inevitable for us now. Moreover, ICT can promote international collaboration and networking in education and provide more flexible and effective ways for professional development. It can also help in pre-service and in-service teacher training programs. You have studied about various ICTs in the earlier units and you will be learning about e-content and Open Educational Resources in this unit.

This unit aims at making you understand the meaning, designing and development of e-content. You will also understand the standards of e-content, learning objects, re-usability of e-content and authoring tools. In this unit you will also learn about open educational resources, meaning and importance, various OER initiatives and creative common licensing.

## 12.2 OBJECTIVES

After studying the Unit you will be able to

- state the meaning of e-content.
- explain the process of designing and development of e-content.
- explain the phases in different instructional design models
- create e-content for a particular topic.
- state the meaning of re-usable learning object.
- describe the use various tools for editing graphics, audio and video.
- explain how authoring tools are used in creating e-content .
- explain the meaning and importance of Open Educational Resources
- explore various Open Educational Resource repositories.
- use different Open Educational Resources for classroom teaching and learning.
- explain the meaning and types of Creative Commons Licensing.

## 12.3 ELECTRONIC CONTENT (E-CONTENT)

Wide varieties of digital materials which are of educational significance are available online. Some of the quality materials which are available free of cost or with minimum restrictions can be used, re-used and modified by teachers and students for their teaching and learning. As textbooks are too expensive, the students are switching from textbooks to digital course materials. These materials provide both teachers and students a greater interactivity and social collaboration. One of the materials which can be designed and developed used, re-used and distributed is e-content.

E-content is becoming popular because of its flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed e-content. It is advantageous to the educational organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centers. It has a significant implications for open and distance learning institutions.

Electronic content (e-content) which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet. According to Oxford dictionary 'e-content is the digital text and images designed to display on web pages'. According to Saxena Anurag(2011) 'E-content is basically a package that satisfies the conditions like minimization of distance, cost effectiveness, user friendliness and adaptability to local conditions'.

Well developed e-content can be delivered many times to different learners. Individual course components i.e. units, lessons and media elements such as graphics and animations can be re-used in different contexts.



### 12.3.1 Designing and Development of E-content

The purpose of e-content development is to create an information rich society. Every one in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated e-content will provide access to high quality meaningful digital content and serve as an effective virtual teacher.

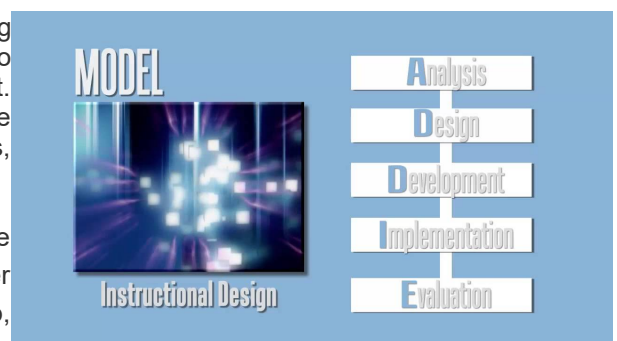
E-content design, development and approach will depend upon the nature of the content and the learners. It will also depend on the quality and complexity the learning you wish to create. Various instructional design models are available according to our requirements. Most of the models involve the process of analyzing the learner needs and goals of the instructional material development, development of a delivery system and content, pilot study of the material developed, implementation, evaluating, refining the materials etc. In designing and development of E-content we have to adopt one of the instructional design models based on our requirements. Before understanding the designing and development of e-content it is essential to understand the meaning of instructional design.



According to Wikipedia '**instructional design** is the practice of creating instructional experiences which make the acquisition of knowledge and skill more efficient, effective and appealing. The process broadly consists of determining the current status of learner understanding, defining the end goal of the instructional material and creating some 'intervention' to assist the transition. This systematic approach provides a step by step process for the analysis of the learners' needs, the design and development of the material'. Most common and popular model used for creating instructional materials is the **ADDIE** model. This abbreviation stands for the five phases involved in the model. They are **analyze, design, develop, implement and evaluate**. This model is initially developed by Florida State University to explain the processes involved in the formulation of an instructional systems development (ISD) program for military inter-service training. ISD was meant for training individuals to do a particular job. This can also be applied to any inter-service curriculum development activity. Originally the model contained several steps under its five original phases (analyze, design, develop, implement and evaluate). Over the years the steps were revised and finally the model itself became more dynamic and interactive.

**Analysis:** It is the first phase of this model meant for examining the suitability of the e-content to be developed. It is related to analyzing the learning needs, context, learner, task and content. Analyzing the learning needs is identifying the needs from the perspective of different learners, teachers, subject experts, practitioner, policy makers etc. Needs are to be clearly stated.

- **Contextual analysis** is collecting data related to the context of learning such as learning environment. Whether the e-content developed is for the individual or group, formal or informal, facilitated or self-learning etc.





- **Learner analysis** is collecting data related to learners academic levels and attributes such as skills, motivation, visual literacy, language competency, learning styles etc. That is nothing but preparing the learner profile. It helps to know about the learner.
- **Task analysis** is stating the purposes of developing the e-content. Deciding whether that is developed for educating, training, creating awareness, developing skills etc.
- **Content analysis** is nothing but preparing a content outline. Good content comprehension is required before designing and developing content. It includes verifying the content with respect to cognitive appropriateness, factual accuracy, completeness etc. It also includes classifying the content into facts, concepts, principles, processes and procedures.

**Design:** It is concerned with defining the learning objectives, structuring the content logically, specifying the instructional and evaluation strategies, and preparing for visual and technical design.

- **Learning objectives** are to be defined in clear, realistic and measurable terms. Learning objectives are the statements that describe what the learner will be able to do at the end of the course or program. Learning objectives should specify performance and communicate their purposes. Prepare a detailed content outline in which content is thoroughly analyzed and logically organized. Content is to be structured logically following simple to complex, known to unknown, concrete to abstract, general to specific etc.
- **Instructional strategies** are to be stated clearly. Depending on the learning style and nature of the content we have to decide the appropriate instructional strategy. Appropriate **media mix** that is combination of audio, video, graphics, animation; simulation etc is to be decided.
- **Learner evaluation strategies** such as practice, computer marked or tutor marked assessments, pretest, post-test, remedial tests etc are to be specified. We have to decide about the formative and summative assessments. Before developing the content for the selected course review the proposed learning objectives. Make sure that content, assessment tests and exercises match the objectives stated. Provide the information and knowledge required to meet the learning objectives.

**Development:** It is related to the creation of story board. **Story board** is nothing but scripting the entire course content. The term 'story board' is taken from film production. In a movie it indicates the visual representation of the various scenes. In e-content development the story board describes step by step script of the final outcome of the e-content i.e. story board is created to provide a blue print of the course with each and every detail along with the content notes. The story board is created based on the objectives and instructional strategies. Here the developers create and assemble the content assets and learning objects. **Programming and integration** of all media elements into a cohesive multimedia package are the part of this phase.

**Implement:** In the implementation phase, materials are distributed to learners. A comprehensive implementation strategy document is developed. This document should cover the course curriculum, learning outcomes, method of delivery in terms of hard ware and soft ware requirements and testing procedures. Ensure that the web site is functional if the material is on the web site.

**Evaluation:** The evaluation phase consists of two parts i.e. Formative and summative evaluation. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation determines the adequacy of the distributed materials in achieving the course objectives. Material is to be revised at all the stages based on the feedback received.

Now, let us learn the main features of some popular alternative models.

### Dick and Carey Design Model

- Starts by identifying instructional goals
- Ends with summative evaluation
- Focuses on specific objectives
- Similar to that of software engineering.

### Hannafin and Peck Design Model

The Hannafin Peck model (1987) uses a three phase process

**Phase 1:** perform a needs assessment

**Phase 2:** design

**Phase 3:** develop and implement instruction

(Note: All the phases involve a process of evaluation and revision)

### Knirk and Gustafson Design Model

The Knirk and Gustafson model (1986) also uses a three stage process:

**Stage 1:** identify the problem and set instructional goals

**Stage 2:** design and develop objectives, set instructional objectives and specify strategies

**Stage 3:** develop materials

(Note: This can be used for individual lessons or modules; focus is on evaluation and development seems to come late in the process.

#### In text Activity:

Watch this video available at

<https://www.youtube.com/watch?v=v6jGmBbg6eY> to know more about e-content

### 12.3.2 Standards of E-content

E-content standards are rules that most e-content developers should abide by. Standards are *engineering or technical specifications* that help e-content developers to establish uniformity. The different kinds of standards are mandatory, voluntary and defacto. Mandatory means one should comply, voluntary is one may or may not follow and defacto which are well established common practices but may not be formally published. Ensuring the high quality of the e-content is concerned with creating, communicating, and maintaining consistent development standards. Writing and textual, graphical and page design, questions and test, interactivity and audio/video standards and guidelines are to be ensured before finalizing. With respect to the quality of the e-content it should be correct, adaptive, communicative, interactive, reflexive, explorative, standardized etc.

Formal standards bodies such as the World Wide Web Consortium (W3C), the Internet Engineering Task Force (IETF), and International Organization for Standardization (ISO) etc publish the electronic standards. W3C is international standards organization for World Wide Web.

E-learning industry follows certain standards for integration of course ware. There are several standards available today for content integration and interoperability. International bodies generally design and publish the standards.

According to International Organization for Standardization(ISO) standards can be defined as “documented agreements containing technical specialization or other precise criteria to be used consistently as rules, guidelines or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose.”

**Share-able Content Object Reference Model (SCORM):** It is a powerful tool. Content can be created and used in many different systems. Content can also be used in many situations without modification. It is the most widely used

standard in all LMSs. It has applications in general usage as well as defense related uses.

**Aviation Industry CBT Committee (AICC):** This was the first standard to be adopted by the e-learning industry. It is still actively used in the aviation industry.

**Institute of Electrical and Electronics Engineers (IEEE) IMS Standards:** This enables high quality accessible and affordable learning experiences. This standard is mainly used today schools, colleges, universities, government institutions etc.

**Instructional Management System Global Learning Consortium** (usually referred to as IMS GLC, IMS Global or simply IMS) is a global, nonprofit, member organization that strives in shaping and growing the learning industry through community development of interoperability and adoption practice standards. Their main activity is to develop interoperability standards and adoption practice standards for distributed learning,

## Check Your Progress-1



### I Choose the correct answer and fill-in the blanks

1. E-content is also known as \_\_\_\_\_

- course content
- Digital content
- E-learning
- Content learning

Wrong

Correct Option

Wrong

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Correct Option \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

2. In ADDIE model ADDIE stands for \_\_\_\_\_

- Arrange, Design. Develop, Implement, Evaluate
- Analyze, Design. Develop, Import, Evaluate
- Analyze, Design. Develop, Implement, Evaluate
- Analyze, Design. Develop, Implement, Educate

Wrong

Wrong

Correct Option

Wrong

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Correct Option (Feedback)
4. Wrong (Feedback)

3. The process of instructional designing broadly consists of

- Determining the current status of learner understanding**
- Defining the end goal of the instructional material
- Creating some 'intervention' to assist the transition
- All the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)



### II Select from the given

- 1 Share-able Content Object Reference Model
- 2 Aviation Industry CBT Committee
- 3 Instructional Management System Global Learning Consortium
- 4 World Wide Web Consortium
- 5 International Organization for Standardization

Check



### 12.3.3 Learning Objects and Re-usability of E-content

The term learning object was coined in 1994 by Wayne Hodgins. It gained quick popularity among educators and instructional designers because these digital materials are designed to allow easy reuse in a wide range of teaching and learning situations. Before understanding the meaning of learning object it is essential to know the meaning of

asset. In Wikipedia **'Asset'** is defined as the smallest, indivisible digital unit for information transfer, e.g. a picture or a short text, a plain picture/text combination or a small and simple animation.

## Learning Objects

Learning Objects are defined in different ways by different organizations and individuals. Let us consider some of the definitions of Learning Objects here.

According to Wikipedia 'a learning object is a resource, usually digital and web-based, that can be used and re-used for learning'.

According to the Institute of Electrical and Electronics Engineers (IEEE) a learning object is *"any entity, digital or non-digital, that may be used for learning, education or training"*. Chiappe defined Learning Objects as: *"A digital self-contained and reusable entity, with a clear educational purpose, with at least three internal and editable components: content, learning activities and elements of context. The learning objects must have an external structure of information to facilitate their identification, storage and retrieval: the metadata."* Daniel Rehak and Robin Mason define it as *"a digitized entity which can be used, reused or referenced during technology supported learning"*.

Learning objects are any items which have the potential to promote learning. An object which can promote learning and teaching is considered as a learning object. For example a printed book, a news paper report etc. Digital learning objects are any thing in the digital form such as learning design or whole course or other forms of resources from a set of learning outcomes. These are cataloged and stored in learning objects repositories. A learning object consists of several learning assets that are structured in a pedagogically meaningful way.

Following are some important characteristics of learning objects:

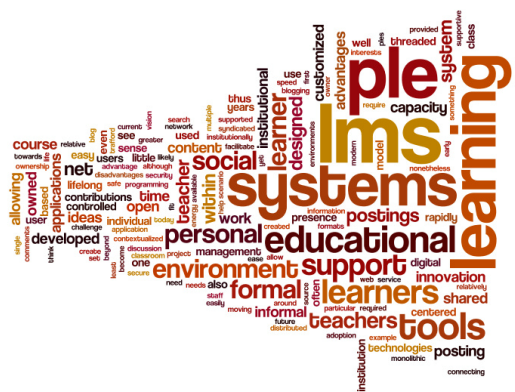
- Learning objects are a new way of thinking about learning content.
- Learning objects are much smaller units of learning, typically ranging from 2 minutes to 15 minutes.
- They are of discrete nature. Because of their discrete nature they can be categorized and stored independently
- They are self-contained – each learning object can be taken independently
- They are reusable in the sense a single learning object may be used in multiple contexts for multiple purposes
- They can be aggregated means learning objects can be grouped into larger collections of content.
- Every learning object has descriptive information. It becomes easy for identification, search and re-use.

## Re-usability of e-content

Three aspects are important in the re-usability of e-content. They are technical, non-technical and pedagogy related ones.

- Technical re-usability of e-content is concerned with the various kinds of tools used to support e-content. These tools may include documentation such as guidelines and instructions saved in the repository.

- Non technical re-usability of e-content is related to the standardization initiatives, intellectual property protection, knowledge transfer, organizational, managerial, social aspects etc. Pedagogy related re-usability includes content, scenarios and pedagogic approaches. E-content can be modified and re-used easily.



## 12.4 E-content Tools

E-content can be created in a variety of ways by using variety of tools and software. E-content development combines Content Management System (CMS) and Learning Management System (LMS). Several proprietary software, freeware, open source software, public domain software and so on are available for e-content development. Among available tools and software packages, Microsoft Office, Libre Office, Software Package can be used easily by the beginners of e-content development.

**Freeware:** It can be used without any monetary charges. However, restrictions are imposed for its use, modification and redistribution. In this source code is not provided. This tool can be passed on to any one free of cost.

**Open Source Software (OSS):** It is computer software and its source code is made available to the public. It is licensed with an open source license. Copy right holder provides the rights to study modify and distribute the software free of cost to anyone for any purpose. Open Source Software is very often developed in a public collaborative manner.

**Proprietary software** is software that is owned by an individual or a company. It will have major restrictions on its use and its source code usually kept secret. These are exclusive property of their developers and can't be copied or

distributed without complying with their licensing agreements.

**Public domain software:** The copy right holder donates it to the public. It is available free of cost to every one and it can be used by any one for any purpose and only with very minimal restrictions.

### 12.4.1 Graphics, Audio and Video-Creating and Editing

There are several audio, video and graphic creators and editors available online. Some are free and some are proprietary.

**Wevideo** is a video creator and editor which allows us to edit and make video in an easy and intuitive way on this cloud-based app. It allows you to control the video sections easily in areas like the transition, fast and slow motion, adding effects etc.

**Magisto** is a video editor that can help you make your video in just a few steps. Upload the video, than you can choose one of the premade editing styles, add a sound track, add a title and the video will be ready for download or for sharing on the social media.



**DrawPad** is a Graphics editor and an easy-to-use image composition and manipulation program for all types of graphic design projects. You can make sketches and paintings on your computer, create logos, banner ads or billboards, draw diagrams, icons and other web graphics



**PhotoShop** is well known and widely used graphic editing software. It helps in image editing and drawing. One of the important features of PhotoShop is layer styles which allows you to create graphics quickly with ease.



**MyPaint**

**MyPaint** is a graphics editor which can be easily used by teachers and students for digital painting. It enables people to create quick sketches and also complex artistic drawings on their computers. MyPaint is a simple and easy to use tool. Menus and interface are very simple. You can start drawing on the canvas without any distractions.



**INKSCAPE**  
Draw Freely.

**Inkscape** is free, open source vector drawing and editing tool. It is a useful tool in doing line art. Inkscape can be used in all major computer operating systems like Linux, Mac, and Windows. It can be imported and exported to many major file formats.



**GIMP** is a robust image editor. It is well known open source software which is completely free. It is a good alternative to Adobe PhotoShop and has most of the characteristics of PhotoShop. It has the features like powerful painting tools, layers and channel support, multiple undo/redo, editable text layers etc.



**WavePad:** This is a **audio editing software**. This is a full-featured professional audio and music editor for Windows and Mac. It lets you record and edit music, voice and other audio recordings. When **editing audio** files, you can cut, copy and paste parts of recordings, and then **add effects** like echo, amplification and noise reduction. WavePad works as a **wav or mp3 editor**.

**Audacity** is free open source software. It is a easy to use multi track audio editor and recorder for Windows, Mac, GNU/Linux and so many other operating systems. Using audacity you can record live audio and also computer playback on the windows, vista, etc. It can convert tapes and records into digital recordings or CDs. Using audacity software you can edit audio that is cut, copy and mix sounds together according to your requirements. You can change the speed and pitch of a recording. Numerous effects can also be given to the audio material.



**VideoPad** is a powerful and easy-to-use video editor that lets you import videos, add music and effects, then burn to DVD. You can **edit video** from any camcorder Capture video from a DV camcorder, webcam, or import most the video file format. More than 50 visual and transition effects are available to add a professional touch to your video. You Create videos for DVD, HD, YouTube etc. You can burn movies to DVD for playback on TV, or as a standalone video file to share online or put on portable devices.

**Magisto** is a video editor that can help you make your video in just a few steps. Upload the video, than you can choose one of the premade editing styles, add a sound track, add a title and the video will be ready for download or for sharing on the social media.

**VideoPad** is a powerful and easy-to-use video editor that lets you import videos, add music and effects, then burn to DVD. You can edit video from any camcorder Capture video from a DV camcorder, webcam, or import most the video file format. More than 50 visual and transition effects are available to add a professional touch to your video. You can create videos for DVD, HD, YouTube etc. You can burn movies to DVD for playback on TV, or as a standalone video file to share online or put on portable devices.



**Openshot** is a free, simple to use open source video editor for Linux. It is user friendly software which every one can use and get great results. Openshot can take peoples' videos, photos and music files. It helps you to create the film as you feel like. You can easily add sub-titles and transitions. It can export film to DVD, YouTube, Vimeo and many other formats. Openshot integrates well with two other open source programs that are 'Inkscape' a vector editing program and the 'Blender 3D' animation program. It supports many video, audio and image formats. Audio mixing and editing is possible in Openshot.



**Concept mapping:** Digital concept mapping tools are another versatile tool for creating e-content in visual form. There are both online and offline concept mapping tools and these are some time referred as mind mapping tool. Teachers can easily create concept map on various topics, edit it, link it to the websites, and add graphics. This could be used as a student activity and create a repository of concept map related to the subject that you are teaching.

Some of the famous open source concepts mapping tools are Visual Understanding Environment, freemind and freepalme. There are many proprietary alternatives with various features. Visual Understanding Environment (VUE) is explained below:

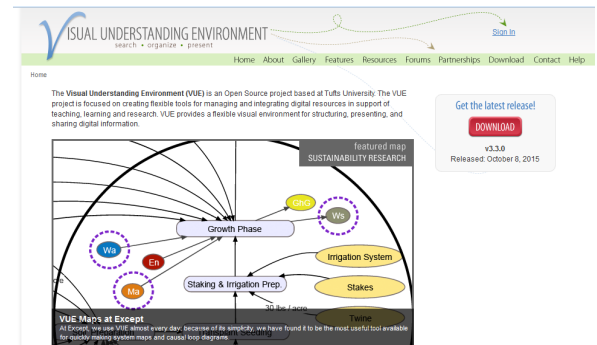
### Visual Understanding Environment (VUE)

The Visual Understanding Environment (VUE) is an Open Source Application tool of Tufts University developed by it's Academic Technology group. VUE 3.0 is the latest release of the Academic Technology Group and it has the features such as dynamic presentation of maps, map merging, enhanced key word tagging and search capabilities etc.

This concept mapping tool can be used by teachers and students for meaningful integration of digital resources into their teaching and learning. This tool can be used with ease for creating concept maps, mind maps, decision maps etc. It helps the user to construct clear pathways through the resources linked together on the concept map. These concept maps help students to identify connections and get the clear and deep understanding about the entire things connected together.

As VUE tool provides a flexible visual environment for structuring, creating, presenting and sharing digital information, this tool can be used for e-content creation and development. All the concept maps given in this course material are created using this VUE concept mapping tool only.

Activity: Watch this video available at <https://www.youtube.com/watch?v=GdKV8NApAeo> to understand more about creating concept maps using VUE concept mapping tool.



### 12.4.2 Authoring Tools

Various tools are available to produce e-content. Microsoft Power Point and word processors are also e-learning tools. These tools are not appropriate to present interactivity, testing and scoring. To develop interactive content various elements such as examples, illustrations, animations, audio, video, interactivity etc are assembled. For this purpose we can use special tools which are authoring tools or author-ware. An e-learning authoring tool is software packages which can be used create and modify web content for the use by other people. Examples are blogging, wiki online forums etc. This tool can be used by e-content developers for creating, packaging and delivering the e-content to the learners. By using authoring tools one can produce attractive and useful graphics. Authoring tool or author-ware is a programme that helps to write hypertext or use multimedia applications. Authoring tools allow authors or e-content developers to integrate or use any array of media to create professional, engaging and interactive e-content. In Wikipedia 'An authoring tool is defined as a software application used to create multimedia content typically for delivery on the world wide web(www)'. Content authoring tools may also create content in other file formats so that material can be provided through compact disc (CD) or in other format for various different uses. Authoring tools can be used by people with minimum technical skills.

The main advantage of authoring tools is their easier and faster use. Using these tools e-content can be developed and transferred easily. There are many categories of authoring tools which differ with respect to their features. Very simple Microsoft PowerPoint converters to powerful tool boxes are available for e-content development and delivery. These authoring tools have some common features. They are

- Scope for interactivity
- Navigation-ability to move throughout the content based on the content menu.
- Editing -e-content developers can make changes or update the material easily.
- Preview or play back -it is possible to preview or play back the material.
- Cross platform and cross browser inter offer-ability - it is possible to run on all platforms and different browsers.

There are many authoring tools in which there are Proprietary software, free software, open source software etc.

**eXe Learning** is a free software tool that can be used to create educational interactive web contents.eXe learning can generate interactive content and it allows one to create easily navigable web pages including text, images, interactive activities, image galleries or multimedia clips. All the educational material generated with eXe Learning can be





transferred to different digital formats. That can be used independently or to integrate them into a Learning Management System(LMS) like Moodle.

Once installed eXe learning has its own tutorial in the help menu. eXe learning can be downloaded from [www.exlearning.net](http://www.exlearning.net)



The **Xerte** is a free and open source authoring tool which provides a full suite of open source tools for e-Learning developers and content authors producing interactive learning materials. This project is funded by Nottingham University.

**Adobe Captivate** is proprietary software. It is a rapid responsive authoring tool that is used for creating e-learning contents such as software demonstrations, software simulations, branched scenarios, and randomized quizzes in Small Web Formats (.swf) and HTML5 formats. It can also convert Adobe Captivate generated files formats (.swf) to digital MP4 (.mp4) formats which can be played with media players or uploaded to video hosting websites. For software simulations, Captivate can use left or right mouse clicks, key presses and rollover images. It can also be used to create screen casts, and to convert Microsoft PowerPoint presentations to Small Web Formats and HTML5 formats.



## ? Check Your Progress-2



### I Choose the correct answer and fill-in the blanks

1) SWF stands for \_\_\_\_\_

- a. Source Web Format
- b. Small Web Format
- c. Small Web Form
- d. Source Word Format

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

2) Authoring tool is also known as \_\_\_\_\_

- a. Courseware
- b. Author-ware
- c. Authors tool
- d. All the above

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

**3)** Technical re-usability of e-content is concerned with

- a) standardization initiatives
- b) intellectual property protection
- c) knowledge transfer
- d) the various kinds of tools used to support e-content

Wrong

Wrong

Wrong

Correct Option

### Solution

1. Wrong (Feedback)
2. Wrong (Feedback)
3. Wrong (Feedback)
4. Correct Option (Feedback)

**4) Which of the following is an authoring tool**

- a) Electrical and Electronics Engineers (IEEE)
- b) Adobe Captivate
- c) Learning object
- d) Learning Management System (LMS)

Wrong

Correct Option

Wrong

Wrong

### Solution

1. Wrong (Feedback)
2. Correct Option (Feedback)
3. Wrong (Feedback)
4. Wrong (Feedback)

**5) Which of the following is a audio editing software**

- a) Magisto
- b) eXe
- c) Xerte
- d) Audacity

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

### 6) Which of the following is a open source authoring tool

- a. Adobe Captivate
- b) VideoPad
- c) Xerte
- d) DrawPad

Wrong

Wrong

Correct Option

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Correct Option \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)



## Check Your Progress-2

**Fill in the blank/s by selecting the appropriate word/words from the given words.**

1. The term learning object was coined in 1994 by

2. Any entity, digital or non-digital, that may be used for learning, education or training can be called

3. The Xerte is a free and open source  tool

(Learning Object, Wayne Hodgins, authoring, Chiappe)

Submit

## ? Check Your Progress-2

State whether the following statements are True or False

1. Proprietary software is software that is owned by an individual or a company.

True  False

**True**

2. An asset consists of several learning objects

True  False

**False**

3. Learning objects are self contained.

True  False

**True**



## Activity

- 1) List proprietary and open source software tools other than those given in the unit.
- 2) Create a graphic or edit a video of your choice using any available appropriate tool.

## 12.5 Open Educational Resources

Resource rich environment is necessary for making teaching and learning effective. However for teachers many of the educational resources were not easily available because they used to be copy righted. Hence there was a movement to produce learning resources and make them available with no or very less copy right restrictions. During late 1960's with initiation of United Kingdom Open University (UKOU), concept of open learning was initiated. This ideology of open learning later led to the 'Open Movement.' Open Educational Resources (OER) are the part of Open Movement. OER is considered as the sub-set of Open Education. It is a recently evolved concept. In 1999 some educational resources were released for free by the University of Tübingen (Germany) and the UKOU. In the beginning of 21<sup>st</sup> century OER initiative came from the Massachusetts Institute of Technology (USA) by releasing the courses with open licenses. The term Open Educational Resources (OER) was coined in 2002 in UNESCO Forum on the Impact of Open Course Ware for Higher Education in Developing Countries. The Cape Town Open Education Declaration (2008) and Paris OER Declaration(2012) provided guidelines and encouragement to the Governments to release Educational resources with open licenses. Countries such as USA, South Africa, Kenya etc., have successfully integrated the OER into their National Policy. In India in 2014 the National Mission on Education through ICT(NMEICT) released all content generated with its funding as OER and adopted an Open License Policy for all its outputs.

(Source: [https://de.wikipedia.org/wiki/Open\\_Educational\\_Resources](https://de.wikipedia.org/wiki/Open_Educational_Resources) )



Open Educational Resources (OER) are freely available, openly licensed materials and media that are useful for teaching, learning and assessing as well as for research purposes. Wide variety of OER is available for free use for teachers, instructors, researchers and students. It is gaining importance in open and distance learning domain. OER allows us to bring the excellent teaching learning materials into our education system and use them.

### 12.5.1 Meaning and Importance of Open Educational Resources

Many organizations and eminent people have attempted to define OER. Some definitions are provided here for you to understand the meaning of OER.

The William and Flora Hewlett Foundation defines "Open educational resources as the teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge."

Wikipedia defines "Open educational resources (OER) as digital materials that can be re-used for teaching, learning, research and more, made available free through open licenses, which allow uses of the materials that would not be easily permitted under copyright alone."

According to UNESCO Open educational resources are "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions."

Based on these definitions we can say that OERs are openly licensed digital teaching, learning and research materials that are available in the public domain or under an open license and can be used, re-used and re-purposed for teaching, learning and research. In the context of OER Public Domain means materials for which copy right has expired or for which copy right has been waived off by the author. These resources are available online...OER movement lead to the origin of Massive Open and Online Courses (MOOC)

#### Importance of Open Educational Resources

Following are some of importance of OERs.

- OERs are useful in improving education across the globe.
- They offer free access to some of the world's best courses.
- OERs allow us to bring the excellent teaching learning materials in to our education system
- They offer equal access to knowledge and re-usability.
- They provide self-paced learning.
- They offer flexibility in study time i. e. any where and any time the learner can study.
- Provide access to huge amount of study materials.
- Help in enhancement of content knowledge.
- Accessible and affordable for all.

- OERs are adaptable and allow others to reproduce them for their use.
- Help in advancing knowledge and widening participation.
- Help in one's own professional advancement.
- Promote life long learning.
- Bridge the gap among formal, informal and non-formal education.
- Offers for sharing and reusing resources.
- OER promote informal learning.

### In-Text Activity:

Here is a YouTube link of video giving additional information on *OER (Open Educational Resources) Introduction*

<https://www.youtube.com/watch?v=ZFeyCc6we-s>

### 12.5.2 Various OER Initiatives

Several countries have witnessed OER initiatives. Some of the initiatives are provided here for your reference.

#### Karnataka Open Educational Resources (KOER)

During 2013-14, the “Karnataka Open Educational Resources” (KOER) program was designed and implemented by RMSA Karnataka with DSERT for its 'in-service teacher education' component. Mathematics, science and social science teachers have collaborated to create digital learning resources for the new class IX textbook topics for KOER. These learning resources include a concept map, learning outlines, notes for teachers, activities, assessment and project/community project ideas. In each section apart from text, teachers have provided images, videos, slide-shows and animations, through resources accessed as web links. These resources are created/modified/adapted by them, in the line of the OER philosophy of the 4 R's i.e. re-use, re-vise, re-mix and re-distribute.

Resource institution for KOER, the IT for Change (ITfC), designed and implemented a series of workshops for the KOER core group of 30 teachers each in the identified subjects and another set of around 30 teachers per subject. These teachers have trained their peers from nearly 1,000 high schools at DIET/CTE which have computer labs. They were trained in accessing web resources, adapting them and co-creating resources to contribute to KOER. Karnataka Open Educational Resources (KOER) includes academic resources, training support resources and school administration resources, to support interactions for all participants in school education. The use of the “wiki” public software which is used by the world’s largest encyclopedia Wikipedia has enabled the easy creation, review, adapting and publishing in inter-linked web pages.

More than 3,600 web pages in English and Kannada have been created in KOER by around 300 teacher-users and several more teacher-contributors. KOER has already crossed 400,000 views. This is a resource repository of the Karnataka teachers, by the Karnataka teachers and for the Karnataka teachers. KOER has potential to democratize teacher education and empower teachers to participate actively in their own professional development. KOER aim is to cover all classes, subjects and media of instruction used in Karnataka education.

### Objectives of KOER are:

- To support the practicing teachers of Karnataka in their professional development
- To support the practicing teachers of Karnataka in their classroom teaching learning processes.
- To engage the Karnataka teacher community in the creation, review, and publication of digital curricular resources on a continuous basis.
- To make the quality curricular resources available to all the teachers specially Karnataka High School teachers.

### Features of KOER are:

- Mainly meant for Karnataka High School Teachers.
- Open access to those who want to access the resources.
- Relevant resources are available free of cost.
- Users can share, re-use, re-mix the Resources.
- All resources on any particular subject or topic are available in one place.
- They are comprehensive.
- Resources may be contextualized.
- Resources can be added to the KOER pool using proper licensing.

### National Repository of Open Educational Resources (NROER)

NROER is launched by the Ministry of Human Resource Development (MHRD), Government of India. NROER is developed as a solution to address the challenges faced by the education sector of our country. It aims at reaching the unreached and prioritizes to extend education to all. It is a collaborative platform involving everyone who is interested in education. It offers resources for all school subjects and grades in multiple languages. It brings together all the digital resources for a school system such as educational videos, audio, images, documents and interactive modules and also allows you to contribute your own resources. NROER enables access to a library from where teachers can access audio, videos, learning objects, images, question banks, activities/presentations and more related to the concepts of the subject that they teach. They can also upload resources which are subject to review by experts. In addition to this, NROER allows teachers to download, share, comment and rate media resources.



### Objectives of NROER are:

- To store, preserve and provide access to a variety of digital resources to students and teachers.
- To engage the teacher community in the development and sharing of digital resources.
- To improve the quality of the education system of the country.
- To facilitate teachers to create and share contextual teaching and learning resources.
- To celebrate innovations in resource creation.

### Features of NROER are:

- Open access to those who want to access the resources.
- Resources are available free of cost.
- Users can share the Resources.
- Resources are available in the form of discrete chunks not as bulk.
- All resources on any particular subject or topic one desires are present in one place and are comprehensive.
- Resources may be contextualized.
- Resources can be added to the NROER pool using proper licensing.



**Activity: Create and share any photograph/video in KOER or NROER or Wikimedia Commons****OER Impact Map**

To understand the global impact of OER, the OER Impact Map was developed. It was built by the OER Research Hub. It provides a visual reference regarding both positive and negative impacts. Themes such as policy change, student impact, improved access and so on have been mapped. It is also possible to drill down to a specific region, country or city to monitor specific OER impacts. This tool is especially useful to policy makers and researchers.

Here is a link <http://oermap.org> of 'OER impact map' which gives you additional information about it.

**OERu**

The Open Educational Resources universitas (OERu) is an education platform offering a number of MOOC-type, university level courses and programmes. There are several courses offered on this platform. Some of these courses offer credits towards further study. This initiative is useful for individuals interested in studying further.

For more detailed information about OERu please visit the site <http://www.col>

Here is an interesting video on The OERs - Open Educational Resources

<https://www.youtube.com/watch?v=-xGRztrWv-k>

**12.5.3 Creative Common Licensing**

Copy right is a legal right created by a law of a country that grants the creator of an original work exclusive rights for its use and distribution. This is usually only for a limited time. Traditional educational materials, such as textbooks, are protected under conventional [copyright](#) terms. Previously copy right was binary i.e. all rights retained or available in public domain. However, alternative and more flexible licensing options are available as a result of the work of Commons. Creative commons (CC) is a global non profit organization which provides free legal tools i.e. Copy right licenses. It is an organization that provides ready-made licensing agreements that are less restrictive than the "all rights reserved" terms of standard international copyright. These copy right licenses enable sharing and reuse of creativity and knowledge. These legal tools help us to reuse the work of others. CC vision is to help others like us to realize the full potential of the internet. CCs offer other legal and technical tools that also facilitate sharing and discovery of creative works such as CCO a public domain dedication. It is for rights holders who wish to put their work into the public domain before the expiration of copy right. Another license, typically used by developers of OER software, is the [GNU-General Public License](#) from the [free and open-source software](#) (FOSS) community. Open licensing allows the user adopt and adapt the work done by some one under different circumstances. Open licensing allows us to use the materials that would not be easily permitted under copyright alone. It is essential to know that open licensing is a concept with in copy right law.



The following concept map by M.U.Paily gives you the overview of Open Educational Resources and related aspects.

### Creative Commons Licensing System

In education Creative commons (CC) has become popular licensing system. Creative commons (CC) has designed a collection of licenses to suit to sharing content under various conditions. Advantages of using Creative Commons License are as follows.

- They are easily understood and commonly used. Conditions of a work can be easily understood by the users and re-users of that work.
- It is easy for others to find a CC licensed resource on the Web.
- They have Legal code, Commons code and Digital code.

All Creative Commons Licenses are constructed from a combination of four specific “rights” or conditions that can be reserved by the creator or author of the resource. They are provided below.

Rights or Conditions	Symbol	Explanation
Attribution(BY)		Licensees may copy, distribute, display and perform the work and make derivative works based on it only if they give the author the credits in the manner specified by these.
Share-alike(SA)		Licensees may distribute derivative works only under a license identical to the license that governs the original work.
Non-commercial (NC)		Licensees may copy, distribute, display, and perform the work and make derivative works based on it only for non-commercial purposes.
No Derivative Works (ND)		Licensees may copy, distribute, display and perform only verbatim copies of the work, not derivative works based on it.

### Creative Commons Licenses

<b>Attribution CC By</b>	
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	This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation.
<b>Attribution-ShareAlike CC BY-SA</b>	This license lets others remix, tweak, and build upon your work even for commercial purposes, as long as they credit you and license their new creations under the identical terms.
<b>Attribution-NoDerivatives CC BY-ND</b>	This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.
<b>Attribution-NonCommercial CC BY-NC</b>	This license lets others remix, tweak, and build upon your work non-commercially, and although their new works must also acknowledge you and be non-commercial, they don't have to license their derivative works on the same terms.
<b>Attribution-NonCommercial-ShareAlike CC BY-NC-SA</b>	This license lets others remix, tweak, and build upon your work non-commercially, as long as they credit you and license their new creations under the identical terms.
<b>Attribution-Non Commercial- No Derivatives CC BY-NC-ND</b>	This license is the most restrictive of six main licenses, only allowing others to download your works and share them with others as long as they credit you, but they can't change them in any way or use them commercially.

(Adapted from: <http://creativecommons.org/licenses>)

## CREATIVE COMMONS – VARIOUS LEVELS OF LICENSES

Icon	Description	Acronym	Free/Libre
	Attribution alone	CC-BY	FULLY FREE USE
	Attribution + Noncommercial	CC-BY-NC	FREE USE- NON-COMMERCIAL
	Attribution + ShareAlike	CC-BY-SA	FREE USE- TO BE SHARED
	Attribution + No-derivatives	CC-BY-ND	FREE USE- NO CHANGES
	Attribution + Noncommercial + Share Alike	CC-BY-NC-SA	FREE USE- NON-COMMERCIAL & TO BE SHARED
	Attribution + Noncommercial + NoDerivatives	CC-BY-NC-ND	FREE USE- NON-COMMERCIAL & NO CGANGES

(Adapted from: <http://creativecommons.org/licenses>)

For learning more about OER and Creative Commons Licenses take the free course 'Understanding Open Educational Resources' in 'Technology Enabled Learning Lounge' available at [tell.colvee.org/](http://tell.colvee.org/)

## ? Check Your Progress-3



### I. Choose the correct answer

#### 1) OER is the abbreviation of

- Open Education Resources
- Online Educational Resources
- Online Education Repositories
- Open Educational Resources

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

#### 2) NROER stands for

- National Reservation of Open Educational Resources
- National Repository of Open Educational Resources
- National Reforms of Open Education Resources
- National Repository of Online Educational Resources

Wrong

Correct Option

Wrong

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Correct Option \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)

#### 3) Copy right

- is a legal right

- grants the exclusive rights to the creator
- is created by a law of a country
- all the above

Wrong

Wrong

Wrong

Correct Option

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Wrong \(Feedback\)](#)
4. [Correct Option \(Feedback\)](#)

#### 4) KOER program was designed and implemented

- by SSA Karnataka along with DSERT
- by RMSA Karnataka along with DSERT
- by RMSA Karnataka along with NCERT
- by SSA Karnataka along with DIET

Wrong

Wrong

Correct Option

Wrong

### Solution

1. [Wrong \(Feedback\)](#)
2. [Wrong \(Feedback\)](#)
3. [Correct Option \(Feedback\)](#)
4. [Wrong \(Feedback\)](#)



### Check Your Progress-3



#### II. State whether the following statements are True or False

1. The ideology of open learning later led to the 'Open Movement.'

- True  False

**True**

2. Open Educational Resources (OER) are not the part of Open Movement.

True  False

**False**

3. OER can be considered as the sub-set of Open Education.

True  False

**True**

4. Open licensing is a concept with in copy right law.

True  False

**True**

5. E-content is the part of digital course material that includes OER.

True  False

**False**

6. Copy right is usually for a limited time.

True  False

**True**

## DropDown Activity

Read and complete

	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
	<input type="text"/>

Check

## 12.6 Let us Sum up

- **Electronic content (e-content)** which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet.
- E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education.
- Most common and popular model used for creating e-content is the **ADDIE** model. This abbreviation stands for the five phases involved in the model. They are **analyze, design, develop, implement and evaluate**.
- **E-content standards** are rules that most e-content developers should abide by. Standards are engineering or technical specifications that help e-content developers to establish uniformity.
- **Learning objects** are any items which have the potential to promote learning. An object which can promote learning and teaching is considered as a learning object.
- There are several proprietary software, free software, open source software, public domain software and so on are available for e-content development.
- **Freeware** can be used without any monetary charges.
- **Open Source Software (OSS)** is computer software and is licensed with an open source license.
- **Proprietary software** is software that is owned by an individual or a company.
- **Public domain software** is a software donated to the public by its copy right holder.
- There are several audio, video and graphic creators and editors available online. Some are Wevideo, Magisto, Drawpad, Wavepad, Videopad etc.
- An **e-learning authoring tool** is software packages which can be used create and modify web content for the use by other people. Examples are blogging, wiki online forums etc.
- This tool can be used by e-content developers for creating, packaging and delivering the e-content to the learners.
- **eXe Learning** is a free software tool that can be used to create educational interactive web contents.
- The **Xerte** is a free and open source authoring tool which provides a full suite of open source tools for e-Learning developers.
- **Adobe Captivate** is a rapid responsive authoring tool that is used for creating e-learning contents such as software demonstrations, software simulations, branched scenarios, and randomized quizzes in Small Web Formats (.swf) and HTML5 formats.
- **Adobe Author-ware** was an interpreted, flowchart-based, graphical programming language.
- **Open Educational Resources (OER)** are freely available, openly licensed materials and media that are useful for teaching, learning and assessing as well as for research purposes.
- Some of the initiatives are Karnataka Open Educational Resources (KOER), National Repository of Open Educational Resources ([NROER](#)), OER Impact Map and OERu.
- Creative commons (CC) is a global non profit organization which provides free legal tools i.e. Copy right licenses.
- These copy right licenses enable sharing and reuse of creativity and knowledge. These legal tools help us to reuse the work of others.
- Creative Commons Licenses are CC-BY, CC-BY-NC, CC-BY-SA, CC-BY-ND, CC-BY-NC-SA, CC-BY-NC-ND.

## 12.7 Unit End Exercises

1. Describe ADDIE Model.
2. Explain the meaning and characteristics of Learning Object.
3. Explain any four e-content tools.
4. Trace the history of OERs.
5. Enumerate the objectives and features of NROER.
6. Bring out the importance of Creative Commons Licensing
7. Create photograph/graphics of your own and create a particular license using creative common sites and share it in Wikimedia Commons

## 12.8 REFERENCES



1. COL (2005). Creating Learning Materials for Open and Distance Learning: A Handbook for Authors and Instructional Designers. Commonwealth of Learning available at <http://oasis.col.org/bitstream/handle/11599/43/odlinstdesignHB.pdf?sequence=1&isAllowed=y>
2. Editing Software - Edit Audio, Video, Photos or Graphics  
[www.nchsoftware.com/software/editing.html](http://www.nchsoftware.com/software/editing.html)
4. e-Learning Standards – Course Avenue available at  
[www.courseavenue.com/e-learning-standards](http://www.courseavenue.com/e-learning-standards) accessed on 19th Jan, 2016
5. Free and Open Source Authoring Tools for e-Learning-eFront Blog available at  
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