

**RESOURCE MATERIAL ON DIGITAL LITERACY
AND E-LEARNING FOR TEACHERS AND
TEACHER EDUCATORS**

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PREFACE

Teacher has been occupying central position in teaching learning process since time immemorial. They are the main implementer of educational plans and policies successfully. The National Policy on Education, (1986) stated teacher is the principal means for implementing all educational programmes and of the organization of education. The role teacher has been changed from transmitter of knowledge to facilitator of construction of knowledge after coming of Constructivist pedagogy and use of different technology in education. For effective teacher in digital age, one needs to be well equipped with content, pedagogy and technology and should be able to integrate these three smoothly.

Our teachers are digital migrants but students are digital natives, which needs to be bridged for quality improvement of learning. Teachers of digital age should have skills and competencies of using different online tools such as wiki, Google drive, pod casting, blogging, tagging, social book marking and social networking etc for helping students to construct knowledge by exposing them variety of experience. Knowledge of technology is not enough, skills of using it in appropriately is required. Teachers of digital age should be acquainted with process of using technology different education related task such as admission, teaching, assignment, testing, evaluating, reporting and administration and managing students. For this to happen, teacher education need to be renewed by adding sufficient content and practice in using technology in different aspects of school education. On the other hand ICT can be more useful for teachers and students of secondary level as it would expose them to different open learning resources. In this backdrop, this resource material on digital literacy and e-learning was developed in workshop mode, which can be useful for training teachers and teacher educators.

This resource material consists of 13 modules on the themes like Basics of ICT, MOOC, Cyber security and safe practices, Cloud based applications, E commerce, E-content and OER, ICT for collaborative learning, Mobile based applications for learning, Emerging trends in ICT, ICT and Pedagogy, ICT for assessing learning, Universal Design for Learning (UDL) and Assistive Technology and ICT for Administration and

professional development. All modules are designed and developed in transactional model, where theoretical as well as activities are given.

Many people have directly and indirectly contributed for the development of this module. At the outset, we would like to express our gratitude to Prof. H. K. Senapathy, Director, NCERT, New Delhi for sanctioning this project. We are thankful to Prof. P. C. Agarwal, Principal, RIE Bhubaneswar for his constant guidance during all the phases of the module development. We place on record our heartfelt thanks to Prof. S. K. Dash, Head, DEE for support and help during different phases of the programme. We are also thankful to Prof. M. K. Sathpathy, Dean of Instructions and Prof. B. N. Panda, Dean of Research, RIE Bhubaneswar for their support and encouragement for the development of the module. Thanks are due to Prof. M. U. Paily, RIE Mysuru, Dr. S K Pandagale, RIE Bhopal, Dr. A. K Araya, RIE Ajmer, Dr. V. Jadhav, S. P. University, Pune, Dr. V. Singh, Xavier College of Education, Patna, Dr. D. Dheeraj, Gaya College, Gaya, Prof. M Gowsami, RIE Bhubaneswar, Dr. R. Sethy, Dr. B. Chand, Dr. U. Ray, Mr. Rajkumar and Mr. A. Bhardwaj for their contribution for the development of the module. We are also thankful to Mr. Raviranjana Kumar, Mr. Vishal Kumar, Mr. Ashesh Kumar, Research Scholars for their assistance during the development of the modules.

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Module-I

BASICS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

1.1 Introduction

The ICT has lot of potential to change the teaching learning process as active, child-centric and productive. Our teachers are dealing with 21st century digital native students and thus their teaching learning activities must be based on technology. ICT as a form of advanced science technology helps and optimizes teaching learning, especially in the implementation of learning in the classroom. ICT is concerned with the storage, retrieval, manipulation, transmission or receipt of digital data. Importantly, it is also concerned with the way these different uses can work with each other. This module deals with basic concepts of Information and Communication Technology and its usage in our daily life situation. The unit is to explain about evolution of ICT and its nature. It also differentiates between Internet and Web. Various usages of Web and major concerns in using ICT in classroom situation is also discussed.

1.2 Objectives

After the completion of the module the participants are expected to;

1. Explain the meaning and nature of ICT
2. Discuss the uses of ICT in daily life activities.
3. Identify major landmarks in ICT evolution.
4. Explain the changing role of ICT in the age of Internet and Web
5. Identify the major shifts in use of ICT in teaching and learning
6. Critically analyze the strengths and concerns associated with ICT use
7. List out resources available on Web useful for teaching and learning.

1.3 Theoretical Framework

1.3.1. Meaning of ICT

It is very simple to understand the term Information and communication technology (ICT) if we deal each term separately. ICT stands for "Information and Communication Technologies." ICT refers to technologies that provide access to information

through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums. 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.

Table-1: Range of Technology under ICT

Information	Technologies
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,

1.3.2. ICT in Daily Life Activities

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. The table below summarizes the use of ICT in different areas.

Table-2: Use of ICT in Different Area

Area of Use	Example
ICT in Business	e-commerce, Online Purchasing, Inventory management etc.
ICT in Financial Services	Banking Transaction, Capital market transaction, Financial Analysis, Financial settlement etc.
ICT in Entertainment	Digital Broadcasting, Social Book-marking, Digital Cameras, Animation and Multimedia creation etc.
ICT in Public Services	e-governance, gas and electricity bills, availing health schemes , Land registration etc.
ICT in Education	Multifaceted usage of ICT in teaching learning and other scenarios.

Worldwide research has shown that ICT can lead to improved student learning and better teaching methods. A report made by the National Institute of Multimedia Education in Japan, proved that an increase in student exposure to educational ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of "Knowledge", "Comprehension", "Practical skill" and "Presentation skill" in subject areas such as mathematics, science, and social study.

1.3.3. Evolution of ICT

The current shape and characteristics of ICT has not been as it is now. It is evolving at a very high pace and it is always becoming better and noble. 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 the wireless world. As a result the world around us also has changed dramatically over the years. 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.

Table-3: Phase-wise Evolution of ICT

Phages of Change	Descriptions
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 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.
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1.3.4. Age of Internet and Web

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. 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.

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

- Local Area Network (LAN)- Within a Class, Building and Campus
- Metropolitan Area Network (MAN)- Within a Town, City
- Wide Area Network (WAN) –Within Country, World and Universe
- Personal Area Network (PAN)- With Intrapersonal and Interpersonal Level

Many people use the terms Internet and World Wide Web (aka. the Web) interchangeably, but in fact the two terms are not synonymous. The Internet and the Web are two separate but related things. The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Information that travels over the Internet does so via a variety of languages known as protocols.

Points about the Internet:

- It is a global network connecting millions of computers.
- The Internet is decentralized.
- Each Internet computer is independent.
- There are a variety of ways to access the Internet.
- There are more than 3,700,000,000 Internet Users in the world.

The **World Wide Web**, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data. Web services, which use HTTP to allow applications to communicate in order to exchange business logic, use the Web to share information. The Web also utilizes browsers, such as Internet Explorer or Firefox, to access Web documents called Web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and video.

Points about the Web:

- It is a system of Internet servers that support specially formatted documents.

- Documents are formatted in a markup language that supports links to other documents.
- You can jump from one document to another simply by clicking on hot spots (hyperlinks).
- Applications called Web browsers that make it easy to access the World Wide Web.
- There are more than 1,275,000,000 Websites.

The Web is just one of the ways that information can be disseminated over the Internet. The Internet, not the Web, is also used for email, which relies on SMTP, Usenet news groups, instant messaging and FTP. So the Web is just a portion of the Internet, albeit a large portion, but the two terms are not synonymous and should not be confused. As the boom of the Internet and technology changes us as a society, it also makes learning more efficient and less costly for students. Internet and Web Resources are very much useful and are nowadays used heavily in the teaching-learning environment. By using the wide range of technology available in most classrooms, students have access to more information and tools than ever before. It is thus the need of the hour that as we recognize them and facilitate students to use them.

1.3.5. Recent Trends of ICT for Teaching and Learning: Major Shifts

Since the Internet has become popular, it's being used for many purposes. Through the help of the World Wide Web and websites, the Internet has become very useful in many ways for the common man. Today Internet has brought a globe in a single room. Right from news across the corner of the world, wealth of knowledge to shopping, purchasing the tickets of your favorite movie-everything is at your finger-tips. There are so many different tools and technologies available on the Internet today, and so many associated terms and concepts. It is to be thought that what are the most important Internet technologies for educators to be aware of, and informed about?

It is sure many people would probably come up with a slightly different list, but based on observations and experiences, and feedback from different educators the following technologies are listed below. Although it is not necessary that every educator

should be expected to use all of these technologies in the classroom, but rather that every educator should understand what these are, the potential they have in the classroom, and how their students may already be using them.

Table-4: Recent Trends in Using ICT as Learning Resource

Applications	Descriptions
Source of Information	The biggest advantage that internet offering is information. The internet and the World Wide Web have made it easy for educators and students to access educational information.
Video and Podcasting	One of the most widely adopted internet technologies for use in instructional settings is video streaming. Ex. YouTube, TeacherTube, EduTube etc.offers an abundance of lectures, how-to videos, and supporting materials available in the form of web based video. Podcasting has also been used to provide similar offerings of audio materials through popular sites like iTunes.
Presentation Tools	This category is vast and rich. There are hundreds (perhaps thousands) of tools on the Internet that can be used to create and share presentations, from simple Powerpoint slide players like Slideshare to multimedia timeline tools like Vuvox and OneTrueMedia. These tools can be used to support classroom teaching or distance learning, or for student reports and presentations.
Collaboration & Brainstorming Tools	This is another wide ranging category, including thought-organizing tools like mindmap and bubbl.us, and collaborative tools like web based interactive whiteboards and Google Documents.
Blogs& Blogging	Blogs and blogging, are platform where educational contents can be created , shared and discussed. In addition to a basic familiarity with this technology, educators should be aware of sites like Blogger and WordPress, where users can quickly and easily

	create their own blogs for free.
Wikis	The use of Wikis in educational settings is growing every day. Sites like Wetpaint , Wikispaces and others allow users to create free wiki web sites and are a great way to get started with using wikis for educational applications.
Social Networking	All educators should have a basic understanding of sites like Facebook and MySpace and how they are used. This doesn't mean they need accounts on these sites but they should understand what they are and how they are being used. Educators should also be aware of the professional social networking site LinkedIn.
Instant Messaging	A large percentage of students use IM regularly, via Aim, IM aggregator site Meebo or other tools. It behooves educators to be aware of this, and I have even come across various articles about using IM within the classroom setting
Twitter	This listing is really focused on technologies, not specific applications, but this application is currently just too popular to ignore. You should at least understand what it is and the fundamentals of how it is used in education.
Virtual Worlds and Simulations	This technology has received a lot of press, with SecondLife being the clear leader thus far in this application area. Active Worlds is one of a number of competitive technologies, and provides a “universe” dedicated to education that has been popular with educators creating real live experiences.
RSS Feeds	RSS allows users to create their own “push” data streams (that is, define data flows you want coming to you automatically, rather than having to go and “pull” the information with a Google search or other browsing effort). RSS feeds enable you to take advantage of streams of published content that will be sitting in your In Box, or in an RSS reader, when you want them.

Textbooks	An e-book has limitless copies and cannot be damaged or lost -- unlike print textbooks, which can become outdated and include misinformation. While e-reader implementation in the classroom can be costly, it reduces how many books a student needs to carry. E-readers also ensure that students all have the same copy of a textbook, and that the textbook remains up-to-date when new editions are released.
Email	By using internet now we can communicate in a fraction of seconds with a person who is sitting in the other part of the world. We can easily pass on educational contents to the students and share their learning experiences.
Video Conferencing	Before the Internet, students had access to professionals in all fields - - from visiting authors to political officials giving talks at local campuses, there's no shortage of people for students to meet. However, videoconferencing removes the variables of travel and reduces issues with scheduling, and it increases student participation by reducing the size of the audience. With videoconferencing students can meet professionals, arrange lessons with other teachers and even meet their peers in other countries.
Distance Learning	Not all schools have access to the same curricular tools -- especially in small towns but nearly every school has an Internet connection. With the Internet, students can take more varied and advanced courses with teachers in different areas without ever leaving the classroom. Distance learning programs can involve complex programs for submitting and managing assignments, or they can be as informal as using email, webcams and chat-rooms for communication.
Research	The Internet puts the sum of human knowledge just a click away -- it's added a lot of tools for students to research information and learn more about the topics that interest them. While students still have to

	be taught how to recognize biased and unreliable sources, they also have access to scholarly databases and news articles, and they're able to search many libraries with an online search function.
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There are unending list of technologies available on the Internet and website so-called modern ICT platform to be used for educational purpose. As a teacher it is their task to explore and find the tools available which they can use in an effective manner so as to deliver their educational content in effective manner. The list provided above includes the most important few upon which you need to explore and use it in your teaching learning situations and some for better administration work in the schools too.

1.3.6. Concerns in ICT

Information and communication technology is seen as a boom to the modern globalised world scenario. You have the access of information originating in the other part of the world in fractions of seconds with a click. You can share billions of information , trillions of data with its analysis results using simple apps available online. You can make your class very much lively and active using virtual reality and simulations apps. You can give feedback and keep their updated profile information using many customized software. Irrespective of these many advantages of ICT there are various points that should be taken care of while you choose and use these technologies. Following are few of the discussion points.

1. Setting up the devices and technology for a novice person can be a troublesome job.
2. Availing ICT infrastructure, installing and using them can be too much expensive to afford.
3. It is again very hard to break the mental deadlocks setup in the inexperienced teachers minds so as to use the ICT tools.
4. Plagiarism is a issue when students blindly copy the contents from the NET and use it to write their term papers and assignment. Many a times the teachers also

follow the same way and use copyrighted piece of work unknowingly being the part of intellectual theft community.

5. While using the Internet application student as well as teacher are always at risk of sharing their privacy to people with ill intentions. Criminals, hackers, militants may use your private information to conspire against you. It is thus the task of the teacher to educate the students to be careful when they use internet and share information.
6. Quality and Equity Issues: Are we will be able to provide equal opportunities in using ICT resources to students coming from different economical and social background. The high input cost always plays the spoilsport maintaining the quality in ICT based education.
7. The Internet is full of many unauthorized content with fake information. It requires careful monitoring by the educators selecting and advising the students on authentic applications and educational content.

In short we have to be careful and wise while using the Internet or any other ICT tools. The teachers should collaborate with others such that they can make students to use the technologies in the efficient manner.

This unit started with giving you conceptual understanding of ICT with its various uses in our day to daylife. The evolution of ICT is then discussed framing examples from each stage . The teachers should collaborate with others such that they can make students to use the technologies in the efficient manner. In the later section it deals about giving you ideas on the concept of Internet and Web. There is one section covering the trends in ICT basically different application available on Internet and web, which can be purposefully used in education. The concerns and point to be taken care of while using ICT and specifically Internet has been discussed at the end. How to use Internet in a wise manner is discussed here.

1.4: Additional Resources

Browse the following for more information on related topic:

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

https://www.ictlounge.com/html/timeline_of_ict.htm

<https://www.timetoast.com/timelines/27704>

https://en.wikibooks.org/wiki/ICT_in_Education/Issues_in_the_Use_of_ICTs_in_Education

<https://miraesiwina.wordpress.com/2010/01/22/the-advantages-and-disadvantages-of-using-ict-for-teaching-and-learning/>

<http://www.emergingedtech.com/2009/04/10-internet-technologies-that-educators-should-be-informed-about/>

References

- UNESCO (2006) Introduction to Information, Communication and Technologies: Teacher's Guide - Module 1, Available at Introduction to information and communication Technology accessed on 15th Jan, 2018.
- ICT in Education - An online course available at ICT in Education accessed on 15th Jan, 2018.
- Matt (2007 August 24) Evolution of ICT, a blog post retrieved from ICT in Ireland accessed on 15th Jan, 2018.

Activities for the Trainer

Activity-1: Reading and group discussion- The trainer will ask the participant to read the module and follow it with group discussion on all the concepts, relevance, sources and limitations of the ICT. (30 minutes). The trainer's role here is to facilitate the reading and discussion. However, he/she may also make presentation.(45 minutes)

Activity-2: The participants will work in groups of four to five and develop a timeline on evolution of ICT citing examples on major technological changes as well as different ways of its usage. (30 minutes)

Activity-3: The trainer will divide them into five groups and ask them to list out and discuss various application of ICT in the field of E-Commerce/Business, Financial services, Education, Public services and Entertainment. (30 minutes).

Activity-4:The participants will explore on different web browsers like (Internet Explorer, Opera, UC Browser, Chrome, Mozilla) searching the content and applications on Educational uses of Internet using different Search Engines (Google, Yahoo, AltaVista, Bing) and searching techniques. (45 minutes)

Activity-5: The trainer will ask the participants to form two groups to explore videos on 1) Advantages and 2) Shortcomings of ICT and present a group presentation on both (30 minutes).

Resources Required

1. Present module Unit
2. The presentation on this module (15-20 minutes)
3. Videos on evolution of ICT.
4. Handouts on Search engines and searching techniques
5. Videos on use, advantages and limitations of ICT
6. Internet with good speed and different web browser.

Module-II

MASSIVE OPEN ONLINE COURSES (MOOC)

2.1. Introduction:

Massive Open Online Courses popularly known as MOOC have been gaining popularity among educational professionals. MOOCs are courses online, free of charge that are offered through different platforms. This module explains the relevance and importance of MOOC, along with its structure and availability for various subjects.

2.2. Objectives:

After the completion of the module the participants are expected to;

1. Define MOOC
2. Explain the structure of MOOC
3. Discuss the relevance and importance of MOOC
4. List the MOOC providers
5. Discuss the limitations of MOOC
6. Enroll and complete a MOOC of their interest

2.3. Theoretical Framework

2.3.1. Concept of MOOC

In Massive Open Online Course is study made available over the internet without charge to a very large number of people. In addition to traditional course materials such as filmed lectures, readings and problem sets, many MOOCs provide interactive user forums to support community interactions among students, professors and teaching assistants. It is a concept of distance education characterized by using Web 2.0 to teach some kind of content to a large number of people through free video lessons that can be accessed at any time or place.

2.3.2. Important of MOOC:

Improving Access: MOOCs are regarded as an important tool to widen access to education for millions of people, for enhancing quality education. MOOCs provides

opportunity to reach the not only locally or regionally but globally as well. The courses offered by universities all over the world are accessible to everybody. The affordable technologies has made the MOOCs to be accessed at each level by extraordinary number of courses offered by world-renowned institutions and teachers.

Affordable alternative to formal education; MOOCs offers a full/complete course experience online for free.

2.3.3. Structure of MOOC:

The common duration of a MOOC is of 6 to 12 weeks. A MOOC is accessible 24 hours a day, 7 days a week. The majority of the content is delivered asynchronously i.e. students can access it in their own time and at their own pace. However, sometimes there can be optional synchronous events such as ‘live’ webinars (interactive sessions) which require participant to join in at specific dates/time. A standard class becomes in a MOOC set of videos of 5-10 minutes each. The learning of students in a MOOC is usually assessed by Multiple-choice questions. An important component of MOOCs is assignments. Students have to upload assignment solutions into the MOOC platform. Assignments can be evaluated and graded. Another component is the forum, where students post questions that other students can answer.

2.3.4. Sources of MOOC

The MOOC on various subject are available by various institutions. The lists of major MOOC providers are:

- **SWAYAM / India** (<https://swayam.gov.in/>)
- Coursera / United States(<https://www.coursera.org/learn/study-in-usa>)
- edX / United States (<https://www.edx.org/>)
- FutureLearn / United Kingdom
(<https://www.futurelearn.com/courses/teaching-practical-science-chemistry?lr=1>)
- XuetangX / China (<https://www.class-central.com/report/xuetangx/>)
- Kadenze / United States (<https://www.kadenze.com/partners/calarts>)

- **OpenHPI / Germany** (<https://open.hpi.de/courses>)
- **K-MOOC / Korea**(<https://www.class-central.com/subject/chemistry>)

2.3.5. SWAYAM:

SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy. This is done through an indigenous developed IT platform that facilitates hosting of all the courses, taught in classrooms from 9th class till post-graduation to be accessed by anyone, anywhere at any time. All the courses are interactive, prepared by the best teachers in the country and are available, free of cost to the residents in India. More than 1,000 specially chosen faculty and teachers from across the Country have participated in preparing these courses. The courses hosted on SWAYAM will be in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts. Steps have been taken to enrich the learning experience by using audio-video and multi-media and state of the art pedagogy / technology. In order to ensure best quality content are produced and delivered, seven National Coordinators have been appointed: They are NPTEL for engineering, UGC for post-graduation education, CEC for under-graduate education, NCERT & NIOS for school education, IGNOU for out of the school students and, for management studies. Courses delivered through SWAYAM are available free of cost to the learners, however students wanting certifications shall be registered, shall be offered a certificate on successful completion of the course, with a little fee. At the end of each course, there will be an assessment of the student through proctored examination and the marks/grades secured in this exam could be transferred to the academic record of the students. UGC has already issued the UGC (Credit Framework for online learning courses through SWAYAM) Regulation 2016 advising the Universities to identify courses where credits can be transferred on to the academic record of the students for

courses done on SWAYAM. SWAYAM platform is indigenously developed by Ministry of Human Resource Development (MHRD) and All India Council for Technical Education (AICTE) with the help of Microsoft and would be ultimately capable of hosting 2000 courses and 80000 hours of learning: covering school, under-graduate, post-graduate, engineering, law and other professional courses. (from <https://swayam.gov.in/about>)

2.3.6. Limitations of MOOC:

- Limited personalized courseware and attention from a tutor
- Difficult to keep track of students' assignments and involvement
- Available only in limited language
- Limited opportunity for effective assessment methods like question and answer in classroom, surprise quizzes and presentations
- No physical hands-on practical exposures

Activities for the Trainer

Activity-1: Reading and group discussion- The trainer will ask the participant to read the module on MOOC and follow it with group discussion on all the concepts, relevance, sources and limitations of the MOOC. (30 minutes). The trainers role here is to facilitate the reading and discussion. However, he/she may also make presentation.

Activity-2: Review of the various MOOC from the MOOC providers like-edx, courser, udacity, SWAYM which is relevant to school and teacher education. (30 minutes)

Activity-3: Identify a MOOC relevant to the participants which is currently on offer from any of the MOOC providers and ask the participants to enroll and complete a week inputs during the training and complete the course after words. (1 hour)

Activity-4: The trainer will ask the participants in pair to discuss and finalize their MOOC journey (enrolling and completing further MOOC, supporting the MOOC learners as mentors, popularizing MOOC among their colleques, contributing/ developing MOOC courses and providing through SWYAM, developing MOOC for your Institution. (30 minutes)

Resources Required

1. This module on MOOC
2. The presentation on MOOC
3. Videos on introduction to MOOC
4. Write up on SWYAM
5. Exhaustive list of MOOC providers
6. The trainer must have completed a MOOC
7. A sample MOOC journey plan

CYBER SECURITY AND SAFE PRACTICES

3.1. Introduction

Cyber security, also called the computer security or IT security, is the protection of computer systems from the theft and damage to their hardware, software or information, as well as from disruption or misdirection of the services they provide. The protection of data (information security) and the protection of networks (hardware security) are important to prevent loss of server resources as well as to protect the network from being used for illegal purposes. Thus, in technical terms, cyber security is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access.

3.2. Objectives

After the completion of the module the participants are expected to;

1. Define Cyber Security.
2. Explain the computer virus and the different ways to manage virus.
3. Discuss the meaning of spam and different ways to manage spam.
4. Explain the computer hoax and different safe practices to manage hoax.
5. Discuss the different ways to deal with cyber bullying, password theft and hacking.
6. Explain the meaning of cyber-crime and different safe practices.

3.3. Theoretical Framework

3.3.1. Concept of Cyber Security

As explained above, Cyber security, also known as computer security or IT security, is the protection of computer systems from the theft and damage to their hardware, software or information..Cyber security focuses on protecting computers, networks, and information from unauthorized access or attacks. Devices connected to the internet are vulnerable to such attacks and hence, need protection. Cyber security professionals protect and defend computers and networks from such threats.

People, not computers, create computer security threats and malware. They are called hackers who force their unauthorized access to our computer systems in order to illegally obtain personal and sensitive information.

Hackers and predators are programmers who victimize others for their own gain by breaking into computer systems to steal, change or destroy information as a form of cyber-terrorism. Cyber security is the techniques of protecting computers, networks, programs and data from such unauthorized access or attacks that are aimed for exploitation.

Different types of cyber security are:

- | | |
|-------------------------|-------------------------|
| 1) Application Security | 2) Information Security |
| 3) Disaster recovery | 4) Network Security |

1. Application Security

Application security is the body of measures or counter-measures that are taken during the application development stage. Application security is meant to protect applications from threats that can come through flaws in the application design, development, deployment, upgrade or maintenance any time in its life cycle.

Some basic techniques used for application security are:

- Input parameter validation
- User/Role Authentication & Authorization
- Session management, parameter manipulation & exception management
- Auditing and logging.

2. Information Security

Information security is the protection of sensitive information from unauthorized access. It seeks to avoid identity theft and privacy. Major techniques used to cover this are:

- Identification, authentication & authorization of user
- Cryptography.

3. Disaster Recovery

Disaster recovery is the recovery of data in the event of a disaster happening to the computer system. The process includes performing risk assessment, establishing priorities, developing recovery strategies in case of a disaster. Any business should have a concrete plan for disaster recovery to resume normal business operations as quickly as possible after a disaster.

4. Network Security

Network security is the protection of the computer network. It includes activities to protect the usability, reliability, integrity and safety of the network. Effective network security targets a variety of threats and stops them from entering or spreading on the network.

Network security components include:

- Anti-virus and anti-spyware
- Firewall, to block unauthorized access to your network,
- Intrusion prevention systems (IPS), to identify fast-spreading threats, such as zero-day or zero hour attacks,
- Virtual Private Networks (VPNs), to provide secure remote access.

Networks are often a weak point in cyber defenses, so it is crucial for businesses to follow recognized network design principles and ensure all devices are configured to the security standards they have adopted.

3.3.2. Meaning of Computer Virus

Viruses represent a significant vulnerability. The term "virus" is also commonly, but erroneously, used to refer to other types of malware. The majority of active malware threats are actually trojan horse programs or computer worms rather than computer viruses. The term computer virus, coined by Fred Cohen in 1985, is a misnomer. Viruses often perform some type of harmful activity on infected host computers, such as acquisition of hard disk space or central processing unit(CPU) time, accessing private

information (e.g., credit card numbers), corrupting data, displaying political or humorous messages on the user's screen, spamming their e-mail contacts, logging their keystrokes, or even rendering the computer useless. Viruses can increase their chances of spreading to other computers by infecting files on a network file system or a file system that is accessed by other computers. They have the ability to destroy systems, compromise data security, and even affect the reputation of organization.

A computer virus is a type of malicious software program ("malware") that, when executed, replicates itself by modifying other computer programs and inserting its own code. Infected computer programs can include, as well, data files, or the "boot" sector of the hard drive. Computer viruses currently cause billions of dollars' worth of economic damage each year, due to causing system failure, wasting computer resources, corrupting data, increasing maintenance costs, etc.

3.3.3. Safe Practices of Different Types of Viruses

There are plenty of viruses being transmitted through software and from online and some are more detrimental than others. In addition, there are plenty of viruses yet to be thought up, so being aware and prepared is better than trying to cure them. Some of the more commonly known viruses are: File infection virus, Boot sector virus, Worms, Trojan horse etc.

To identify the presence of a virus

- Use a reputable, recommended anti-virus software or rush computer to local trusted computer repair person
- Scan the computer
- Once the anti-virus program has contained and removed the virus, scan the computer again to ensure the threat has been eliminated.
- Internet firewalls help to protect computer from any potential malicious threats through the Internet. This can help to minimize the potential for any future attacks.
- Computer viruses are always a potential threat, even with optimal prevention measures in place. That's why it is always essential to take every action to minimize damage in the event of an infection. Always backup data, and inform other users or

clients in the case of an attack. Always keep programs, systems and most importantly, anti-virus protection software up-to-date.

- Some websites run by antivirus software companies provide free online virus scanning, with limited "cleaning" facilities

3.3.4. Meaning of Hoax

A hoax is a term that describes anything that is not real. A hoax message is a false story that has been broadcast through social media; often through WhatsApp, Facebook and Twitter. Sometimes it's also distributed through email and SMS. The purpose of creating a hoax message is to trick people to pass it on to other people. This could then lead to mass panic or sometimes contain embarrassing information or a picture. A hoax is a humorous or malicious deception. A *hoax* is a falsehood deliberately fabricated to masquerade as the truth. It is distinguishable from errors in observation or judgement, rumors, urban legends, pseudo-sciences, and April Fools' Day events that are passed along in good faith by believers or as jokes.

For example, many hoax e-mails are distributed to cause false fears. For example, the "Bad Times" virus claimed to be a virus capable of erasing everything on your computer hard drive as well as any disks or other magnetic media around your computer. Today, most hoaxes are spread through chain mails. Learn to identify hoax messages. Consider whether the story sounds realistic and try to verify its authenticity. Often you can look up information online. There are also websites which expose internet scams.

3.3.5. Meaning of Cyber Bullying, Password Theft and Hacking

3.3.5.1. Cyber Bullying

Cyber bullying is social terror by technology. When any person is threatened, humiliated, harassed, or humiliated via use of technology --- this is Cyber bullying.

Cyber bullying involves using technology to bully people. It can include texting, instant messaging, and posting on social media and gaming websites. Messages also can be designed to cause psychological harm. These messages usually attack, insult, spread rumors about, embarrass, or harm the relationships of the cyber bullying victim. All bullying – including cyber bullying – has the potential to lead to long term stress and

anxiety that can drastically alter child's life and happiness and all bullying needs to be stopped.

Different Types of Cyber Bullying

- emailing or texting threatening or nasty messages to people
- posting an embarrassing or humiliating video of someone on a video-hosting site such as YouTube
- harassing someone by repeatedly sending texts or instant messages through an app or in a chat room
- setting up profiles on social networking sites, such as Facebook, to make fun of someone
- "happy slapping" – when people use their mobiles to film and share videos of physical attacks
- posting or forwarding someone else's personal or private information or images without their permission – known as "sexting" when the content is sexually explicit
- sending viruses that can damage another person's computer
- making abusive comments about another user on a gaming site

Safe Practices against Cyber Bullying

All bullying – including cyber bullying – has the potential to lead to long term stress and anxiety that can drastically alter your child's life and happiness and all bullying needs to be stopped. To prevent cyber bullying from occurring you must understand exactly what it is.

The best way to avoid being cyber-bullied is to use the internet and mobile phones carefully.

- Don't give out personal details, such as your phone number or address.
- Think carefully before posting photos or videos of you or your friends online.
- Only give your mobile number to close friends.

- Protect passwords, and never give your friends access to your accounts.
- Use the privacy settings on social media.
- Don't forward nasty emails.
- Learn how to block instant messages or use mail filters to block emails.
- Know how to report bullying to social media sites, internet service providers or website
- Administrators.
- Ask a parent or teacher for help, or look at the advice on

3.3.5.2. Password Theft

Password Theft is relatively simple to steal passwords from other users in a network if the computers are not secure. Passwords can be stolen in a number of ways. Monitoring the traffic on the network is an advanced but relatively easily accomplished technique.

Theoretically, an unauthorized user can tap into the cable at any point along its length, and listen to all the passing network traffic. Encrypting of all network traffic would protect against this threat. A variety of different types of packet may be sent along a network cable in the space of a second. Some of them can be read directly, while others are encrypted. Commercial programs exist to monitor to the packets. Many network cards are even supplied with a fault-finding program that lets you monitor all the packets sent through the cables. This demonstrates the importance of physical security of the network cables. Avoid any points of contact outside the building. Another way of stealing passwords is to load a false logon program that stores passwords with user IDs. This is one reason why system administrators must never log onto a computer other than his own, which must, of course, be secure. There are also memory-resident programs that detect whenever logon programs are run. When they are started, the next 20 keystrokes are stored in a hidden file.

Simple passwords need to be changed. It's that easy to understand. If you have a really easy password that anyone could guess and instantly get into your account, it's time to change it.

3.3.5.3. Hacking

Hacking is an attempt to exploit a computer system or a private network inside a computer. Simply put, it is the unauthorized access to or control over computer network security systems for some illicit purpose. Hacking is identifying and exploiting weaknesses in computer systems and/or computer networks.

To better describe hacking, one needs to first understand hackers. One can easily assume them to be intelligent and highly skilled in computers. In fact, breaking a security system requires more intelligence and expertise than actually creating one. There are no hard and fast rules whereby we can categorize hackers into neat compartments. However, in general computer parlance, we call them white hats, black hats and grey hats. White hat professionals hack to check their own security systems to make it more hack-proof. In most cases, they are part of the same organization. Black hat hackers hack to take control over the system for personal gains. They can destroy, steal or even prevent authorized users from accessing the system. They do this by finding loopholes and weaknesses in the system. Some computer experts call them crackers instead of hackers. Grey hat hackers comprise curious people who have just about enough computer language skills to enable crime is a combination of means, motive, and opportunity.

Cybercrime is no different. While a good deal of cybercrime can be accomplished by technological means, another part of a proactive cyber security solution is to remove the non-technological vulnerabilities. them to hack a system to locate potential loopholes in the network security system. Grey hats differ from black hats in the sense that the former notify the admin of the network system about the weaknesses discovered in the system, whereas the latter is only looking for personal gains. All kinds of hacking are considered illegal barring the work done by white hat hackers.

3.3.6. Concept of Cybercrime

Cybercrime is the use of computers and networks to perform illegal activities such as spreading computer viruses, online bullying, performing unauthorized electronic fund

transfers, etc. Most cybercrimes are committed through the internet. Some cybercrimes can also be carried out using Mobile phones via SMS and online chatting applications.

The following list presents the common types of cybercrimes:

- Computer Fraud: Intentional deception for personal gain via the use of computer systems.
- Privacy violation: Exposing personal information such as email addresses, phone number, account details, etc. on social media, websites, etc.
- Identity Theft: Stealing personal information from somebody and impersonating that person.
- Sharing copyrighted files/information: This involves distributing copyright protected files such as eBooks and computer programs etc.
- Electronic funds transfer: This involves gaining an un-authorized access to bank computer networks and making illegal fund transfers.
- Electronic money laundering: This involves the use of the computer to launder money.
- ATM Fraud: This involves intercepting ATM card details such as account number and PIN numbers. These details are then used to withdraw funds from the intercepted accounts.
- Denial of Service Attacks: This involves the use of computers in multiple locations to attack servers with a view of shutting them down.
- Spam: Sending unauthorized emails. These emails usually contain advertisements.

Best Practices against Cyber Safety

- **Keep your browser software up-to-date:**

This is crucial, as new patches are often released to fix existing vulnerabilities in browser software. This recommendation doesn't apply solely to browser software – it is critical to keep operating system software and any other software you have up-to-date for the same reason.

- **Run anti-virus software:**

Anti-virus software provides protection by scanning for and removing malicious files on your computer. There are many excellent options for virus protection software (both paid and free), so it is up to you to do a little research and select a program that best fits your needs.

- **Scan files before downloading:**

It is important to avoid downloading anything until you're confident that it is secure. If you have any suspicion that a file may not be legitimate or may be infected, scan it with antivirus software before downloading.

- **Watch out for phishing:**

Phishing attacks use online communications (usually email) to trick users into giving out their sensitive information. Often times these messages appear to be from banks, social media sites, shopping sites, or payment processors. Phishing messages frequently contain links that lead to counterfeit versions of popular sites. You can avoid falling victim to phishing schemes by ignoring unsolicited messages and not clicking on hyperlinks or attachments in emails (type or copy/paste the URL as it appears instead).

- **Don't reuse passwords**

Using the same password for multiple sites only makes it easier for attackers to compromise your sensitive information. Instead, keep track of your different passwords with a handwritten list that you keep in a safe place or come up with your own algorithm for creating unique passwords that only you would know. It is also recommended that you change your passwords every 90 days.

- **Use HTTPS**

The "s" in "https" stands for secure, meaning that the website is employing SSL encryption. Check for an "https:" or a padlock icon in your browser's URL bar to verify that a site is secure before entering any personal information.

- **Read privacy policies:** Websites' privacy policies and user agreements should provide details as to how your information is being collected and protected as well as how that site tracks your online activity.

- **Regularly monitor your bank statements**

Keeping an eye on your online statements will allow you to react quickly in the event that your account has been compromised.

- **Avoid public or free Wi-Fi**

Attackers often use wireless sniffers to steal users' information as it is sent over unprotected networks. The best way to protect yourself from this is to avoid using these networks altogether.

- **Disable stored passwords**

Nearly all browsers and many websites in general offer to remember your passwords for future use. Enabling this feature stores your passwords in one location on your computer, making them easier for an attacker to discover if your system gets compromised. If you have this feature enabled, disable it and clear your stored passwords.

- **Turn on your browser's popup blocker**

Popup blocking is now a standard browser feature and should be enabled any time you are surfing the web. If it must be disabled for a specific program, turn it back on as soon as that activity is complete.

Activities for the Trainer

1. Reading & Group Discussion

Reading and group discussion- The trainer will ask the participant to read the module on Cyber Safety and Security and follow it with group discussion on all the concepts, relevance, sources and limitations of the Cyber Safety and Security. (30 minutes). The trainer's role here is to facilitate the reading and discussion. However, he/she may also make presentation.

2. Practical Review

Review of the various types of Cyber Security and Cyber Safety issues like-Computer virus and managing virus, managing spam, hoax, dealing cyber bullying, password theft, hacking, practices etc.

3. Identify Threats

Identify concept like Computer Virus to the participants which is essential to know for managing virus in their system and ask the participants how to different ways to handle computer Viruses (1 hour)

4. Clarify Concepts

The trainer will ask the participants in pair to discuss and know the information about different types of Cyber security and safe practices. -Computer virus and managing virus, managing spam, hoax, dealing cyber bullying, password theft, hacking, Cybercrime safe practices.

5. Demonstrate

The trainer will show some video and demo regarding the different ways to follow the instructions for Cyber security and safe practices.

References

- 1 <http://nicerc.org/curricula/>
- 2 <https://k12cs.org/>
- 3 [.https://www.cybercompex.org/](https://www.cybercompex.org/)
- 4 . <http://nicerc.org/pd/> 5 www.fedvte.usalearning.gov
- 5.https://en.wikipedia.org/wiki/Computer_security
- 6.<https://www.paloaltonetworks.com/cyberpedia>
- 7.<https://www.fireeye.com>
- 8.<https://www.csoonline.com/>
9. <https://www.veracode.com/blog/>.

Resource Required

1. This module on Cyber Safety and Security
2. This session focus on managing computer virus
3. Introductory video on dealing with cyber bullying
4. Introduction about managing hoax and spam
5. The trainer must know about different computer safety practices

Module-IV

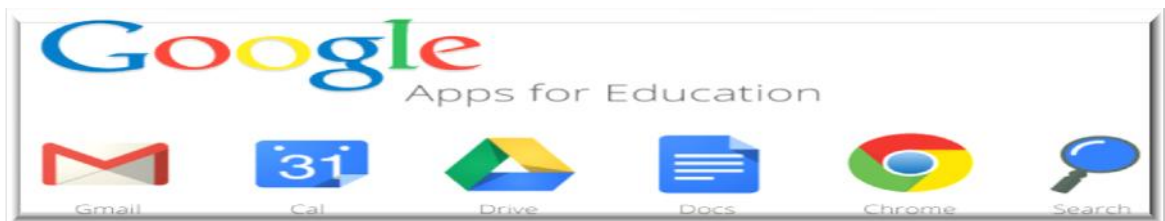
CLOUD BASED APPLICATIONS

4.1. Introduction

Cloud storage is a cloud computing model in which data is stored on remote servers accessed from the internet, or "cloud." It is maintained, operated and managed by a cloud storage service provider on a storage servers that are built on virtualization techniques.

Cloud storage is also known as utility storage – a term subject to differentiation based on actual implementation and service delivery. Cloud storage works through data center virtualization, providing end users and applications with a virtual storage architecture that is scalable according to application requirements. In general, cloud storage operates through a web-based application that is remotely implemented through its interaction with the client application's in-house cloud storage infrastructure for input/output (I/O) and read/write (R/W) operations.

Google Drive is a personal cloud storage service from Google that lets users store and synchronize digital content across computers, laptops and mobile devices, including Android-powered tablet and smartphone devices. Google Drive highly uses in the school also, teacher will be able to maintain all the schedule and important documents on it. Teachers will share all data among their group and at one time or real time, they will editing and sharing these documents for educational purpose.



Google Drive additionally provides advanced search capabilities for finding specific information within files, and users can also share and collaborate with others on documents via the service's built-in access to the Google Docs suite of editing tools.

4.2: Objectives

After the completion of the module the participants are expected to;

1. Explain the cloud based services
2. Use online cloud storage like google drive.
3. Use google form, google draw, google sheets for educational purpose

4.3: Define Cloud Based Applications (CBA)

Cloud computing is a type of computing that relies on shared computing resources rather than having local servers or personal devices to handle applications.

In its most simple description, cloud computing is taking services ("*cloud services*") and moving them outside an organization's firewall. Applications, storage and other services are accessed via the Web. The services are delivered and used over the Internet and are paid for by the cloud customer on an as-needed or pay-per-use business model.

Explain the Structure of CBA

Cloud application servers typically are located in a remote data center operated by a third-party cloud services infrastructure provider. Cloud-based application tasks may encompass email, file storage and sharing, order entry, inventory management, word processing, customer relationship management (CRM), data collection, or financial accounting features.

Discuss the Relevance and Importance of CBA

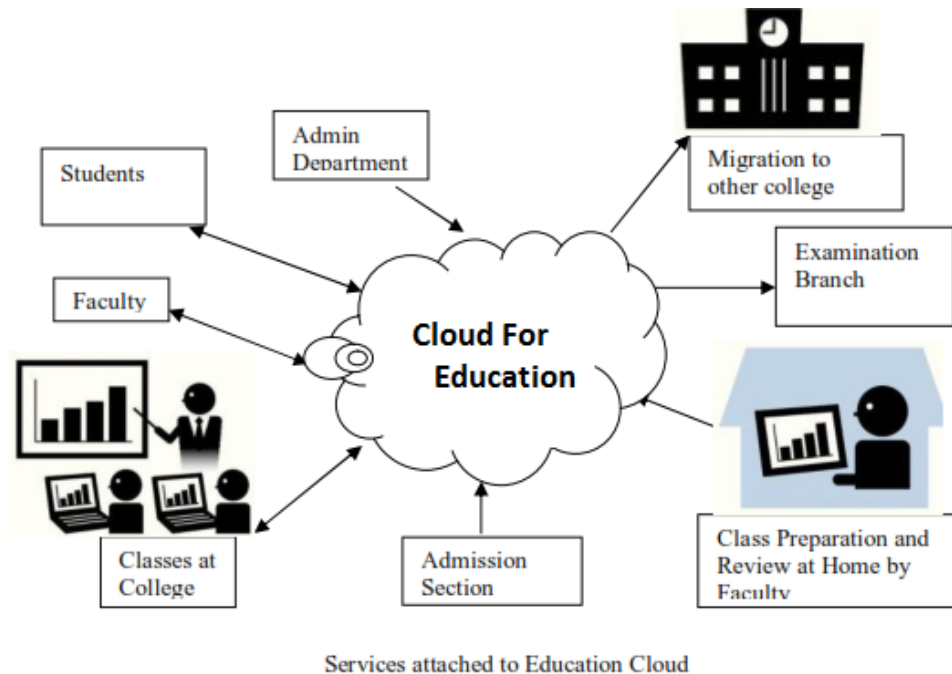
One of the biggest challenges that the government faces in providing education is the lack of infrastructure and if available, then maintenance of that infrastructure and other issue are Procuring and maintaining a wide range of hardware and software require ample, ongoing investment and the skills to support them.

A solution to all this issue can be Cloud computing. It's a set-up of computing resources—located just about anywhere—that can be shared. Accordingly, by implementing cloud computing innovation, we can defeat all these short comes and keep up a unified framework where every one of the powers can check the education

framework from every single angle and proceed with screen and guide the framework. They check the requirements of the institutes as well as guarantee that quality training is given to each student after his participation, class exhibitions and so on can be adequately kept up without stressing for the framework issue.

The cloud guarantees that students, instructors, personnel, guardians, and staff have access to basic data utilizing any gadget from anyplace. Both open and private foundations can utilize the cloud to convey better administrations, even as they work with fewer assets.

- A. Diminished Costs:** Cloud-based administrations can help institutes decrease costs and quicken the utilization of new innovations to meet developing educational needs. Students can utilize office applications without purchasing, install and stay up with the latest on their PCs. It likewise gives the instructors of Pay per use for a few applications.
- B. Easy Access:** Lesson arranges labs, grades, notes, and PowerPoint slides – pretty much anything computerized that you use in training is effectively transferred.
- C. Security:** Your information, content, data, pictures – anything you store in the cloud normally requires verification (ID and secret word, for instance) – so it is not effectively available for anybody.
- D. Shareability:** Cloud computing opens up a universe of new conceivable outcomes for students, particularly the individuals who are not served well by customary training frameworks. With cloud computing, one can reach more and more diverse, students.
- E. No costly programming required:** One of the greatest focal points of cloud-based registering is the software-as-a-Service (SaaS) model. Numerous product projects are presently accessible either free or on an ease membership premise, which considerably brings down the expense of key applications for students.
- F. Practice environmental safety:** Education cloud will definitely diminish the carbon impression.



Source: http://www.ijirce.com/upload/2014/february/21_Role.pdf

Easy Update:

Roll out improvements to a lesson and need to change it back? Don't worry about it. Cloud computing will spare various corrections and variants of a record with the goal that you can sequentially follow back the development of a thing.

In these and different ways, cloud computing is lessening costs, as well as making a situation where all students can have admittance to amazing instruction and assets. Whether you are a chairman, an instructor, a student, or the guardian of a student, now is an incredible time to investigate how cloud-based applications can advantage you, your youngsters, and your school.

- **Online Cloud Storage:** It is a term that refers to **online** space that you can use to store your data. As well as keeping a backup of your files on physical **storage** devices such as external hard drives or USB flash drives, **cloud storage** provides a secure way to remotely store your important data.

- **Google Drive:** It is a personal cloud storage service from **Google** that lets users store and synchronize digital content across computers, laptops and mobile devices, including Android-powered tablet and smart phone devices.
- **Google Forms:** It is one the tools available from **Google** Docs collection. They can be a useful tool to help you plan events, send a survey, give students a quiz, or collect other information in an easy, streamlined way.
- **Google Draw:** It is free, web-based diagramming software developed by **Google**. It allows users to collaborate and work together in real time to create flowcharts, organizational charts, website wireframes, mind maps, concept maps, and other types of diagrams.
- **Google Sheet:** It is a Web-based application that allows users to create, update and modify spreadsheets and share the data live online. The Ajax-based program is compatible with Microsoft Excel and CSV (comma-separated values) files. Spreadsheets can also be saved as HTML.

4.3.2. List the CBA providers: The top Cloud Computing Companies are;

- 1) Amazon Web Service (AWS)
- 2) Microsoft Azure
- 3) Google Cloud Platform
- 4) Adobe
- 5) VMware
- 6) IBM Cloud
- 7) Rackspace
- 8) Red Hat
- 9) Salesforce
- 10) Oracle Cloud
- 11) SAP
- 12) Verizon Cloud
- 13) Navisite

14) Dropbox

15) Egnyte

4.3.3. Steps to use “Google Drive

Step 1: Go to drive.google.com On your computer, go to drive.google.com. You’ll see "My Drive," which has:

- Files and folders you upload or sync
- Google Docs, Sheets, Slides, and Forms you create

Learn how to back up and sync files from your Mac or PC.

Step 2: Upload or create files

You can upload files from your computer or create files in Google Drive.

- Upload files and folders to Google Drive
- Work with Office files
- Create, edit, and format Google Docs, Sheets, and Slides

Step 3: Share and organize files

You can share files or folders, so other people can view, edit, or comment on them.

- Share files from Google Drive
- Share folders from Google Drive
- Make someone else the owner of a file

To see files that other people have shared with you, go to the "Shared with me" section

Reference:

<https://www.techopedia.com/definition/26535/cloud-storage> retrieved dated on 15/12/17 at 11.35am.

https://www.webopedia.com/TERM/G/google_drive.html retrieved dated on 15/12/17 at 11.51am.

Activities for the Trainer

Activity 1: Reading and group discussion: The trainer will ask the participant to discuss the availability of google drive in their school for teaching learning process and follow it with group discussion on all the concepts and sources with their limitation. (30min).

Activity 2: The trainer will ask to the participants that they will create their account on google. And they must upload document on google drive. They will register themselves on drive and click on the button of create and open their documents.

Activity 3: Explore and use the google drive and do hands on with google drive. The trainer will ask to the participants to open their document and click on the 'shared with me' in the google drive. They will edit the document on sharing activity.

Resource Required

1. This module on Google Drive
2. This session focus on use of google drive and its usages in education
3. Introductory Videos
4. Exhaustive list of various functions of google drive.
5. The trainer must have google account and Gmail account.

Module-V

ONLINE TRANSACTIONS

5.1: Introduction

At its most basic, an online booking system is software which allows a potential customer to book and pay for an activity or service directly through your website. That means from the moment a customer decides they want to book to choosing a date, picking a time and paying for the booking, everything is handled online, greatly reducing the workload on staff and removing the opportunity for double-bookings. Advanced systems like allow customers to book through a variety of methods online, including mobile, greatly expanding the potential for bookings for your business, and better leveraging an increasingly social internet.

5.2: Objectives

After the completion of the module the participants are expected to;

1. Explain concept of Online Booking.
2. Discuss the relevance and importance of Online Booking.
3. List and evaluate different Online Booking Apps.
4. Discuss the advantage and the limitations of Online Transactions.
5. Explore different Online Transaction Websites.
6. Use some mobile based application for Online Transactions.

5.3: Theoretical Framework

5.3.1. Process of Making Online Booking

Online Booking is a trusted and easy way for travelers to book your property. Travelers enter their payment details (either Visa or Master card) when they request a booking. You are notified when the request is submitted and have up to 24 hours to accept, edit or decline the request.

If the booking request is accepted, your calendar is blocked and the traveler is automatically charged for the booking according to dates and amounts pre-set in Owner Admin by you. You will receive the deposit payment within 3 business days of the

booking being accepted, and the final payment within 3 business days after your traveler's arrival date.

If a traveler is not ready to submit a booking request and messages you to ask questions about your property or get more details, you can correspond with them until you both agree to proceed with a booking. To initiate an online booking, simply reply and pre-approve an enquiry, through OwnerAdmin.

Here is what you need to be Online Booking ready;

- Set customized rates for at least 12 months
- Provide your bank account details and update your Online Booking settings which include your Cancellation Policy and Refundable Damage Deposit
- Block your calendar for all confirmed bookings and for dates what your property is unavailable
- Ensure your description and features/amenities accurately reflect your property.
- We also recommend reading the below articles to understand the basics of Online Booking.

Concept of Online Banking

Online banking, also known as internet banking, e-banking or virtual banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank and is in contrast to branch banking which was the traditional way customers accessed banking services.

Concept of Mobile Banking

Mobile banking is a service provided by a bank or other financial institution that allows its customers to conduct financial transactions remotely using a mobile device such as

a smart phone or tablet. Unlike the related internet banking it uses software, usually called an app, provided by the financial institution for the purpose. Mobile banking is usually available on a 24-hour basis. Some financial institutions have restrictions on which accounts may be accessed through mobile banking, as well as a limit on the amount that can be transacted.

Transactions through mobile banking may include obtaining account balances and lists of latest transactions, electronic bill payments, and funds transfers between a customer's or another's accounts. Some apps also enable copies of statements to be downloaded and sometimes printed at the customer's premises; and some banks charge a fee for mailing hardcopies of bank statements.

5.3.2: Difference between Internet Banking and Mobile Banking

The Digital user is fast, sharp and always on the move. They are always connected and ready to try new products on the shelf. As far as banking is concerned, they like it swift and convenient. In a Digital world that is constantly evolving, they are always willing to keep up with the latest trends that are making banking simpler. The same has happened with the onset of Internet Banking and Mobile Banking. It has made banking simpler, easier and extremely convenient.

What started with cashless transactions with Credit Cards and Debit cards, has now moved to an all new level with Mobile apps and Internet Banking. There used to be a time when swiping a card at a shop would mean a big leap of faith but now everything is on your screen. Up, close and personal. You shop online, you pay online. You book movie tickets online and you make the payment online. Every minor transaction can happen without walking across to a vendor personally or actually exchanging cash. While some swear by Internet banking, there are some who prefer to use their mobile Apps for banking. But what is the difference between Internet Banking and Mobile Banking?

Well, first things first. It all started with Internet Banking. Mobile banking is a much latest entrant into the digital world of banking. When Internet Banking took off, it felt like the go to thing for all transactions. Never before could a customer access his/her account balance

and make transactions sitting on their sofa in the comfort of their home. All you require is your customer ID and the rest falls into place. Right from making credit card payments to setting up your mutual fund and loan repayment debits, everything is a part of Internet banking. If you needed to buy anything, you could immediately make a payment online and there that was, your transaction was done. There is no waiting time; there is no need to check if there was cash in your wallet. All you needed was your login credentials.

Mobile banking is just the thing you need when you are on the move. In the absence of a laptop/computer, your mobile app is the answer to all your banking needs. Be it a phone recharge or a fund transfer, a mobile app takes care of all your basic utility bill payments for which you would, once upon a time make multiple trips. What mobile banking gives you is the freedom to make a transaction irrespective of the place or time. You maybe commuting or waiting at the airport, your mobile app is always handy! Further you can locate ATMs and add beneficiary payees. All this and more adds to your convenience as a user.

Mobile Banking and Internet banking are two sides of the same coin. The screens have changes, the sizes have become smaller and banking has become simpler.

5.3.3: Payment Applications

Mobile payment (also referred to as mobile money, mobile money transfer, and mobile wallet) generally refer to payment services operated under financial regulation and performed from or via a mobile device. Instead of paying with cash, cheque, or credit cards, a consumer can use a mobile to pay for a wide range of services and digital or hard goods. Although the concept of using non-coin-based currency systems has a long history, it is only recently that the technology to support such systems has become widely available.

In developing countries mobile payment solutions have been deployed as a means of extending financial services to the community known as the "unbanked" or "under banked," which is estimated to be as much as 50% of the world's adult population,

according to Financial Access' 2009 Report "Half the World is Unbanked".^[8] These payment networks are often used for micropayments.^[9] The use of mobile payments in developing countries has attracted public and private funding by organizations such as the Bill & Melinda Gates Foundation, United States Agency for International Development and Mercy Corps.

5.3.4: Online Purchase

Online shopping is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the Internet using a web browser. Consumers find a product of interest by visiting the website of the retailer directly or by searching among alternative vendors using a shopping search engine, which displays the same product's availability and pricing at different e-retailers. As of 2016, customers can shop online using a range of different computers and devices, including desktop computers, laptops, tablet computers and smart phones.

An online shop evokes the physical analogy of buying products or services at a regular "bricks-and-mortar" retailer or shopping center; the process is called business-to-consumer (B2C) online shopping. When an online store is set up to enable businesses to buy from another businesses the process is called business-to-business (B2B) online shopping. A typical online store enables the customer to browse the firm's range of products and services, view photos or images of the products, along with information about the product specifications, features and prices.

Online stores typically enable shoppers to use "search" features to find specific models, brands or items. Online customers must have access to the Internet and a valid method of payment in order to complete a transaction, such as a credit card, an Interact-enabled debit card, or a service such as PayPal. For physical products (e.g., paperback books or clothes), the e-tailer ships the products to the customer; for digital products, such as digital audio files of songs or software, the e-tailer typically sends the file to the customer over the Internet. The largest of these online retailing corporations are Alibaba Amazon.com, and eBay.

5.3.5: Use of Debit & Credit Card

A credit card is a payment card issued to users (cardholders) to enable the cardholder to pay a merchant for goods and services based on the cardholder's promise to the card issuer to pay them for the amounts so paid plus the other agreed charges. The card issuer (usually a bank) creates a revolving account and grants a line of credit to the cardholder, from which the cardholder can borrow money for payment to a merchant or as a cash advance. In other words, credit cards combine payment services with extensions of credit. Complex fee structures in the credit card industry may limit customers' ability to comparison shop, help ensure that the industry is not price-competitive and help maximize industry profits. Because of this, legislatures have regulated credit card fees.

A debit card (also known as a bank card, plastic card or check card) is a plastic payment card that can be used instead of cash when making purchases. It is similar to a credit card, but unlike a credit card, the money comes directly from the user's bank account when performing a transaction.

Some cards may carry a stored value with which a payment is made, while most relay a message to the cardholder's bank to withdraw funds from a payer's designated bank account. In some cases, the primary account number is assigned exclusively for use on the Internet and there is no physical card.

In many countries, the use of debit cards has become so widespread that their volume has overtaken or entirely replaced cheques and, in some instances, cash transactions. The development of debit cards, unlike credit cards and charge cards, has generally been country specific resulting in a number of different systems around the world, which were often incompatible. Since the mid-2000s, a number of initiatives have allowed debit cards issued in one country to be used in other countries and allowed their use for internet and phone purchases.

5.3.6: Safe Practices/Precautions in Using ATM

- Memorise your PIN. Do not write it down anywhere, and certainly never on the card itself
- Your card is for your own personal use. Do not share your PIN or card with anyone, not even your friends or family.
- "Shoulder surfer" can peep at your PIN as you enter it. So stand close to the ATM machine and use your body and hand to shield the keypad as you enter the PIN.
- Do not take help from strangers for using the ATM card or handling your cash.
- Press the 'Cancel' key before moving away from the ATM. Remember to take your card and transaction slip with you.
- If you take transaction slip, shred it immediately after use.
- If your ATM card is lost or stolen, report it to your card-issuing bank immediately.
- When you deposit a cheque or card into your ATM, check the credit entry in your account after a couple of days. If there is any discrepancy, report it to your bank.
- If your card gets stuck in the ATM, or if cash is not dispensed after you having keyed in a transaction, call your bank immediately.
- If you have any complaint about your ATM/Debit/Credit card transaction at an ATM, you must take it up with the bank that issued the card to you.

Activities for the Trainer

Activity 1: Reading and group discussion – The trainer will ask the participant to read the modules of Online Transaction and follow it with group discussion on all the concept, & other aspects of online transactions.

Activity 2: The trainer will ask the participants to discuss about Mobile Banking & Internet Banking, they will also discuss the similarities beetwin the two.

Activity 3: Group Discussion on Mobile Payment Apps & Demo by some groups.

Activity 4: Exploring different online purchasing sites and demo for booking any item from amazon, flipkart & snapdeal..

Activity 5: Group Work

Group 1- Explore different Mobile based Payment Apps Identifying, Evaluating, Listing.

Group 2- Explore different Mobile based online booking apps Identifying, Evaluating, Listing.

Activity 7: Discussion on Limitations of Online Transaction.

Resources Required

1. Modules on Online Transaction.
2. Presentation of Online Transaction.
3. Videos on introduction & Application of Online Transaction.
4. Write up on Online Booking, Mobile Banking, Payment apps, online purchase, Debit & Credit Card & safe practices/precautions while using ATM.
5. The trainer must have used different Online Transaction apps..

Module-VI

E-CONTENT AND OPEN EDUCATION RESOURCE (OER)

6.1. Introduction

ICT have offered 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 has also promoted international collaboration and networking in education and provided more flexible and effective ways for professional development. It can also help in pre-service and in-service teacher training programs. This present module aims to understand the meaning and access of e-content and OER as source of e-content. This module also presents e-content as learning objects, their e-usability and authorized access. The module will also give information about open educational resources, meaning and importance, various OER initiatives and creative common licensing.

6.2. Objectives

After the completion of the module the participants are expected to;

1. Explain the meaning of e-content and open educational resources (OER)
2. Demonstrate the concept open educational resources and licensing
3. Explain the accessing of resources from repositories
4. Explore various repositories for accessing subject specific resources
5. Explore and cite various national initiatives on OER
6. Appreciate web as a source of educational resources

6.3. Theoretical Framework

6.3.1. Concept of E-Content and Open Educational Resources (OER)

Electronic content (e-content) or digital content is the 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'. The e-content includes all kinds of digital content delivered through various electronic media with combination of sounds, images and text. 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. 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.

6.3.2. Meaning of OER and Licensing

The e-content serve as an effective virtual teacher and is necessary for making teaching and learning effective. However, the many of the educational resources are accessible as they are copy righted. Hence, to make learning resources available to all with no or very less copy right restrictions the courses with open licenses were launched.

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. OER includes all the electronic resources such as textbooks, course readings and other learning content; simulations, games, and other learning applications; syllabi, quizzes, and assessment tools; and virtually any other material that can be used for educational purposes. 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.

The OER are important as

- They offer free access to some of the world's best courses.
- They offer equal access to knowledge and re-usability.
- Provide access to huge amount of study materials anywhere and anytime.
- Accessible and affordable for all.
- OERs are adaptable and allow others to reproduce them for their use.
- Offers for sharing and reusing resources.
- Bridge the gap among formal, informal and non-formal education.

6.3.3. Concept of NROER

National Repository of Open Educational Resources (NROER) is launched by the Ministry of Human Resource Development (MHRD), Government to bring together all the digital resources for a school system such as educational videos, audio, images, documents and interactive modules at national level. It offers resources for all school subjects and grades in multiple languages. 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:

- Digitization of the content
- Development of e-content in multiple languages along with multiple supportive resources.
- Collaborative creation of e-content
- Widespread dissemination of e-content
- Setting up of state and national level digital repositories
- Development of digital resources as per the National policy on open standards
- Celebrate best practices in content development.





6.3.4. Concept of Creative Common Licensing

The available learning resources are copyrighted and are available under Creative Commons Licence. The Creative commons (CC) is the popular licensing system having 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

 <p>Attribution CC By</p>	<p>This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation.</p>
 <p>Attribution-ShareAlike CC BY-SA</p>	<p>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.</p>
 <p>Attribution- NoDerivatives CC BY-ND</p>	<p>This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.</p>
 <p>Attribution- NonCommercial CC BY-NC</p>	<p>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.</p>
 <p>Attribution- NonCommercial- ShareAlike CC BY-NC-SA</p>	<p>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.</p>
 <p>Attribution-Non Commercial- No Derivatives CC BY- NC-ND</p>	<p>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.</p>

(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>)

6.3.5. National Initiatives for OER

1. E-Pathshala web portal (<http://epathshala.nic.in>)

- E-Pathshala is a web portal which hosts educational resources for Students, Teachers, Parents, researchers and educators.
- It contains textbooks and other e-books as E-Pub 3.0 and Flipbooks in English, Hindi and Urdu.
- It is available through especially developed mobile app interface on Android, IOS and windows platforms for wider access.

E-Pathshala has been developed by NCERT for showcasing and disseminating all educational e-resources including textbooks, audio, video, periodicals and a variety of other print and non-print materials through website and mobile app. The platform addresses the dual challenge of reaching out to a diverse clientele and bridging the digital divide (geographical, socio-cultural and linguistic), offering comparable quality of e-

contents and ensuring its free access at every time and every place. All the concerned stakeholders such as students, teachers, educators and parents can access e-books through multiple technology platforms i.e. mobile phones (android, ios and windows platforms), and tablets (as e-pub) and on web through laptops and desktops (as flipbooks).

All the NCERT books have been digitized and uploaded. Currently the e-contents are available in Hindi, English and Urdu. States/ UTs are being approached to digitize and share all textbooks in Indian languages through this platform, which will be done in a phased manner. The Web portal and Mobile App of e-Pathshala was launched by Hon'ble HRM during the National Conference on ICT in School Education on 7th November, 2015.

2. **National Repository of Open Educational Resources (NROER):**
(<http://nroer.gov.in/>)

NCERT in collaboration with the Department of School Education and Literacy, Ministry of Human Resources and Development, Government of India has developed national repository. The repository provides digital resources – documents, audio-visuals, interactive objects and images open to all for free for widespread dissemination of e-content. The e-content is available in in multiple languages along with multiple supportive resources.

3. **Sakshat:** (<http://www.sakshat.ac.in>)

Human resource ministry has set up vocational education programme named, Sakshat. One stop education portal for 50 crore users. The programme was formally launched by the President A P J Abdul Kalam on Oct 30, 2006. UGC, AICTE, IGNOU, NCERT, KVS, NVS, CBSE, IITs and IISc has developed the content links for Sakshat The portal has four functional module

- e-books,
- e-journals,
- digital repository and
- digital library

This portal offers e-content, media content, spoken tutorial, talk to a teacher and virtual classes facilities under the Sakshat Repository. Sakshat web portal provides downloadable e-content in the form of text, audio and video.

4. **National Program on Technology Enhanced Learning**(<http://nptel.iitm.ac.in>):
It is a joint venture by seven Indian institutes of technology and Indian institutes of science and funded by the Ministry of Human Resource Development, Government of India to enhance the quality of higher education in the country by developing curriculum-based video and web courses.
5. **Open Source Educational Resources Animation Repository (OSCAR)** (<http://oscar.iitb.ac.in/oscarHome.do>):
It is web based interactive animations for teaching. It provides a platform for student developers to create animations based on ideas and guidance from instructors.
6. **State OER: Karnataka Open Educational Resources (KOER)**: This is the program 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.

References

1. Module on critical understanding of ICT developed by RIE Mysore (<http://www.riemysore.ac.in/ict/>)
2. Journal of Library & Information Science | Vol.6 No.1, March, 2016

Activities for the Trainer

Activity-1: Reading and group discussion-The trainer will ask the participant to read the module on E-content and open educational resources (OER) and follow it with group discussion on e-content, their access and exploration on various OER. (30 minutes).

The trainers role here is to facilitate the reading and discussion. However, he/she may also make presentation.

Activity-2: The trainer will demonstrate the creation of a resource library by searching, accessing and downloading media resources for a particular topic from the web by saving it in a particular folder.

The trainer will facilitate individual activity to the participants under following heads. (30 minutes)

- Search suitable media (image/audio/video) resource of any one topic of their subject area using suitable tools from the web resources.
- Save the downloaded media resources in folder.
- Report two websites from where the media (image/audio/video) resource is available for their subject topics.

Activity-3: The trainer will demonstrate the accessing and downloading of various resources from repositories like NROER, Sakshat, National Digital Library (IIT Kharagpur), Wikipedia, National Council of Teachers of Mathematics, UNESCO, BECTA , National Council of Science Museums, IIT Bombay Oscar, etc. by showing their websites.

The trainer will ask the participants to prepare a list of open educational resources (OER) with their URL in the text. (30 hour)

Activity-4: The trainer will ask the participants in performing activities under following heads

- Go to NROER web site www.nroer.gov.in,
- Create an account and login on the website

- Explore the educational repository
- Download media resource of any topic of your interest (2 each on image/audio/video).
- Comment and rate the resources on the web site

Resources Required

1. This module on E-Content and OER
2. The presentation on E-Content and OER
3. Videos on introduction to NROER
4. Write up on various OERs

Module-VII

ICT FOR COLLABORATIVE LEARNING

7.1. Introduction

ICT based collaboration is the method of collaboration between virtual team members that is carried out via technology-mediated communication. ICT based collaboration follows the same process as collaboration, but the parties involved in virtual collaboration do not physically interact and communicate exclusively through technological channels. Distributed teams use ICT based collaboration to simulate the information transfer present in face-to-face meetings, communicating virtually through verbal, visual, written, and digital means.

ICT based collaboration is commonly used by globally distributed business and scientific teams. Ideally, virtual collaboration is most effective when it can simulate face-to-face interaction between team members through the transfer of contextual information, but technological limits in sharing certain types of information prevent virtual collaboration from being as effective as face-to-face interaction. Following are the characteristics of ICT based collaboration:

- **Sharing of information:** Collaboration, by definition, is a process of assembling knowledge from different parties towards a common goal. ICT based collaboration is meant to enable the sharing of knowledge between parties who cannot exchange information due to physical separation. Virtual collaboration platforms allow the transfer of different types of information between collaborators to work towards a common goal.
- **Dispersed Collaborators:** Collaborators within ICT based collaboration are physically separated from each other and can only interact virtually. Being able to physically interact with a team member affords many benefits that virtual collaboration cannot provide, and eliminates any need for virtual meetings (sharing of context, interpersonal relationships, etc.). Collaborators can meet physically, but interaction outside of the virtual platform may change the dynamics of the collaboration and classify it as non-virtual.

- **Technology-mediated:** Because virtual collaborators cannot interact physically they use technology to share information over several mediums. Most ICT based collaboration platforms are carried out via the internet, for example email, video conferencing, and virtual workspaces. Audio conferencing can also be a means of virtual collaboration, as information is shared over a telephone or other audio device.

There are two types ICT based collaborations:

- **Synchronous:** Synchronous collaboration occurs when team members are able to share information and ideas instantaneously. Examples of synchronous virtual collaboration include instant messaging, chat rooms, and video or audio conferencing.
- **Asynchronous:** Asynchronous collaboration occurs when team members communicate without the ability to instantly respond to messages or ideas. Examples of asynchronous virtual collaboration include e-mail, discussion boards, application-specific groupware, or shared databases.

7.2: Objectives

After the completion of the module the participants are expected to;

1. Explain the concept of collaborative learning.
2. Discuss the relevance and importance of ICT for ensuring collaborative learning
3. Choose and employ appropriate platforms for collaborative learning
4. Compare the utility and limitations of different platforms for collaborative learning

7.3: Theoretical Framework

Concept of Collaborative Learning

Collaborative learning is an umbrella term for a variety of approaches in education that involve joint intellectual effort by students or students and teachers. Collaborative

learning refers to methodologies and environments in which learners at different performance level engage in a common task (like solving a problem, complete a task, or create a product etc.) in which each individual depends on and is accountable to each other. It involves use of small groups so that all students can maximize their learning and that of their peers. It is a process of shared creation: two or more individuals interacting to create a shared understanding of a concept, discipline or area of practice that none had previously possessed or could have come to on their own. According to Gerlach, "Collaborative learning is based on the idea that learning is a naturally social act in which the participants talk among themselves (Gerlach, 1994). It is through the talk that learning occurs."

A set of assumptions about the learning process (Smith and MacGregor, 1992) underlies them all:

1. Learning is an active process whereby students assimilate the information and relate this new knowledge to a framework of prior knowledge.
2. Learning requires a challenge that opens the door for the learner to actively engage his/her peers, and to process and synthesize information rather than simply memorize and regurgitate it.
3. Learners benefit when exposed to diverse viewpoints from people with varied backgrounds.
4. Learning flourishes in a social environment where conversation between learners takes place. During this intellectual gymnastics, the learner creates a framework and meaning to the discourse.
5. In the collaborative learning environment, the learners are challenged both socially and emotionally as they listen to different perspectives, and are required to articulate and defend their ideas. In so doing, the learners begin to create their own unique conceptual frameworks and not rely solely on an expert's or a text's framework. Thus, in a collaborative learning setting, learners have the opportunity to converse with peers, present and defend ideas, exchange diverse beliefs, question other conceptual frameworks, and be actively engaged.

Collaborative learning processes can be incorporated into a typical class in a variety of ways. Some require a thorough preparation, such as a long-term project, while others require less preparation, such as posing a question during lecture and asking students to discuss their ideas with their neighbours. As Smith and MacGregor state, "In collaborative classrooms, the lecturing/listening/note-taking process may not disappear entirely, but it lives alongside other processes that are based in students' discussion and active work with the course material." Regardless of the specific approach taken or how much of the ubiquitous lecture-based course is replaced, the goal is the same: to shift learning from a teacher-centred to a student-centred model.

Proponents of collaborative learning claim that the active exchange of ideas within small groups not only increases interest among the participants but also promotes critical thinking. There is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than learners who work quietly as individuals. The shared learning gives learners an opportunity to engage in discussion, take responsibility for their own learning, and thus become critical thinkers.

In nutshell, Collaborative Learning is a relationship among learners that requires positive interdependence (a sense of sink or swim together), individual accountability (each of us has to contribute and learn), interpersonal skills (communication, trust, leadership, decision making, and conflict resolution), face-to-face promotive interaction, and processing (reflecting on how well the team is functioning and how to function even better) and is based upon some principles:

- The learner or student is the primary focus of instruction.
- Interaction and "doing" are of primary importance
- Working in groups is an important mode of learning.
- Structured approaches to developing solutions to real-world problems should be incorporated into learning.

7.4: Different ICT Based Platforms and Tools used for Collaborative Learning

Google Docs and Drive

“Google Drive is a file storage and synchronization service provided by Google, which enables user cloud storage, file sharing and collaborative editing.” Google Drive, is also the host of Google Apps which includes a suite of productivity and collaboration tools. You can store any type of file on Google Drive. You can keep pictures, stories, designs, drawings, recordings, videos – anything. Your storage works with Drive, Gmail and Google+ Photos, so you can keep files, save email attachments and back-up photos directly to drive. If you have a Google account, you already have access to at least 15 GB of file storage space on Google Drive.

Google Docs is an online version of Microsoft Word, PowerPoint and Excel. In Google Docs they are called Google Document, Spreadsheet and Presentation. There are two methods in which files can be created in the Drive. The first method is by creating an empty file from scratch. This can be done by simply clicking on the “CREATE” button. The second method is by uploading an existing file onto Drive and editing it afterwards. We can only do editing on a Google Docs file and not on a Microsoft Word document. To make the document editable, click on File > Open with > Google Docs. This will save the original file as Google Docs and open up the file in a separate editor. We will now be able to make changes to the file.

One of the most powerful features of Google Docs is that it is a collaborative tool. Google Docs allows us to have multiple people editing the same files at the same time and ensure that all modification can be seen by all editors. This is useful when we have a single document that requires multiple input from different users for example program agenda.

Social Bookmarking

Social bookmarking is a centralized online service which allows users to add, annotate, edit, and share bookmarks of web documents. It’s a tagging a web page with a web-based tool so you can easily access it later. Instead of saving them to your web browser, you are

saving them to the web. And, because your bookmarks are online, you can easily access them anywhere you have an internet connection and share them with friends. In fact, social bookmarking sites are being used as intelligent search engines. Unlike file sharing, social bookmarking does not save the resources themselves, merely bookmarks that reference them, i.e. a link to the bookmarked page. Descriptions may be added to these bookmarks 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. Folksonomy is also called social tagging, "the process by which many users add metadata in the form of keywords to shared content".

This technology offers knowledge sharing solutions and a social platform for interactions and discussions. These tools enable users to collaboratively underline, highlight, and annotate an electronic text, in addition to providing a mechanism to write additional comments on the margins of the electronic document. For example, Delicious could be used in a course to provide an inexpensive answer to the question of rising course materials costs. RISAL (Repository of Interactive Social Assets for Learning) is another social bookmarking system used for supporting teaching and learning at the university level.

Social bookmarking tools have several purposes in an academic setting including: organizing and categorizing web pages for efficient retrieval; keeping tagged pages accessible from any networked computer; sharing needed or desired resources with other users; accessing tagged pages with RSS feeds, cell phones and PDAs for increased mobility; allowing librarians and instructors the capability to follow students' progress; and giving students another way to collaborate with each other and make collective discoveries.

Social Networking

A social network is defined as a chain of individuals and their personal connections and social networking is the practice of expanding the number of one's business and/or social contacts by making connections through individuals, often through social media sites

such as **Skype, Facebook, Twitter, LinkedIn and Google+**. Depending on the social media platform, members may be able to contact any other member. In other cases, members can contact anyone they have a connection to, and subsequently anyone that contact has a connection to, and so on. Some services require members to have a preexisting connection to contact other members. Social networking services are interactive Web 2.0 Internet-based applications and user-generated content, such as user-submitted digital photos, text posts, "tagging", online comments, and diary-style "web logs" (blogs), is the lifeblood of the SNS organism. Through social networking, interrelated cyber communities can be created in order to help individuals find contacts that may be useful to them but otherwise may be very unlikely for them to meet.

Instant Messaging

Instant messaging, often shortened to IM or IM'ing, is the exchange of near real-time messages through a stand-alone application or embedded software. IM sessions usually take place between two users in a private, back-and-forth style of communication. Instant messaging (IM) is a type of online chat that offers real-time text transmission over the Internet. Some IM applications can use push technology to provide real-time text, which transmits messages character by character, as they are composed. More advanced instant messaging can add file transfer, clickable hyperlinks, Voice over IP, or video chat. For IM'ing to work as intended, both users must be online at the same time, although nearly all instant messaging platforms now allow asynchronous interactions between online and offline users. Because of its messaging or even conferencing feature individually or in group it could be a good discussion and collaboration platform. Some of such platforms are **Facebook, Facebook messenger, Whatsapp** etc.

Forums

If you and your team needs to communicate outside of the office, across vast distances, or with a lot of people, a forum is the perfect facilitator. With an online interactive forum, you can post a topic, discuss critical ideas and help retain knowledge in a central place. Any group project involves discussions, and unlike emails, all forum topics are available in a central location. Through forums, exchanging information with colleagues can make

big ideas come alive. The facilities are: start a new discussion (post a topic, edit/delete a topic), engage project users (post a reply, view replies, update comments), organize topic across categories, (add a forum category, edit/delete a forum category), watch/ un-watch topics and thus provide benefits like improve decision making through access to relevant knowledge, interact with team members scattered across the globe, escalate critical bugs and get a instant solutions from experts, tap the knowledge, skills, and ideas in your team from a single place.

There are free softwares for this purpose like **phpBB**, **bbpress**, **MyBB** etc. and also websites where such forums can be started to collaborate like **<https://www.discourse.org/>**, **<https://todaysmeet.com/>**etc.

Wiki

A wiki is a website on which users collaboratively modify content and structure directly from the web browser. A wiki Web site operates on a principle of collaborative trust. The simplest wiki programs allow users to create and edit content. More advanced wikis have a management component that allow a designated person to accept or reject changes. The best known example of a wiki Web site is **Wikipedia**. In a typical wiki, text is written using a simplified markup language and often edited with the help of a rich-text editor. A wiki is run using wiki software, otherwise known as a wiki engine. A wiki engine is a type of content management system, but it differs from most other such systems, including blog software, in that the content is created without any defined owner or leader, and wikis have little implicit structure, allowing structure to emerge according to the needs of the users.

Blog

"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 and may include images videos also. Blogs range from the personal to the political, and can focus on one narrow subject or a whole range of

subjects. A blog is basically a journal that is available on the web. The activity of updating a blog is “blogging” and someone who keeps a blog is a “blogger. During the new blog creation process, you may be asked whether you want to make your blog private. If you use WordPress.com, you’ll find that there’s a theme called **P2** that’s especially suited for turning your new blog into a collaboration tool. It can be applied to your blog by selecting the “Appearances” menu and then the “Theme” menu. Once your collaboration site is set up and marked as private, the next step is making it accessible specifically to those team members who will be working on your project. On **Blogger**, you’ll find your access settings on the “Permissions” menu, underneath the “Settings” menu. You can add blog authors as well as blog readers there. On **TypePad**, you can invite people to contribute to your blog over email in the “Authors” page under the “Edit Configuration” menu. Similarly, on a **WordPress.com** blog, you have the ability to add more people to the site. You’ll be asked for their name and email address, as well as to choose a role. Because of the way that different user roles work within **WordPress**, you’ll likely want to make most of your team members either Editors or Authors; Administrators can change anything about your collaboration site, Editors can add, edit or remove any content and Authors can only add, change or remove their own content.

7.5. Different Platforms and Tools for Collaborative Learning

These tools and/or platforms are context specific and are used according to need as well as expertise of the user. Some of them are communicating tools where as others are collaborative tools.

Google docs are communicating as well as collaborative tool. It can be used for instant developing, organizing and editing of text etc. However, unlike wiki content can be edited by those who are permitted for that whereas in wiki anybody can edit or update the content which can be further edited by the others. Instant messaging can be used for discussion but content cannot be edited.

Social bookmarking or tagging are useful to communicate the intended material that is available on internet. Instead of downloading and sending the large content to others a hyperlink is sent which points to a whole document or to a specific element within a

document which may have a hypertext even. It can be used for blending purpose in the classroom.

Blogs can be used for discussion, commentary or for arguments. However content can't be edited.

7.6: Limitations of different Platforms and Tools for Collaborative Learning

No tool is free from limitations. These limitations may be because of usability, flexibility, ease, etc.

In **Blogs** confidentiality and quality are major concern. All the postings go to public unless the site owner limits the access. It's time consuming and involves a lot of efforts to maintain the quality of the site quality and keep it on task. Users can be distracted easily. Once the students get connected with blogs or wikis, they also have access to the entire virtual world and can get diverted away from their tasks easily. Lack of listening and speaking skill training. The activities are mainly conducted in text writing. Not all language skills can be comprehended in blogging or wiki related coursework, especially in listening and speaking.

Similarly, **Wiki** platforms have a bit of a learning curve. You have to dig in to learn how to use it. It can turn people off. Moreover, A wiki is good for search they don't actually provide tools for project management. If a member of a project group has 10 things to do, a wiki is not the tool that will tell that person the next step. Wikis' major technology weakness are their substandard ability to import or export data from and to external data sources. Security is another issue.

In social **book-marking** informal vocabularies are the problem 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), 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, and 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). Moreover spam and corruption is also a problem and social bookmarking is susceptible to corruption and collusion. Due to its popularity, some users have started considering it as a tool to use along with search engine optimization to make their website more visible. The more often a web page is submitted and tagged, the better chance it has of being found. Spammers have started bookmarking the same web page multiple times and/or tagging each page of their web site using a lot of popular tags, obliging developers to constantly adjust their security system to overcome abuses.

Google offers **Google Docs** as a free alternative to Microsoft Word and Docs is compatible with Word documents, but the free word processor lacks some features, such as support for multiple columns. Docs runs completely from the Internet, which causes some limitations to file availability. Google Docs includes most of the same features as Microsoft Word, but not everything works identically between the two programs.

Some of the obvious disadvantages of ICT based collaboration are

1. **Lack of Face-To-Face Interaction:** While online collaboration through video conferencing provides real-time communication between people, it lacks the aspect of face-to-face interaction. For instance, meeting participants cannot argue with one another simultaneously over the online platform because of longer lag times. That may sometimes limit the level of engagement of the employees in an online meeting. And when the quality of video stream is poor, it's difficult for meeting attendees to decipher facial expressions and body language of the presenter.
2. **Possibility of Network Failure and Equipment Breakdown:** Disconnection from the internet bars attendees from participating in collaborative efforts.
3. **Language and Cultural Differences:** Differences in language and culture can limit the engagement of employees working in different regions. That means online collaboration cannot offer meaningful solutions in this case.
4. **Incidences of Group Think:** There is always the threat of group think, where stronger personalities may take over the discussions, persuade and supplant the ideas of others.

That might end up lowering the performance as important ideas may be left out in the process.

Activities for the Trainer

Activity-1: Presentation and group discussion- The trainer will present the concepts of collaboration and role of ICT for collaboration along with relevant tools and platforms and follow it with group discussion on all the concepts, relevance, sources and limitations of ICT based collaboration and associated tools. (60 minutes).

Activity-2: Reflection on the possibility and scope for ICT based collaboration and its tools/ platforms. (30 minutes)

Activity-3: Participant will give hand on try to various tools/ platforms for collaboration among themselves. (90 minutes)

Activity-4: The trainer will engage the participants to discuss over ease and applicability of these tools in their workplace after experiencing. (30 minutes)

Resources Required

- This module on ICT based collaboration
- A presentation on ICT based collaboration
- Internet connection and computers so that participant can participate in hands on try out.

Module-VIII

MOBILE BASED APPLICATION FOR LEARNING

8.1: Introduction

A mobile based application for learning most commonly referred to as an app, is a type of application software designed to run on a mobile device, such as a smart phone or tablet computer. Mobile applications frequently serve to provide users with similar services to those accessed on PCs. Apps are generally small, individual software units with limited function. This use of software has been popularized by Apple Inc. and its App Store, which sells thousands of applications for the iPhone, iPad and iPod Touch. A mobile application also may be known as an app, Web app, online app, iPhone app or smart phone app.

8.2: Objectives

After the completion of the module the participants are expected to;

1. Explain concept of Mobile Based Application for Learning.
2. Discuss the relevance and importance of MBAL.
3. List and evaluate different MBAL.
4. Discuss the advantage and the limitations of MBAL.
5. Explore different pedagogical approaches using MBAL
6. Use some mobile based application in a particular subject.
7. Explore various mobile based utility application

8.3: Theoretical Framework

Concept of Mobile Based Application for Learning (MBAL)

Teaching learning is a continuous process and this concept exists since time immemorial. There is a paradigm shift in transaction of knowledge from ancient age to modern era i.e. from Gurukul/Ashrams to latest Global schools as sites of learning. Application of ICT has brought a revolution in the field of teaching learning and has transformed the traditional methods of teaching (Chalk and Talk) into latest practices of classroom transaction based on modern ICT based approaches. With the changing

framework of time now android mobile has become a common device for normal uses like calling, chatting on whatsapp, checking facebook status, sending e-mails and many more.

Now here is a moot question that if people are user friendly and comfortable with android handsets then why it can't be used as learning device?

Let us explore android mobile as wonderful learning device and teacher as a facilitator in normal classroom situation.

Here we will learn about some Mobile Based Application for Learning.

Importance of MBAL

MBAL has got a number of advantages

- 1) Enhanced interaction
- 2) Universal availability
- 3) Utilization of leisure hour
- 4) Systematic learning
- 5) Portability
- 6) Sustainability
- 7) Latest updates
- 8) Easy evaluation

MBAL is not only latest approach for classroom transaction in a particular subject but it is relevant for all most all disciplines. There are numerous apps like translators and dictionaries which allow us to quickly look up terms and meaning going beyond that one can continue working anywhere anytime. One of the highlights of mobile based applications for learning apps is that it encourages self-learning. These little downloads provide a range of possibilities that allow for learning beyond the boundary walls of classroom. This can also be used to create videos or podcasts. An important online lecture coming up may be saved on You Tube channel for future use at desired time and destination. Access can be also made to keep latest updates and information on any discipline.

1. Usage of different MBAL- identifying, downloading, uploading, installing ...e-pathshala, SWAYAM, (To be explained with the help of video).
2. Pedagogical application of MBAL- Assessment, Group/Individual/pair work, assignment, projects.
3. Limitations of MBAL-

Today, moving away from the traditional classroom, more and more people are making use of technology for learning purposes. People are recognizing the benefits of mobile learning, hence, the approach becoming more of standard rather than an exception.

Disadvantages of MBAL

Let's take a look at some of the disadvantages of MBAL, and why it may not always be the best option for classroom transaction.

- No self-discipline.
- No face-to-face interaction.
- Lack of flexibility..
- Slow evolution..
- Lack of transformational powers

8.4: Mobile Based Utility Application

Portable Document Format (PDF)

PDF files can contain not only images and text, but also interactive buttons, hyperlinks, embedded fonts, video, and more. You'll often see product manuals, eBooks, flyers, job applications, scanned documents, brochures, and all sorts of other documents available in the PDF format. Because PDFs don't rely on the software that created them, nor on any particular operating system or hardware, they look the same no matter what device they're opened on.

Opening a PDF File

Most people head right to Adobe Acrobat Reader when they need to open a PDF. Adobe created the PDF standard and its program is certainly the most popular PDF reader out

there. It's completely fine to use it, but I find it to be a somewhat bloated program with lots of features that you may never need or want to use.

Most web browsers, like both Chrome and Firefox, can open PDFs themselves. You may or may not need an add-on or extension to do it, but it's pretty handy to have one open automatically when you click a PDF link online. It is highly recommend Sumatra PDF or Mu PDF if you're after something a bit more. Both are free.

Editing a PDF File

Adobe Acrobat is the most popular PDF editor, but Microsoft Word will do it too. Other PDF editors also exist, like Phantom PDF and Nitro Pro, among others.

Form Swift's Free PDF Editor, PDF escape, Doc Hub, and PDF Buddy are a few free-to-use online PDF editors that make it really easy to fill out forms, like ones you sometimes see on a job application or a tax form.

Just upload your PDF to the website to do things like insert images, text, signatures, links, and more, and then download it back to your computer as a PDF.

See our Best Free PDF Editors list for a regularly updated collection of PDF editors if you're after something more than just form filling, like adding or removing text or images from your PDF.

Converting a PDF File

Most people wanting to convert a PDF file to some other format are interested in doing that so they can edit the contents of the PDF. Converting a PDF means that it will no longer be a PDF, and instead will open in a program other than a PDF reader.

For example, converting a PDF to a Microsoft Word file (DOC and DOCX) lets you open the file not only in Word, but also in other document editing programs like Open Office and Libre Office. Using these types of programs to edit a converted PDF is probably a much more comfortable thing to do, compared to an unfamiliar PDF editor, like one of the programs I mentioned above.

If you instead want a non-PDF file to be a .PDF file, you can use a PDF *creator*. These types of tools can take things like images, eBooks, and Microsoft Word documents, and export them as PDF, which enables them to be opened in a PDF or eBook reader.

Saving or exporting from some format to PDF can be accomplished using a free PDF creator. Some even serve as a PDF printer, allowing you to virtually "print" pretty much any file to a PDF file. In reality, it's just a simple way to convert pretty much anything to PDF. See [How to Print to PDF](#) for a full look at those options.

Some of the programs from the links above can be used in both ways, meaning you can use them to both convert PDFs to different formats as well as to create PDFs. Caliber is another example of a free program that supports converting to and from an eBook format. Also, many of the programs mentioned can also merge multiple PDFs into one, extract out specific PDF pages, and save just the images from the PDF.

Form Swift's [Free PDF to Word Converter](#) is one example of an online PDF converter that can save PDFs to DOCX.

See these [Free File Conversion Programs and Online Services](#) for other ways to convert a PDF file to some other file format, including image formats, HTML, SWF, MOBI, PDB, EPUB, TXT, and others.

Securing a PDF

Securing a PDF may include requiring a password to open it, as well as preventing someone from printing the PDF, copying its text, adding comments, inserting pages, and other things.

PDF Protect!, Foxy Utile and some of the PDF creators and converters linked to from above - like [PDF Mate PDF Converter Free](#), [Primo PDF](#), and [Free PDF Creator](#) - are just some free applications out of many that can change these types of security options.

Cracking a PDF Password or Unlock a PDF

Though protecting a PDF file with a password is recommended in some circumstances, you may end up forgetting what the password is, disabling access to your own file.

If you need to remove or recover the PDF owner password (the one that restricts certain activities) or PDF user password (the one that restricts opening) on a PDF file, use one of these [Free PDF Password Remover Tools](#).

Still Having Problems Opening or Using a PDF File

See [Get More Help](#) for information about contacting me on social networks or via email, posting on tech support forums, and more. Let me know what kinds of problems you're having with opening or using the PDF file and I'll see what I can do to help.

Scanning

Scan to PDF or convert JPEG files to PDF

1. Within Acrobat, click on the Enhance Scans tool in the right pane.
2. Choose from Select a File or Scan a Document, and click Start. You'll be prompted to select a JPEG, TIFF, or other image for conversion, or presented with a document scanning view.
3. Click on the Recognize Text icon, select a page range and language for text recognition, and click Recognize Text. Acrobat creates a layer of text in your PDF that can be searched - or copied and pasted into a new document.
4. Click on the Correct Suspects icon (magnifying glass). Acrobat identifies suspected text errors and displays the image and text side by side.
5. Correct mistakes as needed. Click Accept for each correction, and Done when the task is complete.

Graphics

Graphic organizers are important and effective pedagogical tools for organizing content and ideas and facilitating learners' comprehension of newly acquired information. Gardner's *Theory of Multiple Intelligences* posits that students are better able to learn and internalize information when more than one learning modality is employed in an instructional strategy. Since graphic organizers present material through the visual and spatial modalities (and reinforce what is taught in the classroom), the use of graphic organizers helps students internalize what they are learning.

For today's classroom, nothing is more essential to successful teaching and learning than strategy-based instruction. It is through the use of specific teaching strategies and learning tools that students can be more successful learners. Graphic organizers are

teaching and learning tools; when they're integrated into classroom experiences, students are better able to understand new material. Creating a strong visual picture, graphic organizers support students by enabling them to literally see connections and relationships between facts, information, and terms.

Audio File

An audio file format is a file format for storing audio. There are various audio file formats and they all encode audio data in different ways. There are two different approaches; compressed or non-compressed formats. Other differences between formats include licenses. Let take a closer look at these differences and which formats suit which purposes best.

Uncompressed formats

Uncompressed audio formats are always lossless, meaning that all original audio information is retained. If you have unlimited storage space, an uncompressed - or lossless - file format is the way to go. While working with audio (ie making music), also stick with uncompressed formats.

There are two main format options here, AIFF and WAV. Neither of these requires a license to use.

Our recommendation is to use WAV as it is more widely used and supported.

Uncompressed audio in CD-quality (sample rate of 44.1 kHz and a bit depth of 16 bits) takes about 10MB for one minute of stereo audio.

Compressed formats

Compressed audio formats are primarily lossy formats, meaning that audio information is reduced. If you want to distribute your audio over the internet, a compressed format is your best option.

Although MP3 is very popular, it does require a license, even for audio distribution.

OGG is a free alternative unrestricted by licensing.

Both MP3 and OGG are lossy, meaning that they don't fully reproduce the original audio file, ie. there is a loss of audio quality.

If you want to be sure that you can recreate the information, but still save space, use the open FLAC format. This is an example of a lossless compressed file format. It is compressed differently to lossy file formats and is a good compromise as it retains all audio information but still at a reduced file size, although it will still be larger than an MP3 or OGG file.

Compressed audio in MP3 or OGG format takes about 1 MB/minute of stereo audio. FLAC files are typically 50% of the original size compared to an uncompressed file.

Video File

A video file format is a type of file format for storing digital video data on a computer system. Video is almost always stored in compressed form to reduce the file size.

A video file normally consists of a container format (e.g. Matroska) containing video data in a video coding format (e.g. VP9) alongside audio data in an audio coding format (e.g. Opus). The container format can also contain synchronization information, subtitles, and metadata such as title. A standardized (or in some cases de facto standard) video file type such as .webm is a profile specified by a restriction on which container format and which video and audio compression formats are allowed.

The coded video and audio inside a video file container (i.e. not headers, footers and metadata) is called the essence. A program (or hardware) which can decode video or audio is called a codec; playing or encoding a video file will sometimes require the user to install a codec library corresponding to the type of video and audio coding used in the file.

Good design normally dictates that a file extension enables the user to derive which program will open the file from the file extension. That is the case with some video file formats, such as Web M (.webm), Windows Media Video (.wmv), and Ogg Video (.ogv), each of which can only contain a few well-defined subtypes of video and audio coding formats, making it relatively easy to know which codec will play the file. In contrast to that, some very general-purpose container types like AVI (.avi) and QuickTime (.mov) can contain video and audio in almost any format, and have file extensions named after

the container type, making it very hard for the end user to use the file extension to derive which codec or program to use to play the files.

Access Point

In a wireless local area network (WLAN), an access point is a station that transmits and receives data (sometimes referred to as a transceiver). An access point connects users to other users within the network and also can serve as the point of interconnection between the WLAN and a fixed wire network. Each access point can serve multiple users within a defined network area; as people move beyond the range of one access point, they are automatically handed over to the next one. A small WLAN may only require a single access point; the number required increases as a function of the number of network users and the physical size of the network.

Activities for the Trainer

Activity 1: Reading and group discussion – The trainer will ask the participant to read the modules of MBAL and follow it with group discussion on all the concept, Advantages, Relevance and importance of MBAL.

Activity 2: The trainer will ask the participants to discuss Download, Uploading, Installing & Uninstalling different MBAL followed by hands on practice & supported by video.

Activity 3: Group Discussion on pedagogical integration including demo by different groups and presentation of at least one from each group.

Activity 4: Exploring different MBAL – E-Pathshala, Swayam & Gyankosh etc.

Activity 5: Demonstration and hands on- Using cam-Scanner/Graphics.

Activity 6: Group Work

- Group 1- Explore Android Application- Identifying, Evaluating, Listing (Subject wise)
- Group 2- Explore Android Application- Identifying, Evaluating, Listing (Subject wise)
- Group 3- Explore Android Application- Identifying, Evaluating, Listing (Subject wise)

Resources Required

- Modules on MBAL.
- Presentation of MBAL.
- Videos on introduction & Application of MBAL.
- Write up on PDF, Scanning, Audio File, Video File & Access Point
- Exhaustive list of different MBAL.
- The trainer must have used different MBAL.

ICT IN ASSESSMENT OF LEARNING

9.1: Introduction

Today's world is a world of technology and education is not indifferent to it. Nowadays, Information and Communication Technology (ICT) is used in every aspect of educational process, ranging from admission to assessment. However, the role of ICT in assessment is not much harnessed by the educational functionaries and stakeholders. Assessment is as important as teaching. Without it, we cannot ascertain the progress of the student. Though it's not liked by many, however, it cannot be avoided or removed from the educational system. Therefore, there is an urgent need to focus on the potential of ICT to be used in assessment in particular and educational process in general to make teaching learning, especially, assessment process easy and attractive. For this, the burning issue is an examination reform as suggested by NCF 2005.

ICT can enable a number of interactive applications, supported by databases, which can store and facilitate search and query. A number of applications have been developed to assess and evaluate products and processes. Examples can range from-

- Simple question banks,
- Automatically generated question papers,
- Online tests,
- Automated assessment and
- Feedback.

Leveraging these applications for education can result in improved practices of tests and examinations. They can not only reduce the time involved but also spare that time for the much-needed academic input. Supported by audio-visual and interactive media it can enhance the range of questions, particularly the testing of higher order questions, which do not easily lend themselves to paper pencil tests. At a systemic level, an automated examination service can facilitate on demand examinations, allowing students to take the examination multiple times, without any increase in the administrative processes.

ICT can be utilized for continuous comprehensive evaluation. Designing databases, which can store student records of performance; longitudinal tracking of students can be undertaken more efficiently and guiding students towards improved performance in different areas of growth and development. It would not be possible for a large school system to make drastic changes. It would therefore be necessary to engage with the concept of examination reform, identifying various issues.

9.2. Objectives

After the completion of the module the participants are expected to;

1. Explain the uses of ICT for assessing learning
2. Develop skills and competencies of using different ICT tools for assessing learning

9.3. Theoretical Framework

ICT Tools for Assessment

9.3.1 Digital 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 input text, electronic files, images, multimedia, blog entries, and hyperlinks.

- Mahara (<http://mahara.org/>) is customizable and flexible. It is the perfect personal learning environment mixed with social networking, allowing you to collect, reflect on and share your achievements and development online in a space you control.
 - Portfolio artifacts
 - News letter
 - Project report
 - Blog posts etc.
- Google sites (<https://sites.google.com/>)
- PortfolioGen (<http://www.portfoliogen.com/>)

- Pathbrite (<https://pathbrite.com/#maker>)
- **Online reflective journal** for Peer Assessment using <http://edublogs.org/>

9.3.2. Digital Rubrics

A rubric is a scoring tool used to evaluate and assess a set list of criteria and objectives. Rubrics are often used as a way to evaluate work that is subject to the evaluator's personal feelings, prejudices or interpretations.

- Annenberg Learner
(http://www.learner.org/workshops/hswriting/interactives/rubric/?utm_campaign=elearningindustry.com&utm_source=%2Fthe-5-best-free-rubric-making-tools-for-teachers&utm_medium=link)
- EssayTagger Common Core Rubric Creation Tool
(http://www.essaytagger.com/commoncore?utm_campaign=elearningindustry.com&utm_source=%2Fthe-5-best-free-rubric-making-tools-for-teachers&utm_medium=link)
- iRubric
(https://www.rcampus.com/indexrubric.cfm?utm_campaign=elearningindustry.com&utm_source=%2Fthe-5-best-free-rubric-making-tools-for-teachers&utm_medium=link)
- RubiStar(<http://rubistar.4teachers.org/>)
- Chalkup (<http://blog.chalkup.co/how-to-grade-assignments-with-a-digital-rubric-in-chalkup>)
- edtechtteacher(<http://edtechtteacher.org/assessment/>)
- TeAchnology General Rubric Generator
(http://www.technology.com/web_tools/rubrics/general/?utm_campaign=elearningindustry.com&utm_source=%2Fthe-5-best-free-rubric-making-tools-for-teachers&utm_medium=link)

9.3.3. Mobile Apps for Assessment

For most educators, the Common Core State Standards mean next-generation assessments. Fortunately 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.

Here are 10 top-rated mobile assessment apps that are being used to help teachers fulfill the all-important role of observing and assessing their students in a way that is authentic, informative, and engaging.

- Nearpod (<https://nearpod.com/>)
The Nearpod platform enables teachers to manage content on students' devices. It combines presentation, collaboration, and real-time assessment tools into one integrated solution.
- GoClass (<https://www.goclass.com/>)
GoClass allows teachers to create lessons and share them with their students, then track how students are using the lessons. To check for student understanding, the teacher can post a question or poll and get immediate feedback.
- Socrative (<https://www.socrative.com/>)
Socrative 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.
- Edmodo (<https://www.edmodo.com/>)
Teachers can use Edmodo to create and assign quizzes, have students upload files to electronic portfolios, or conduct class discussions for formative assessment. This classroom-management app makes it easy for teachers and students to stay connected and share information.
- ClassDojo (<https://www.classdojo.com/>)
Class Dojo helps teachers improve behavior in their classrooms by capturing and generating data on behavior and creating behavior incentives with students. Data can be shared with parents and administrators.

- **Lino** (<http://en.linoit.com/>)
Lino is a virtual corkboard of sticky-notes so students can provide questions or comments on their learning. These can be used like exit tickets or during the course of a lesson for formative assessment.
- **Poll Everywhere** (<https://www.polleverywhere.com/>)
Teachers can create a feedback poll or ask formative assessment questions. Students respond in various ways, using mobile devices, and teachers see the results in real-time.
- **Google Forms** (<http://www.google.com/google-d-s/forms/>)
Teachers can use Google Forms to create their own survey-style data-entry forms. Results from the assessment can be viewed as a graph or easily exported in different formats, including PDF, Excel spreadsheet, and Word document.
- **Kidblog** (<https://kidblog.org/home/>)
Kidblog is a student-friendly blog site with features that are easy to learn. Teachers can monitor blog activity and view a digital anthology of student work to easily assess progress through the year.
- **Evernote** (<https://evernote.com/>)
Evernote is a useful app for gathering anecdotal evidence for assessment. Teachers can make notes, take photos, and record audio of the work that students are doing. Notes can be tagged and easily share with colleagues.

9.3.4. Concept Map

Concept-mapping—or mind-mapping, idea-mapping, or some other variation that makes sense to you—is the practice of demonstrating the relationship between ideas in a map-like form.

Concept-mapping allows creators to articulate nuance, context, and interdependence between ideas in a very user-centered way. This makes them especially useful in education, whether you use them for pre-writing, research notes, or “back-mapping” a unit or unit assessment. They encourage macro-thinking, can provide a bridge to struggling writers who have trouble turning their thinking into prose, and are a powerful tool for visual learning.

- Coggle
(https://coggle.it/?utm_campaign=elearningindustry.com&utm_source=%2F6-best-mind-mapping-tools-creative-students&utm_medium=link)
Coggle is an online mind map that you can use in Chrome. It comes in three flavors. These are "free", "awesome" and "organization". It has quite a lot of functionality and allows you to mind map in different colors!
- Imindq
(https://www.imindq.com/imindq/utm_medium/link?utm_campaign=elearningindustry.com&utm_source=%2F6-best-mind-mapping-tools-creative-students) If you want to pay for mind mapping software you should go for Imindq. It's got a free trail if you want to try it out for a while.
- FreeMind
(http://freemind.sourceforge.net/wiki/index.php/Main_Page?utm_campaign=elearningindustry.com&utm_source=%2F6-best-mind-mapping-tools-creative-students&utm_medium=link)
FreeMind is a good choice for working offline. It's open source.
- MindMapple
(http://www.mindmapple.com/?utm_campaign=elearningindustry.com&utm_source=%2F6-best-mind-mapping-tools-creative-students&utm_medium=link)
MindMapple is a great choice as well, particularly for visual thinkers as it also allows you to use clip art and other visual stuff like that. Another great aspect is that you can cloud share it via Google Drive. As the name gives away, it also works for macs.
- Sketchboard
(https://sketchboard.io/?utm_campaign=elearningindustry.com&utm_source=%2F6-best-mind-mapping-tools-creative-students&utm_medium=link)
Sketchboard is more a sketch board than a mind map, but can still be used as a mind map and gives you slightly more flexibility besides. And it allows you to draw pretty pictures as well, which is definitely a bonus if that's what you like to do. Mindmaps are awesome, but they're even nicer if you've got nice pictures to

go along with them. And that makes Sketchboard one of the best websites for this kind of thing.

9.3.5. Survey Tools

Online surveys are a great way to engage your audience and get feedback from them. Making an online survey is easy – there are many great online survey creators out there to help you craft that super survey.

- Survey Monkey (<https://www.surveymonkey.com/>)

In the free version, you'll get- 10 questions, 100 respondents, 15 question types, Light theme customization and templates. The system is well designed, pretty easy to use, and you can embed surveys.

- Typeform (<https://www.typeform.com/>)

Typeform's interface is elegant and its style is attractive, reflecting the company's motto, "Asking questions should be easy, human, and beautiful." The free version, nicknamed the CORE plan, has a ton to offer, including: Unlimited questions, Unlimited answers, Data export, Custom design themes or choose from templates and basic reporting.

- Google Forms (<https://www.google.com/forms/about/>)

Some awesome features of Google Forms: Unlimited surveys, Unlimited respondents, Survey answers and data are automatically collected in Google Spreadsheets, Lots of theme options, Add your own custom logo, Add images or videos, Skip logic and page branching, Embed survey into emails or website, Add collaborators and 100% free! Google Forms is the only free online survey tool that provides free skip logic, which is pretty awesome. This will probably be the first pick for most.

- Zoho Survey (<https://www.zoho.com/survey/>)

Zoho Survey is another decent free survey creator offering. The free version gives you: Unlimited surveys, 15 survey questions and 150 responses.

- Survey Gizmo (<https://www.surveygizmo.com/>)

Survey Gizmo creates some snazzy looking surveys, and they're a great choice, even with the free version, so long as you don't plan on getting a ton of respondents. The free

version offers: Unlimited surveys and questions, 50 respondents, Several basic question types, Free templates, Basic reporting and Option to export to CSV.

- Survey Planet (<https://www.surveyplanet.com/>)

The free version of Survey Planet is pretty robust, offering: Unlimited surveys, Unlimited questions, Unlimited respondents, Survey theme options and Survey embedding.

- Easy Test Maker (<http://www.easytestmaker.com/>) Develop and conduct a traditional multiple-choice **online test**.
- Polldaddy(<https://polldaddy.com/>) offers unlimited surveys and responses for free.

9.3.6. Hot Potatoes

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. This software can be downloaded and used for test making purpose.

Conclusion

It is established that the speed and accuracy can be many times increased if technology is used. Its uses reduce our labour with many more other advantages. Therefore, schools need to be equipped with these facilities to introduce the culture of ICT in examinations.

References

- Harding, R., & Raikes, N. (2002). ICT in Assessment and Learning: The Evolving Role of an External Examinations Board, 1–13.
- Khalilov, C., State, T., & Admission, S. (2007). Use Ict in Test Examinations’
- <https://www.clarity-innovations.com/blog/lfisher/create-engage-and-assess-mobile-assessment-apps>
- <https://elearningindustry.com/6-best-mind-mapping-tools-creative-students>
- <https://www.wordstream.com/blog/ws/2014/11/10/best-online-survey-tools>

Module-X

ICT FOR ADMINISTRATION AND PROFESSIONAL DEVELOPMENT

10.1: Introduction

Today the world is encompassed with the technology. It has made the life easy and reduced the pace of efforts the people used to do in earlier. 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 21st 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. As per the school administration is concerned, teachers play a vital role. It is equally important that teacher should know that how to manage the school activities being organised in the school at different point of time. Having the knowledge of ICT can maximise the outcomes of the school. ICT is the tool which can help the teachers to maintain the students' records, helps in scheduling of time table, calendar, Examination. Connecting with parents via different media is most important aspect of establishing communication with parents. It keeps the parents in touch with the teachers and with the administration of the school. For a quality management and administration and professional development of the teachers it requires the knowledge of different ICT tools of management and administration.

10.2: Objectives

After the completion of the module the participants are expected to;

1. Describe the concept of Educational administration and professional development
2. Use ICT for keeping different students records

3. Use different softwares and applications for scheduling
4. Discuss the use of ICT for connecting with parents, community and with staff members
5. Explain uses of ICT tools for professional development
6. Develop a technology plan for the school

10.3: Theoretical framework

10.3.1. Concept of Educational Administration

Education sector is one of the largest sector contributes in the development and growth of the individual and to meet the needs of Society. Education involves the activity of a large number of people - students, teachers, parents and the public. For the effective working of such a system we need a sound machinery to run it and effective principles to secure efficiency. There is need for the co-operative activity of all participants in the educative process for the achievement of its goals. It is the task of administration to set up such machinery and make it work smoothly and effectively. The scope of educational administration therefore extends to a vast area and a large variety of activities organised in the schools and outside the school.

According to National Society for the Study of Education (NSSE) “Educational Administration is a social statesmanship which guides educational activities, plans, programmes, facilities, and provides leadership in a long-term but broad social perspective.”

Educational Administration has been defined by R. Mort as, “ the influencing of one group of human beings, the pupils, to grow towards defined objectives, utilising a second group of human beings, the teachers, as agents and operating in a setting of a third group of public, variously concerned both with objectives and with means used to achieve them.”

Russell T. Gregg, in an article on Administration in Encyclopaedia of Educational Research writes, “Educational Administration is the process of utilising appropriate materials in such a way as to promote effectively the development of human qualities. It

is concerned not only with the development of children and youth, but also with the growth of adults and particularly with the growth of school personnel.”

Educational Administration is the service associated to the school and society in the task of achieving the educational goals by co-ordinating the efforts of the stakeholders engaged in the task. The concept of Educational Administration can better be understood by giving the reflections on the functions those performed under educational administration. These are as follows:

1. One of the function of Educational administration is to delegate authority and responsibility
2. Strengthening the local initiative and local control.
3. To implement a democratically determined programme.
4. To determine policies and to implement them.
5. To utilise maximally the special capacities of the personnel and the material resources.
6. Establishing educational purpose by expressing them in the form of aims and a program of work to be accomplished.
7. It is one of the functions of Educational administration is to make coordination with all the stakeholders of the school system including parents and community members.
8. To conduct and manage all the activities organised by the school both inside and outside.
9. To manage all the academic and non-academic activities etc.

10.3.2. Concept of Professional Development

In education, the term **professional development** may be used in reference to a wide variety of specialized training, formal education, or advanced professional learning intended to help administrators, teachers, and other educators improve their professional knowledge, competence, skill, and effectiveness. Along with this professional development for educators encompasses an extremely broad range of topics and formats. There are different programmes organised and funded by the central and state

government for the professional-development of the teachers. They may be organised in the form of conferences, workshops, capacity building programmes, seminars, orientation programmes, refresher courses, and other training programmes.

The following are the areas associated with the professional development of educators;

- Initiatives of development in a teacher's subject area—e.g., learning new scientific theories, expanding knowledge of different historical periods, or learning how to teach subject-area content and concepts more effectively.
- Training or mentoring in specialized teaching techniques that can be used in many different subject areas, such as differentiation (varying teaching techniques based on student learning needs and interests) or literacy strategies (techniques for improving reading and writing skills), for example.
- Earning certification in a particular educational approach or program, usually from a university or other credentialing organization, such as teaching Advanced Placement courses or career and technical programs that culminate in students earning an industry-specific certification.
- Developing technical, quantitative, and analytical skills that can be used to analyze student-performance data, and then use the findings to make modifications to academic programs and teaching techniques.
- Learning new technological skills, such as how to use interactive whiteboards or course-management systems in ways that can improve teaching effectiveness and student performance.
- Improving fundamental teaching techniques, such as how to manage classroom activities effectively or frame questions in ways that elicit deeper thinking and more substantive answers from students.
- Knowing to working with colleagues, such as in professional learning communities, to develop teaching skills collaboratively or create new interdisciplinary courses that are taught by teams and groups
- Developing specialized skills to teach better to certain populations of students, such as students with learning disabilities.

- To acquire leadership skills, such as skills that can be used to develop and coordinate a school-improvement initiative or a community-volunteer program.
- Pairing new and beginning teachers with more experienced “mentor teachers”
- Conducting action research
- Earning other certificate courses etc.

10.3.3. ICT for Student 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.

It is important for the teacher to keep the record of all the activities and programmes organized in the institution and some of the official records teacher has to maintain. The most convenient way of keeping the schools record is computer. Teacher can make their task easier by using the MS Office. Creating files (record files) in MS word and Excel is most convenient way. All the files (audio, video and other documents) can be stored in the computer by creating the different folders.

Take a look that how to create a folder

1. On the desktop (main screen), right click the My Computer icon.
2. Select Explore from the list that appears.
3. The screen will change, exposing a window with two panes. On the left is a list of all your drives and on the right is a list of the drives sorted in categories.
4. To keep things simple we are going to create a folder in My Documents. Click My Documents.

5. The screen changes. The left side of the window lists all the folders already in the My Documents folder. On the right is a list of the existing folders in My Documents.
6. Right click in any empty space in the right pane.
7. Select New from the list and it will expand. Select Folder from the new list.

A new folder is created at the bottom of the list of files and folders with the name New Folder. It will be highlighted if you haven't moved the mouse.

8. Hit Enter key and the folder will have the new name you typed. That's it. You are done.

You are requested to watch the video which would help you to create the folders and different files. The link is given below:

(<https://www.youtube.com/watch?v=QpncRWAR6pk>).

The other records of school (scholastic and co-scholastic) can be kept by using the word and Excel. You are requested to watch the video which would help you in using the same.

The links are given below:

1. <https://www.youtube.com/watch?v=LQ1tsqriGfE>
2. <https://www.youtube.com/watch?v=wOvPoNDqCXw>

10.3.4. ICT for 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, organize 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.

Timetable

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 is various time table generator software which can be used in schools. Teacher can use the different applications and software to schedule the time table for whole session and even

on the seasonal basis. There are different applications which can prove beneficial for them. e-school app is one of them.

Create time table by using the application

User may create different templates to suit multiple teaching sessions at the school. All the classes' timetables are maintained in the system, each staff timetable with information such as subjects taught and free periods could easily be viewed or printed as and when required. Time tables can be generated or sorted out by various means i.e. Class Wise, Teacher wise, etc. Substitutions can also be managed easily with immediate information on any staff that has free periods.

Generate Timetable:-You can generate the time table in the GENERATE TIMETABLE segment. When you will open the segment you will see step by step process for generation of time table.

- In the Step 1 select the season for which you have to generate the time table.
- When you will click on Go, a table will open under the Definition of Special Periods.
- Select class for which you have to define special period and click on Go.
- The table will show all the periods which you configured earlier in teaching periods section.
- Enter the period which you want to be there like yoga, or dance or anything like that which you to be on exactly that period you can mention it there.
- After entering all the special periods, click on Submit.
- If you want to copy that data to another class then select the class and click on Copy this Data to all Section For Selected Classes.
- After defining the Special Period next step is to define Teacher Engaged Period.
- In this step you can define the engagement of the teacher if he/she is busy on some other work or handles some more responsibilities as well other than teaching then you can mention that here.

- Select the teacher or staff member from the drop down menu, and enter for which period he/she is engaged.
- The use for defining that is this system will not generate period for that teacher at that time.
- After doing all that configuration, and following all the step by step process , the last thing is to Generate.
- Select the classes for which you have to generate the Time Table and click on Generate.
- You can see the logs and processes the system does while generating the Time Table.

Class Wise Timetable: After the full process of configuring and generating the time table, you can view the time table from this segment. In this segment as the name denotes you can view Class Wise Timetable and also export it in pdf form.

- Select the season and the class for which you want to view the time table.
- Click on Go. The time table of that class will be displayed below.
- If you want to take out and save the class wise time table of all the classes then click on Export All to PDF button.
- The PDF file will be downloaded containing class wise time table for all the classes.

Teacher Wise Time wise: Just like Class Wise Time Table, you can view Teacher Wise Time Table after generating it.

- Just select the Season and then select the Teacher for which you have to view the Time Table, then click on Go.
- The time table of that particular teacher will be displayed below.
- You can save the time tables for all the teacher by clicking on Export All to Pdf button.

For more detailed description you can refer the instructions from this site

<http://blog.eschoolapp.in/School-TimeTable/>

Calendar of school

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. Google calendar is very helpful for scheduling the time table for Class tests, Internal and External Examinations.
- 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.

Activity: Watch the quick start tutorial to Google Calendar from here <https://www.youtube.com/watch?v=NombARISmC8>

10.3.5. ICT for Connecting with Parents via Different Media of Communication

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.

Mail: 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.

WhatsAap

WhatsApp Messenger is a freeware and cross-platform instant messaging and Voice over IP (VoIP) service. The application allows the sending of text messages and voice calls, as well as video calls, images and other media, documents, and user location. The

application runs from a mobile device though it is also accessible from desktop computers; the service uses standard cellular mobile numbers. Originally users could only communicate with other users individually or in groups of individual users.

Facebook

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/>

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 word press to provide information to parents, students and public in general.

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.

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

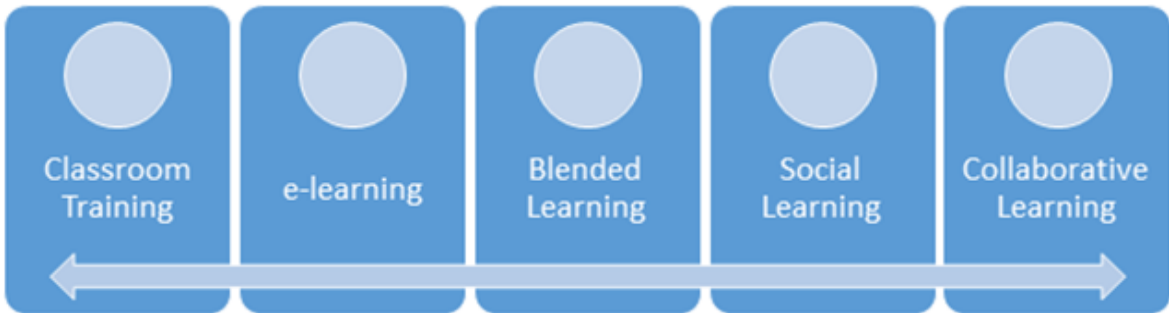
or Yahoo services to communicate each other and among parents. It is also possible to share files among the group members.

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.

10.3.6. ICT for professional development of teachers

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.



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.

10.3.7. Teacher Professional Development through ICT

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.earn.org>

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/>

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.

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/>)

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-Publications (Blog, websites and OER Repository):

- 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>

- The Odisha State Open University shall have jurisdiction over the whole of the State of Odisha. The University shall focus on education, research and training by diversity on means of distance and continuing education including the use of new educational technology available to common man at affordable cost. Degrees, Diplomas and Certificates issued by the University shall be treated at par with Degrees/Diplomas issued by other Universities established by centre/states and recognized by UGC. Emphasis will be placed on Skill Based Education to enhance employ ability of the students. Besides Skill Based and vocational courses, focus will be on Teacher Education, Business & Management Studies, Computer Science courses, Engineering Science (short-term), paramedical courses, agriculture and foreign language courses. Add-on courses will be offered targeting students already admitted in Undergraduate and postgraduate courses in the State .The fee to be charged from the students shall be made reasonable and affordable by disadvantaged groups. All Norms and Regulations prescribed by statutory bodies like UGC, AICTE, NCTE, NCI, BCI, DEB, and MCI etc. shall be strictly followed in offering academic programmes by the Odisha State Open University.

References

1. http://www.riemysore.ac.in/ict/unit__10__ict_for_educational_management.html#obj
2. www.jtle.net/uploadfile/2013/0903/20130903024043135.pdf
3. www.ijcsmc.com/docs/papers/March2015/V4I3201599a50.pdf
4. <https://www.trackschoolbus.com/>
5. <http://eschoolapp.in/index.html#services>
6. http://eschoolapp.in/html_erp/School%20TimeTable.html
7. http://shodhganga.inflibnet.ac.in/bitstream/10603/45335/1/01_chapter%201.pdf
8. <https://files.eric.ed.gov/fulltext/ED025828.pdf>
9. <http://edglossary.org/professional-development/>
10. <https://www.oecd.org/berlin/43541636.pdf>

11. <http://egyanagar.osou.ac.in/about-osou.php>

12. http://www.riemysore.ac.in/ict/unit__10__ict_for_educational_management.html

Activities for the Trainer

Activity-1:

1. Module reading
2. Discussion regarding Educational administration and need of professional development and Input by the trainee

Activity-2:

1. Practical session on the use of different media for communication among parents, community and staff members
2. Demonstration session on the use of Excel and worksheet for keeping record and scheduling
3. Demonstration session on the use of different software and management tools for management of Examination record, keeping others records, time table, scheduling etc.

Activity 3:

1. Home assignment for practice
2. Demonstration by participants on different software and management tools

Activity 4:

1. Search for online learning platforms

Activity 5:

2. Develop a technology plan for the school

Resources Required:

- Computer

- Mobile
- Content/ videos
- Samples
- Pen
- Registers
- Internet
- Seating arrangement

Module-XI

BASICS ON USE OF MULTIMEDIA AND EMAIL APPLICATIONS

11.1: Introduction

We are living in an age where we cannot imagine a day without mobile, computers, projectors or tablets. The students we teach are much beyond these devices and are having potential to use it with more efficiency. In such a scenario where our students are so much demanding in the sense of so called Multimedia based education we have to certainly go for this cause. 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 multimedia learning which is developed on the premise that students can learn more deeply from well-designed multimedia 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. We will further skill ourselves in managing our email accounts and learn how to type in hindi and convert it to an Unicode.

11.2: Objectives

After the completion of the module the participants are expected to;

1. Explain the concept of basic elements of multimedia like images, audio and video files.
2. Create an image and use it as a medium of educational communication.
3. Create and share an audio/video file on different platform for educational use.
4. Communicate and manage their email messages.
5. Handle various input tools for typing in Hindi in Word processor and convert it to Unicode.

11.3: Theoretical Framework

11.3.1: Concept of Multimedia

As the name implies, multimedia is the integration of multiple forms of media. This includes text, graphics, audio, video, etc. For example, a presentation involving audio and

video clips would be considered a "multimedia presentation." Educational software that involves animations, sound, and text is called "multimedia software." CDs and DVDs are often considered to be "multimedia formats" since they can store a lot of data and most forms of multimedia require a lot of disk space. Due to the advancements in computer speeds and storage space, multimedia is commonplace today. Therefore, the term doesn't produce the same excitement as once did. This also means it is not as overused as it was back in the late '90s.

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.

11.3.2 Meaning of Multimedia

A good general definition of multimedia is: *Multimedia* is the field concerned with the computer-controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally. A *Multimedia Application* is an Application which uses a collection of multiple media sources e.g. text, graphics, images, sound/audio, animation and/or video (Marshall, 2001).

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).

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.

11.3.3: Elements of Multimedia

In this section, we will discuss some aspects of the 'how' of developing the multimedia, especially the elements of multimedia, and the good practices in preparing text, graphics, audio, video, graphics, etc. for including in a multimedia programme. The different building blocks of Multimedia are :

- 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

11.3.4: Texts in Multimedia

Text is the most common medium of presenting information. It is also used to communicate a concept or an idea. It should effectively complement the other media.

Factors that influence the textual communication are typeface, font and style, kerning, antialiasing, animation, special effects, special characters and hypertext. While dealing with text in multimedia it is very important to note that it is not the only means of communication. In multimedia, text is most often used for titles, headlines, menus, navigation and content. Overcrowding of text on a single page should be avoided.

It is recommended that text should be presented in combination with graphics.

Typefaces: Typefaces are broadly categorized into two types - 'serif' and "sans-serif". Serif is the small decoration at the end of the letter stroke while sans serif is the letter without a decoration. Serif fonts are commonly used in the body of the text while sans-serif fonts are used for headlines and bold statements.

Fonts: A font is a collection of characters of single size belonging to particular typeface family. Style and size are the main attributes of a font. Common font styles are bold and italic. Font sizes are expressed in points. A point is approximately 1/72 of an inch.

In the usage of fonts, it is recommended to vary as few number fonts as possible on the same page. The style, size and kerning may be adjusted as and when necessary. Anti-aliased text may be used for titles and headlines. Bold text may be more suitable to convey an idea or a concept. Text can be made attractive and pleasing to the eye by choosing the combination of colors for the font and background. Care should be taken for selecting the appropriate type of fonts on menus and buttons, symbols and special characters.

Text Animation: Presentation of text can be more fun and interesting through animation. A wide variety of methods are available to animate the text. Some of the methods are: scrolling (vertical and horizontal), zoom-in and zoom-out, fade-in and fade-out, dissolve etc. 3D text also has an impressive look. Care should be taken to introduce animation only at selected places where the presentation is most impressive. Authoring Programmes like Macromedia's Director have built in tools to animate text. It refers to adjustment of the space between two characters.

Kerning: Kerning makes certain combinations of letters, such as WA, MW, TA, and VA, look better. Only the most sophisticated word processors and desktop publishing systems perform kerning. Normally, you can activate or deactivate kerning for particular fonts.

Anti-aliasing: Aliasing is the well-known effect on computer screens, in fact, on all pixel devices where distortions occur at the edges of letters, in the case of text presentation. Anti-aliasing is the technique of making the edges smooth. Antialiased text is often called "grey-scale" text. Certain adaptations of anti-aliasing have enhanced both the legibility and aesthetics of on-screen type.

Hypertext: The function of hypertext is to build links and generate an index of words. The index helps to find and group words as per user's search criteria. Hypertext systems are very useful in multimedia interactive education courseware. Hypertext systems provide both unidirectional and bi-directional navigation. Navigations can be through buttons or through simple, plain text. The simple and easy navigation is through linear hypertext where information is organized in linear fashion. Non-linear hypertext, however, is the ultimate goal of effective navigation.

11.3.5 Audio in Multimedia

Audio is another vital media in a multimedia presentation. Audio is available in different file formats and the appropriate file format is chosen to maximize its performance. Sound editors play an important role for converting file formats and also for enhancing the quality of sound. In most cases sound files are imported and edited for a multimedia application.

Digital Audio: The Sound recorded on an audio tape through a microphone or from other sources is in an analog (continuous) form. The analog format must be converted to a digital format for storage in a computer. This process is called 'Digitizing'. The method used for digitizing sound is called sampling.

Sampling Rate: Sampling rate is defined as the number of times the analog sound is sampled during each period and converted into digital information. Sampling rates are

measured in Hertz (HZ or Kilo HZ). The most common sampling rates used in multimedia applications are 44.1KHZ, 22.05KHZ and 11.025KHZ. Higher rates of 192KHZ will probably be the professional DVD standards in future. Higher the sampling rate, higher is the quality of sound. A higher sampling rate however occupies more disk space. One can convert from a higher sampling rate to a lower rate (Down Sampling) when required.

Sound Bit Depth: Sampling rate and sound bit depth are the audio equivalent of resolution and color depth of a graphic image. Bit depth depends on the amount of space in bytes used for storing a given piece of audio information. Higher the number of bytes higher is the quality of sound. Multimedia sound comes in 8-bit, 16-bit, 32-bit and 64-bit formats. An 8-bit has 28 or 256 possible values; a 16-bit has 216 or 65,536 possible values. A single bit rate and single sampling rate are recommended throughout the work. An audio file size can be calculated with the simple formula:

File Size in Disk = (length in seconds) x (sample rate) x (bit depth /8 bits per byte).

Mono or Stereo: Opting for mono may be a good choice as the file size is doubled for stereo. However stereo may be used only at those places where the requirement is a must.

Digital Recording: Digital sound can be recorded through microphone, keyboard or synthesizer or DAT (Digital Audio Tape) .Recording through a microphone connected to a sound card directly is not recommended as it is difficult to control the recording consistency and also to avoid amplification of noise. A better practice would be to record on a tape recorder after making all the changes required and then record it through sound card.

Sound Editors: Sound editors are very useful in creating sound, transforming file formats, and enhancing the quality of sound by cutting the noise. There are 3 sound editors used very frequently for multimedia applications. , and . Sound Forge for PC is regarded as probably the best software for audio recording and editing. Cool Edit, a low cost software, is easy to use giving a fairly good quality of sound. Sound Edit 16 allows

you to record, edit and transform digital audio easily and quickly. It can be used to produce a variety of digital speech, sound effects and music clips.

Sound File Formats: The most common sound file formats are:

WAV	Window wave format
AIFF	Audio Interchange File Format -(wave form for use on MAC)
AU	Wave format developed by SUN Microsystems
MP3	Compressed file format using MPEG1 Layer3 compression
QT	Digital audio quick time movies that contain only audio can be used in multimedia applications.
SWA	Shock Wave audio files compressed up to a ratio 176:1

The choice of the right format to use depends upon the file size, the nature of application and the operating system.

11.3.6 Video in Multimedia

Video in multimedia is an extremely useful communication tool for presentations. It illustrates ideas and concepts besides capturing real world events. Video files occupy enormous space and so there are two choices to recommend:

- 1) Use very short video clips (not exceeding a minute or two)
- 2) Use highly compressed video files like MPEG. AVI files that can be transformed to MPEG files.

Digital Video: Digital video provides a superior means of communicating images and sounds of real world. Digital video has many more controls than digital audio, although both of them deal with time-based medium in the midst of a frame based medium.

Frame Rate: It is the number of frames per second that are displayed on the screen. A rate of 15 frames per second (fps) is recommended for most computers, although it cannot match the high quality of 30 fps.

Video Formats: Video Editors: The most commonly used video formats are:

AVI	File format developed by Microsoft for windows. It is also known as video for windows (VFW).
MOV, MOOV, QT	Files belong to Apple Quick Time Movie. Flattened quick time video clips can be viewed on Unix workstations and on IBM compatible PC with media players.
MPEG,MPG	MPEG files use the MPEG-1 video compression routine. MPEG video clips can be viewed with IBM compatible PC and on Unix workstations.

Colour Depth for Digital Video: Digital video set at 24-bit are recommended for windows for an 8-bit or 16-bit images video performances through video editing.

Video Compression: As digital video files occupy a large bandwidth and extremely large space as compared to audio and graphics file formats, reducing the file size is of utmost importance. A number of CODEC methods are available to meet this requirement. The MPEG format for example uses inter-frame compression to get compression up to 200:1. This large compression is achieved at the expense of the quality of video. The inter-frame compression involves cutting out the visual information that is not noticeable to the human eye.

Video Editors: The popular software for video editing are Adobe Premiere 6.0, Pinnacle systems, Studio DV, Apple's Movie 2.0.1 and CoolEdit. For editing the analog video is first digitized through a video capture and then the appropriate software is used for editing. If a DV camcorder is used for video shooting then the video can be transferred to PC directly for editing. It is very important to note that video takes enormous disk space as much as 200MB per minute. So preview of the video and editing are done separately to suit one's requirement. The safest rule is to keep the video file size to absolute minimum.

The PC must be adequately equipped with a minimum of 20GB hard disk and a minimum of 128 MB RAM and with a good AGP card with 32 MB VRAM.

11.3.7 Graphics in Multimedia

Graphics is the most commonly used element of multimedia. The richness of multimedia and the effective communication are through graphic presentations. The attributes of color, texture, pattern and animation enrich a multimedia presentation.

Types of graphics: The two approaches in designing graphics are: a) Raster graphics; and b) Vector graphics. Raster graphics, commonly known as bitmap images are based on a grid of pixels; vector graphics are based on mathematical formulas. Bitmap images are associated with 'paint' or 'photo'. Vector graphics occupy lesser memory and are easily 'scalable' i.e there is no loss of resolution when the image size is changed. Vector graphics are associated with 'drawing' or 'illustration'.

Graphics formats: Some of the commonly used graphic formats are:

- GIF GIF stands for Graphics Interchange Format. GIF images are very small in size and so load faster than other formats. GIF make the file size small without losing or blurring any part of the image (lossless compression). GIF also supports transparency i.e they can be pasted on the top of a background image. GIF further supports animation. GIF supports only up to 256 colours.

- JPEG JPEG stands for Joint Photographic Experts Group. This format is used to display photographic images. The advantage of using JPEG over GIF is that JPEG can display up to 16 million colors (True-color). Main disadvantage of JPEG is the loss of quality. JPEG does not support transparency or animation.

- PNG PNG stands for Portable Network Graphics. It was designed to be an alternative to GIF file format. PNG formats are of two types: PNG-8 format holding 8 bits of color information (Similar to GIF) and PNG-24 format which holds 24 bits of color (similar to JPEG). PNG 24 is loss less. PNG also support transparency, but not animation.

Scanning: The basic purpose of scanning an image is to digitize it i.e convert it from an analog form into a digital form. Images are typically scanned at resolutions between 50 to 1200 Dots per Inch (DPI). Image resolution refers to number of Pixels per Square Inch. This is commonly called “dots per inch” or “dpi”. In general, high resolution results in better image quality. While image resolution can always be reduced after scanning, increasing resolution after scanning will not improve image quality.

Image Editing: Digitized images can be edited by any image editing software like Adobe Photoshop or JASC's Paint Shop programme. The software can be used to enhance the image quality, and do several manipulations like crop, duplicate, fill, rotate and flip the image. Deleting and adding images to another image is also one of the interesting manipulations of the editing software.

11.3.8 Animation in Multimedia:

A very popular and a chief element of multimedia is animation. Animation is designed as a simulation of movement created by displaying a series of pictures or frames. Animation strictly is a visual illusion. It builds dynamism, energy and motion to inanimate objects. It also adds the dimension of time to graphics .Computer animation is relevant to multimedia as all the presentations are developed on the computer. The key concepts of computer animation are: key frames and tweening.

Key frames: Major frames of animation are created first. These frames define the key frames in which many changes take place. They are the 'key' points of animation. Key frames are specified to show how the moving objects will behave with time.

Tweening: Tweening is the process of generating intermediate frames between two images to give the appearance that the first image evolves smoothly into the second image. Tweening is a key process in computer animation. A software programme can automatically generate the in between frames.


Software Tools: Software used for animation determines the quality of computer animation produced. Some very popular animation software packages for windows are



3D Studio Max, Adobe Premiere, SoftImage, Animator Studio, Flash, etc. Software packages for Mac include Adobe Premiere, Elastic Reality, Strata Studio pro, etc.



Animation File Formats: The file formats for animation depends on the nature of software used. Based on this, you will have .dir (for Director), .fla (for flash), .max (for 3d studio max), .dcr (for shockwave animation file), etc.

11.3.9 Devices for Developing Multimedia in Education

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.

Sl.N o	Devices	Description
1		<p>A Digital Camera 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>

		(Source: https://en.wikipedia.org/wiki/Digital_camera)
2		<p>A camcorder or a video camera recorder 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: https://en.wikipedia.org/wiki/Camcorder)</p>
3		<p>A scanner 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: https://en.wikipedia.org/wiki/Image_scanner)</p>

<p>4</p>		<p>An interactive whiteboard (IWB) 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 groups, in training rooms for professional sports coaching, in broadcasting studios, and others.</p> <p>Examples of the characteristics accessible when using an interactive whiteboard:</p> <ul style="list-style-type: none"> • 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 <p>(Source: https://en.wikipedia.org/wiki/Interactive_whiteboard)</p>
<p>5</p>		<p>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</p>

		<p>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.</p> <p>(Source: https://en.wikipedia.org/wiki/LCD_projector)</p>
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11.3.10. Educational Uses in Multimedia

There are various benefits of using multimedia in teaching learning some of them is as follows:

Educational Benefits of Multimedia tools (from an Educator's Perspective) :

- Provide students with opportunities to represent and express their prior knowledge.
- "Allow students to function as designers, using tools for analyzing the world, accessing and interpreting information, organizing their personal knowledge, and representing what they know to others."
- Multimedia applications engage students and provide valuable learning opportunities.
- Empower students to create and design rather than "absorbing representations created by others."
- "Encourages deep reflective thinking.

Create personally meaningful learning opportunities. tech4learning.com

Educational Benefits of Multimedia tools (from the Student's Perspective) :

- Giving students an opportunity to produce documents of their own provides several educational advantages.
- Students that experience the technical steps needed to produce effective multimedia documents become better consumers of multimedia documents produced by others.

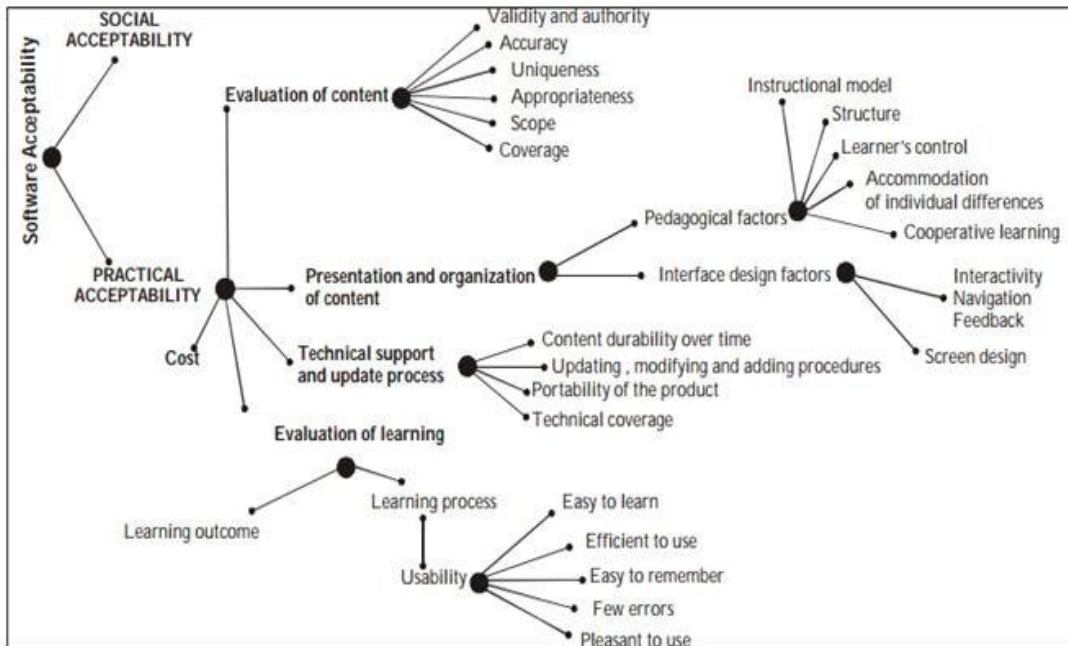
Students indicate they learn the material included in their presentation at a much greater depth than in traditional writing projects.

- Students work with the same information from four perspectives: 1) as researcher, they must locate and select the information needed to understand the chosen topic; 2) as authors, they must consider their intended audience and decide what amount of information is needed to give their readers an understanding of the topic; 3) as designers, they must select the appropriate media to share the concepts selected; and 4) as writers, they must find a way to fit the information to the container including the manner of linking the information for others to retrieve (Smith, 1993). All of these contribute to student learning and help to explain the improved student learning that is often associated with IT assisted PBL.

There is another aspect to developing multimedia documents that empowers students. Students quickly recognize that their electronic documents can be easily shared. Because of this, students place a greater value on producing a product that is of high standard. An audience of one—the teacher—is less demanding than an audience of many—particularly one’s peers. Students quickly recognize that publishing a multimedia document that communicates effectively requires attention to both the content and the design of the document.

11.3.11 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. 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).

11.3.12 Working on e-mail

Whenever we think of using an efficient method to communicate Email is one of such method. Email is a way of sending and receiving messages instantly is through the computer using electronic mail or 'e-mail' as it is popularly known. Whether for business or personal use, you can use e-mail to communicate instantly.

To communicate with the help of the computer using e-mail you will need:

- An e-mail address
- A password
- The e-mail address of the person to whom you wish to send the e-mail

- Internet connection

To use e-mail you need to first register for an e-mail account on a web site that offers such a service.

Creating an Email Account

A. Select an E-mail Service

1. Start the web browser.
2. Click to place your cursor in the Address or Location bar. Type e-mail.
3. Press the Enter key on your keyboard. You will notice that a list of popular web sites offering free e-mail services like gmail, outlook, Yahoo etc. will appear.
4. Although Gmail has now become the most used and popular e-mail provider services on the Internet you can click on any of the website that interests you.

B. Create an E-mail Account

1. Read the page and look for Sign Up or Create an Account. Then, click on it.
2. You will be directed to the registration page which appears like a form.
3. Fill in the registration details in the boxes, such as your:
 - First Name and Last Name
 - Date of Birth
 - Country or Location
 - Gender (whether you are male or female)
 - Zip Code

Note: You will notice that some boxes have the drop-down menu which allows you to select one option from several choices. Just click on the down arrow and move your cursor to the option you would like to choose.

4. Type your desired e-mail ID or login/username.

Note: You can create your e-mail ID or login/username as you wish subject to its availability. Look at the following examples:

- name@example.com
- name.surname@example.com
- birthday@example.com
- favoriteplace_favoritenumber@example.com

5. Click Check or Check Availability to see if the e-mail ID or login/username you created is available otherwise try an another name.

6. In the box below, type a password for your e-mail ID. Type your password again.

7. Choose a question in the Security Question box. Or, if you wish, you can type your own question. Then, type an answer to your question. This question, in combination with your answer, will be used by the web site to identify your account information and provide a new password in case you forget your current password.

8. Type the characters you see in the box or picture.

9. Click the “I Accept” box to agree to follow the terms of service.

10. Click Create My Account.

11. Your e-mail account is created and you are now registered to send and receive e-mails on that web site.

Note: Some web sites will directly take you to your account. While for some, a welcome screen is displayed with your e-mail account details. Click Continue.

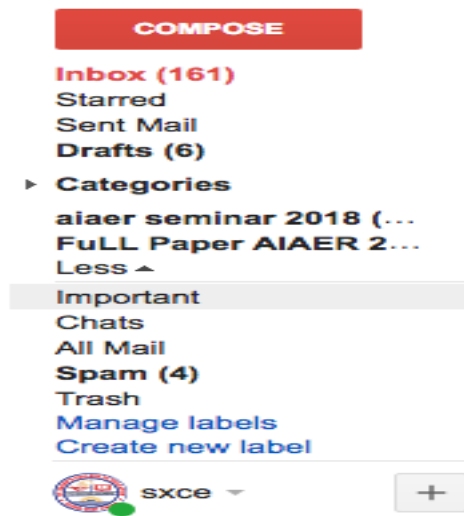
12. You will notice that you are directed to your e-mail account.

Learning Email Basics Using Gmail: Sending, Replying, Attachments, and Printing

Different folders in an e-mail

A typical E-mail service providers has several folders options for organizing your e-mail.. The basic mail system folders are **Inbox**, **Sent**, **Drafts**, **Junk**, and **Trash**. You can create extra folder labels if you wish to organise them in a specific way the fig below depicts the same. You cannot move, rename, or delete these folders. System folders are always displayed at the top of your folder list, followed by any folders you create(Ex-aiaer

seminar 2018, Full Paper AIAER 2018 in the figure below.) If you have any new unread messages in a folder, the folder name will appear bold with the number of messages will appear beside it. (For example, **Inbox (3)**). Let us understand some of these folders as follows.



INBOX

New email messages arrive in the Inbox. By default, the contents of your Inbox is displayed when you log into any mail service.

SENT

A copy of each message you send is saved in the **Sent** folder.

DRAFTS

Messages that you have composed but have not yet sent can be saved in the **Drafts** folder. If you open a message in the Drafts folder, it opens in the Compose view. As you are composing, the system automatically saves draft copies of your message every minute or so. You can manually save a draft by clicking on the "Save Draft" button.

JUNK/SPAM

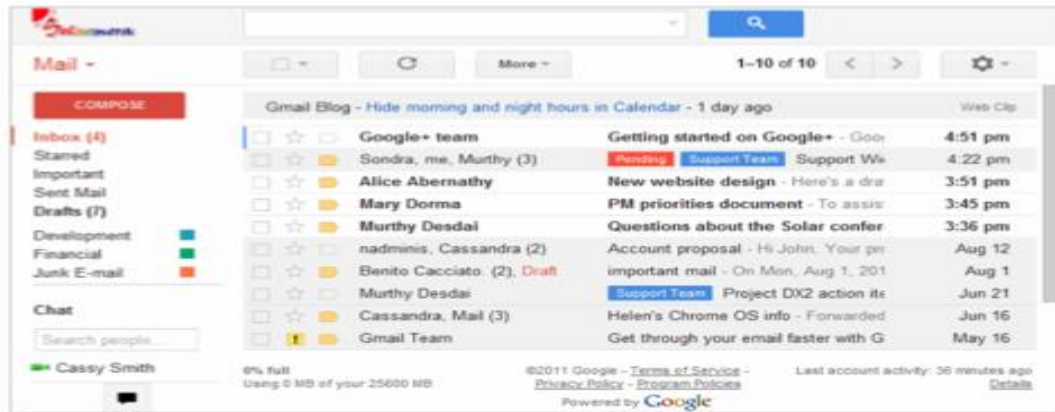
Approximately 95% of all incoming junk mail is prevented from arriving in your email account. The remaining spam messages that do get through are automatically placed into your Junk folder. It is best to check your Junk folder periodically for messages that have been mistakenly marked as spam.

TRASH

Based on when the message was placed into the Trash folder there is a specific retention time after which the message automatically gets deleted.

If you want to remove messages from the Trash immediately, it is best to delete only those specific messages from the Trash folder. Emptying the entire Trash folder is highly

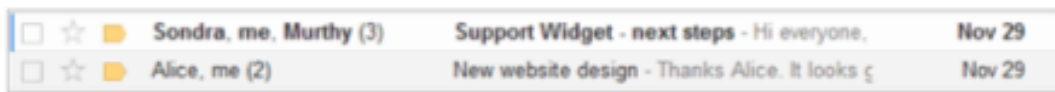
discouraged. Fortunately, you can recover items deleted from the trash can within 30 days of deletion. Provided that you have not yet emptied your Trash folder, you can simply move the message out of your Trash folder by dragging it to "Inbox" or another folder as you wish, within a year from when the message was placed into Trash. When you sign in to Gmail, you'll see a list of any messages you've received in your Inbox. Here's an example:



Unread messages are in **bold**. To open a message, simply click it in your message list.

About Conversation

By default, replies to messages are grouped into **conversations**. A conversation keeps all messages in a thread together, which makes it easier to keep track of them and reduces Inbox clutter. Here's how a conversation appears in your **Inbox**:



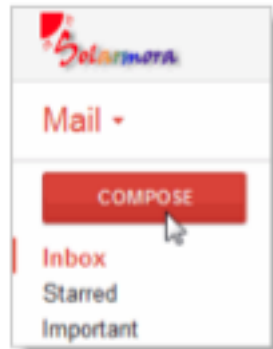
Note that the number of messages in a conversation appears to the right of senders' names.

- **If Conversation View is off**, new messages won't be grouped into conversations, and any existing conversations are ungrouped into separate messages.

- **If Conversation View is on**, you can't separate the messages in a conversation. However, if you want to send a reply but don't want it to be added to the conversation, you can simply change the subject line in your reply.

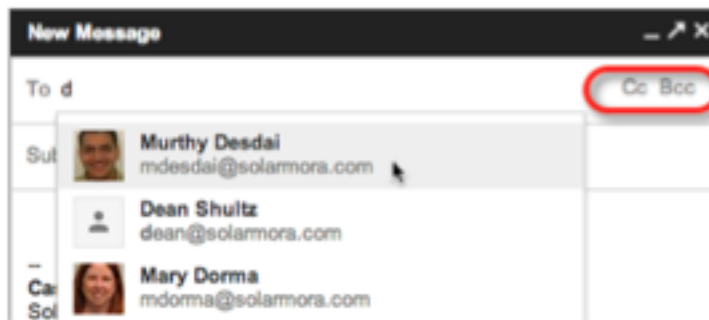
Compose a message

1. In the pane on the left, click **COMPOSE**.

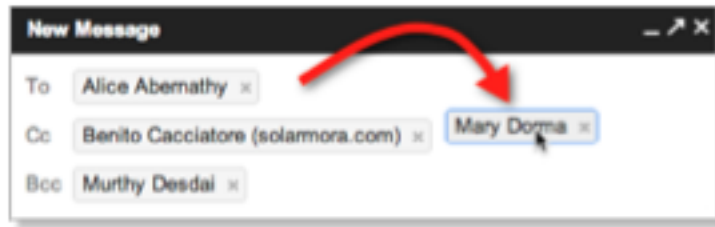


2. A new message opens near the lower-right of your Gmail window. To minimize the new message click _ Symbol. Click the arrow symbol to pop out the message into a new window. You can resize the message window and move it around the screen this way.

3. In the **To** field, type the first letter or letters of a recipient's name to look up their email address in your corporate directory. (When you are not adding addresses, the **To**field is labeled **Recipients**.)



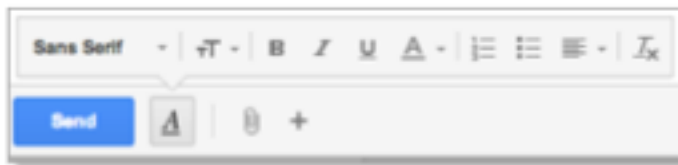
4. To add a Cc or a Bcc, simply click **Cc** or **Bcc** that shows up when you're entering addresses. You can also drag and drop email addresses between **To**, **Cc**, and **Bcc**.



5. Enter a subject and the message text. Your email pane will grow as you type to fit your message.

Format your message

To format the text of your message, click the 'A' icon to expand your formatting options.



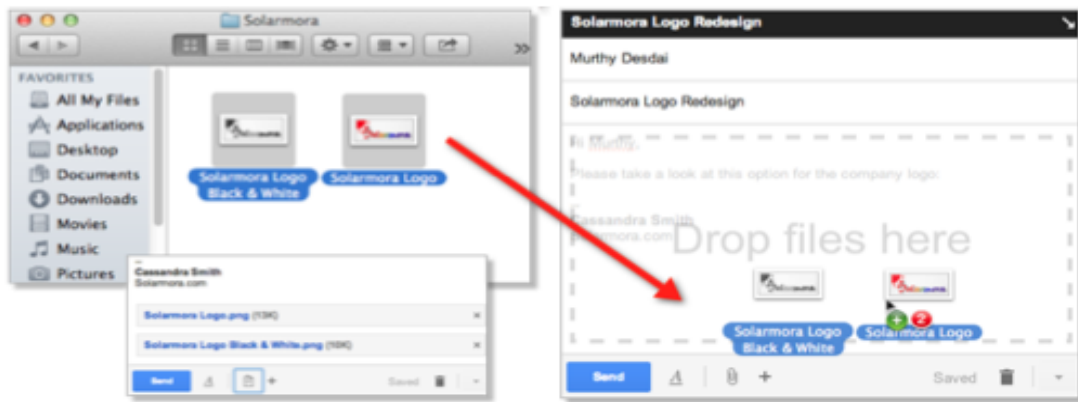
Add a file attachment, image, or link

Hover over the **paperclip** icon on the bottom of the message to show options for attaching a file; inserting a picture, document, emoticon, or calendar invite; or creating a hyperlink.



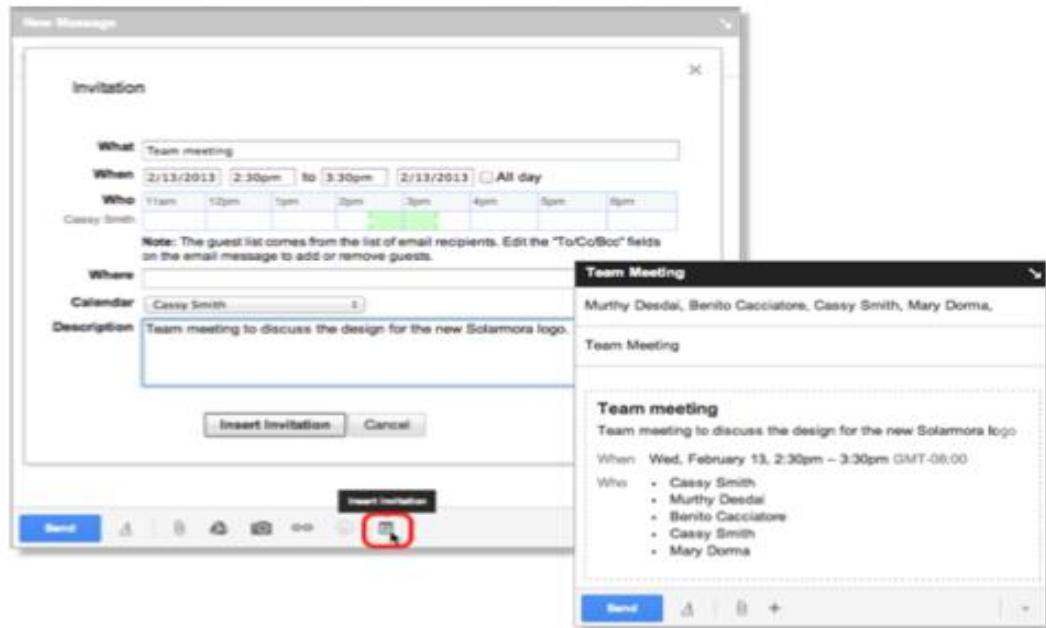
To attach a file, click the **paperclip** and then browse for the file on your computer or local network. Once attached, the file appears at the bottom of the message.

You can also attach files by dragging and dropping them into the body of the email. The files will attach at the bottom of the email.



Insert a calendar invitation

Insert a calendar invitation into your email by clicking the **Insert invitation** icon and filling out the fields. The invitation will be sent to everyone copied on the message.



Send a message

At the bottom of the message window, click Send.



A message appears at the top of the mail window, confirming that your message is sent by popping a message as **‘Your message has been sent’**

Reply to a Message

You can reply to just the sender or to all recipients of a message.

To reply to a single message or the last message in a conversation

1. Open the message. If the message is part of a conversation, open the conversation and select the message you want to reply to.
2. At the bottom of the message, click **Reply** (to reply to just the sender) or **Reply to all** (to reply to all recipients). The Reply to all option won't appear if the email was only sent to you.



3. Optionally, you can change your reply format by clicking the arrow next to the Recipients field, or add new email addresses to the conversation by clicking directly in the Recipients field.

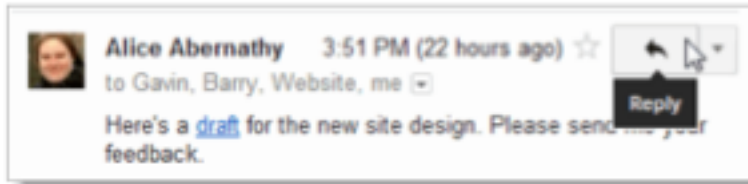


4. Enter your reply in the message field.
5. At the bottom of the message, click **Send**.

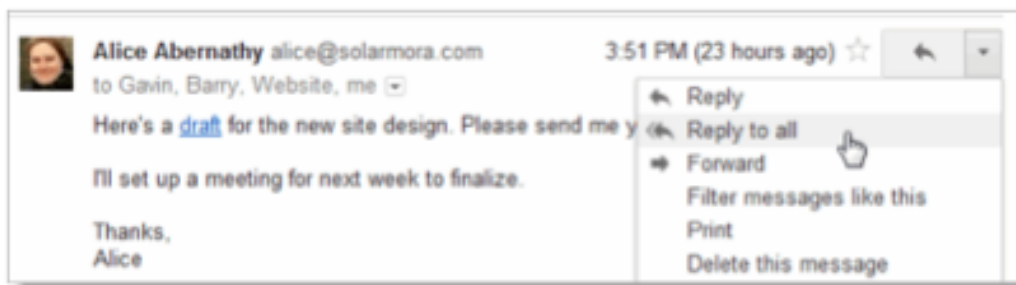
To reply to an earlier message in a conversation

1. Open the conversation and select the message you want to reply to.

2. To reply to just the sender, click the **Reply** button:



If you'd rather reply to all recipients, click the **down arrow** next to the **Reply** button, and then click **Reply to all**:



3. Optionally, add other email addresses to which to send the reply.
4. Enter your reply in the message field.
5. At the bottom of the message, click **Send**.

Forward a Message

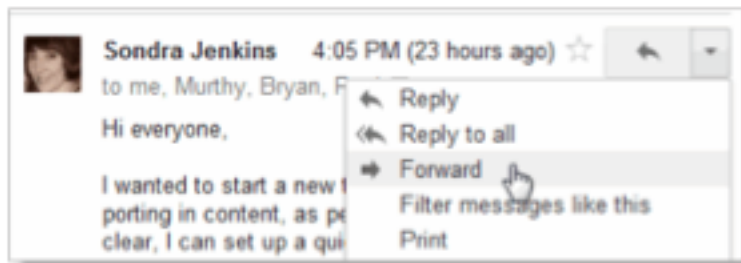
You can forward a message, just a single message in a conversation, or an entire conversation.

To forward a message or a single message in a conversation:

1. Open the message. If the message is part of a conversation, open the conversation and select the message to forward.
2. At the bottom of the message, click **Forward**.



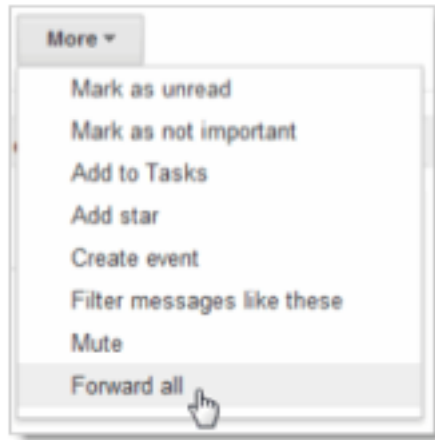
Note: If you have a conversation open, the **Forward** link sends the last (most recent) message. If you'd rather forward an earlier message in the conversation, select the message, click the **down arrow** next to the message's Reply button, and then click **Forward**:



3. Enter the email addresses to which to forward the message, and add any notes in the message field.
4. If the message has an attachment that you don't want to forward, uncheck the box next to the attachment's file name, below the Subject field.
5. At the bottom of the message, click **Send**.

To forward an entire conversation:

1. Open the conversation.
2. In the menu bar above the conversation, click **More** and then click **Forward all**.



3. At the bottom of the message, click **Send**.

The recipient receives a single message containing all messages in the conversation, listed in order of oldest to most recent.

Print a Message

You can print a single message or an entire conversation.

To print a single message or an entire conversation:

1. Open the message or conversation.
2. At the upper right of the message, click the **Print all** icon.



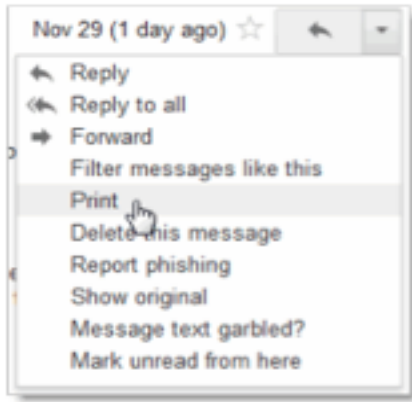
A printerfriendly version of the conversation appears.

3. Use your web browser's **Print** options to print the message.

To print a single message within a conversation:

Open the conversation and select the message you want to print.

In the message, click the **down arrow** to the right of the **Reply** button, and then click **Print**.



A printer friendly version of the message appears.

3. Use your web browser's Print options to print the message.

1.3.13 Inputting in Different Indian Languages

Google Input tools is a very powerful development tool for an Indian language. Input tools are also called transliteration. It can convert English to the Hindi Language. That concept can be used in the Windows OS, website and Android Phone.

I will show a simple example:

English: "Kyakarrhe ho?"

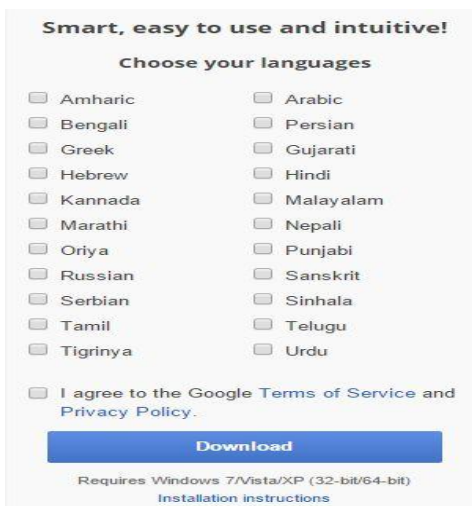
Converted to Hindi: क्याकर रहे हो ?

Advantage

We can easily type the Hindi language and also the typing speed is greater than from English. Because when we talk to anyone we use the Hinglish Language. For example: "Kyakarrhe ho?". So that tool helps you to write text in Hindi.

Installation on Windows OS

First go to



the link.<https://www.google.co.in/inputtools/windows/> Then you will see the following:

Now you can select your choice language and then install on the Windows OS.

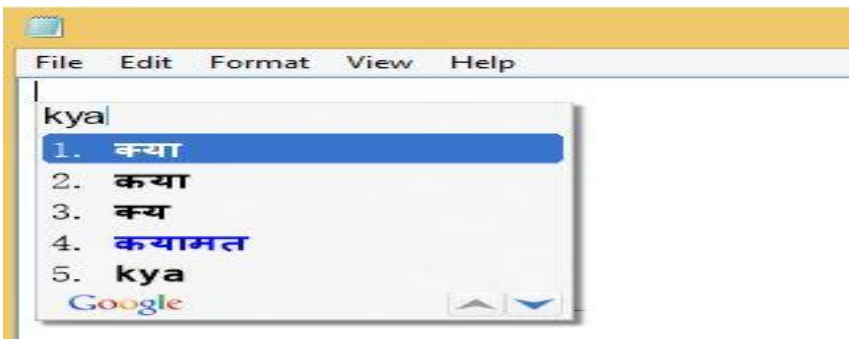
After installing successfully you will see “ENG” in the right side of the Taskbar.



Then press the “Window+Space” key of the keyboard



Then open Notepad and start writing, but you will write any text defined in the Hindi language.



settings

It will show 5 helping words but you can change the

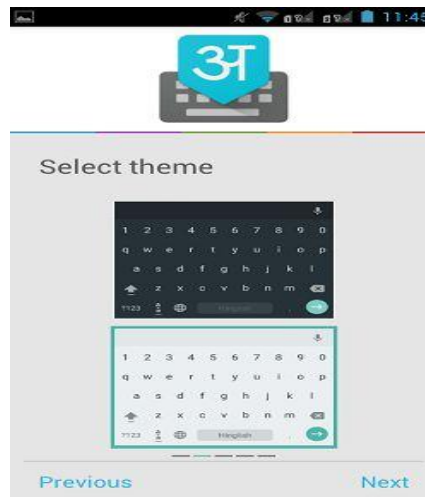
from

here:

When you want to again change the language Hindi to English the press again “Windows+Space keys”.

Installation on Android Phones

First go to Google Play Store link for Google Input. After installing the apps in your Android phone, open it.

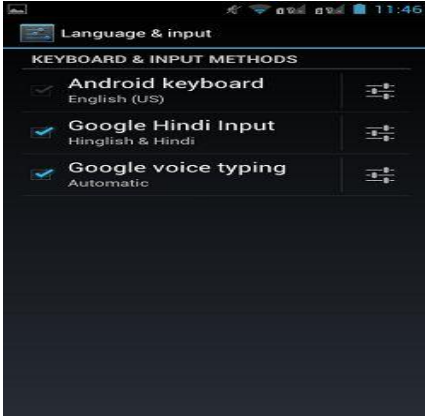


Press Next.

Press Next.



On clicking “Enable Google Hindi Input”, you will see the following:



Check the Checkbox for Google Hindi input and press the “back” button. Now click “**Select Google Hindi Input**”, in other words the choice of your Android keyboard. Then you can see the following:

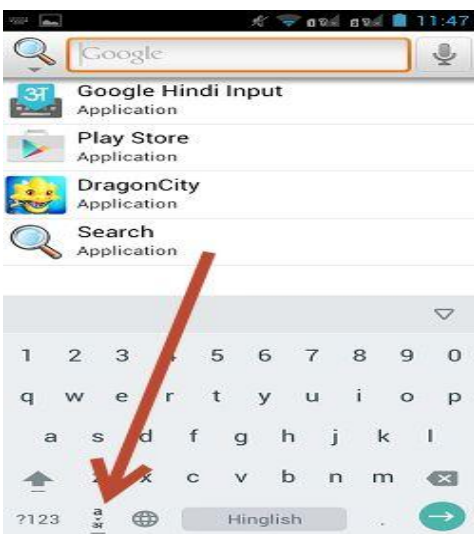


Close the app. Open Google search and see that your keypad GUI has changed now.

The keypad can now work with the following three languages.

1. English
2. Hindi
3. Hinglish

By default the english Type mode is selected. Now change the type mode by pressing the button.



After selection start writing the text as in the Windows OS.

Example



You can change the language by pressing the button at the bottom.

11.3.14: Unicode and Its Usage

Fundamentally, computers just deal with numbers. They store letters and other characters by assigning a number for each one. Before Unicode was invented, there were hundreds of different systems, called character encodings, for assigning these numbers. These early character encodings were limited and could not contain enough characters to cover all the world's languages. Even for a single language like English no single encoding was adequate for all the letters, punctuation, and technical symbols in common use.

Early character encodings also conflicted with one another. That is, two encodings could use the same number for two different characters, or use different numbers for the same character. Any given computer (especially servers) would need to support many different encodings. However, when data is passed through different computers or between different encodings, that data runs the risk of corruption. For Example when you open your word file typed in hindi language in a different computer all the letters in the file gets corrupted and seems to changed in other fonts.

Unicode Characters and Converter tools

Unicode has changed all that! The Unicode Standard provides a unique number for every character, no matter what platform, device, application or language. It has been adopted by all modern software providers and now allows data to be transported through many

different platforms, devices and applications without corruption. Support of Unicode forms the foundation for the representation of languages and symbols in all major operating systems, search engines, browsers, laptops, and smart phones—plus the Internet and World Wide Web (URLs, HTML, XML, CSS, JSON, etc.). Supporting Unicode is the best way to implement ISO/IEC 10646.

The emergence of the Unicode Standard and the availability of tools supporting it are among the most significant recent global software technology trends. Many free Unicode converters are available online. Unicode Converter enables you to easily convert Unicode characters in UTF-16, UTF-8, and UTF-32 formats to their Unicode and decimal representations and thus your file can run on any platform without any corruption and the above problem faced by you does not appear.

11.4: Let Us Sum Up

Multimedia is a powerful tool in the hands of educators as well as the students and thus its integration in teaching and learning environment has multiple benefits. This unit started with the introduction on concept of multimedia. It then discussed about various elements of multimedia like text, audio, video etc. This unit has also introduced to you how to communicate through E-mail. Taking the example of Gmail it has discussed on creating an e-mail account, composing messages, attaching files in e-mail, sending reply and printing mail. In the last section the unit has discussed one of the very basic and important requirements on how to input using hindi input tool on computers or a android device like mobile. The Unicode conversion of file and its benefits has been also discussed in brief.

References

- (n.d.). Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.578.6105&rep=rep1&type=pdf>
- <http://journalofdigitalhumanities.org/1-4/evaluating-multimodal-work-revisited-by-shannon-mattern/>

- Benefits of Using Multimedia in Education. (n.d.). Retrieved January 18, 2016, from http://hrsbstaff.ednet.ns.ca/engramja/gradcourse/multimedia/benefits_of_multimedia.htm
- Carver, S. M., Lehrer, R., Connell, T., & Erickson, J. (1992). *Carver, S. M. Learning by hypermedia design: Issues of assessment and implication. Educational Psychologist, 273(3), 385-404.*
- (n.d.). Retrieved January 10, 2016, from <http://cemca.org.in/ckfinder/userfiles/files/Section7.pdf>MERLOT Journal of Online Learning and Teaching Vol. 6, No. 2, June 2010 491 Barbara A. Frey University of Pittsburgh Pittsburgh, PA USA bafrey@pitt.edu
- <mailto:bafrey@pitt.edu>*Courseware development process (MES-034 Designing Courseware).* (n.d.). Delhi: Indira Gandhi National Open University, School of Education.
- Methodology of Multimedia Production. (n.d.). Retrieved January 5, 2016, from <http://www.ignca.nic.in/clcnf180.htm>
- <http://www.ignca.nic.in/clcnf180.htm>Module 6: Methods and criteria for the evaluation of multimedia educational materials - EDDE 221: Design and Evaluation of Multimedia Educational Materials. (n.d.). Retrieved January 18, 2016, from <https://sites.google.com/a/upou.edu.ph/edde-221/modules/unit-3/module-6>
- <https://sites.google.com/a/upou.edu.ph/edde-221/modules/unit-3/module-6>Multimedia in Education - Introduction, the Elements of, Educational Requirements, Classroom Architecture and Resources, Concerns. (n.d.). Retrieved January 13, 2016, from <http://encyclopedia.jrank.org/articles/pages/6821/Multimedia-in-Education.html>
- <http://encyclopedia.jrank.org/articles/pages/6821/Multimedia-in-Education.html>(n.d.). PROFIL: A method for the development of multimedia courseware. Retrieved January 23, 2016, from <http://dspace.learningnetworks.org/bitstream/1820/412/2/PROFILPB.pdf>

- <http://dspace.learningnetworks.org/bitstream/1820/412/2/PROFILPB.pdf> Week Five - Multimedia in Education. (n.d.). Retrieved January 18, 2016, from [http://edu90template.wikispaces.com/Week Five - Multimedia in Education](http://edu90template.wikispaces.com/Week+Five+-+Multimedia+in+Education)
- http://www.riemysore.ac.in/ict/unit__6___multimedia.html. Unit 6 . OER of RIE, Mysore retrieved on 15th January 2018.

Activities for the Trainer

Activity-1: Reading and group discussion- The trainer will ask the participant to read the module on BASICS ON USE OF MULTIMEDIA AND EMAIL APPLICATIONS and follow it with group discussion on different types of multimedia resources and its application in education as well as various email applications. (30 minutes). The trainer's role here is to facilitate the reading and discussion. However, he/she may also make presentation.(45 minutes)

Activity-2: The participants will create/scan/edit one image each in their computer and mobile as a piece of educational communication. They will be asked by the trainer to transfer it to mobile and computer and also share it on social networking groups for its educational use. (30 minutes).

Activity-3: The participants will create one audio and one video clip on their mobile as a piece of educational communication They will be asked by the trainer to transfer it to computer and also share it on social networking groups for its educational use. (30 minutes).

Activity-4: The trainer will ask the participants to open a new email account using Gmail and use its different applications like Emailing (compose, attach files, sending with and without attachments, insert images, insert signature, reply, forward, share), Access email (Read, mark as read or unread), Organize email (create folder, organize email in folder), Manage email (searching a particular, deleting, mark email as spam, flag a mail, create a contact list/ mailing list) and Printing email. (30 minutes).

Activity-5: The trainer will ask the participants to install any Hindi input tool in their computer/mobile. They will type a paragraph in MS Word of maximum 100 words using the tool. They will later convert the file into a compatible Hindi Unicode converted file and open it on any other platform like Notepad. (30 minutes).

Activity-6:The trainer will divide participants into small groups and ask participants to explore multimedia (any three) available on Websites. Later on they will discuss among themselves and evaluate the multimedia.

Resources Required

1. Present module Unit
2. The presentation on this module (15-20 minutes)
3. Software tools like – Windows Media Player, VLC, Photo Editor Pro App, Adobe Photo Editor App, Media Converter App
4. Hindi Unicode Converter App
5. Videos on different Multimedia Resources
6. Internet with good speed and different web browser

Module-XII

UNIVERSAL DESIGN FOR LEARNING AND ASSISTIVE TECHNOLOGY IN SCHOOL

12.1: Introduction:

Assistive technology promotes greater independence for people with disabilities in the school and they can performing their task with the help of various tools. They will be able to perform tasks that they otherwise would have great difficulty or not be able to accomplish. This module will help the participants to develop into competent assistive technology professionals and providers. The module will consist of information relating to social and political aspects of people with disability and technology. The areas of Seating and Positioning, Mobility, Augmentative and Alternative Communication, Daily Living Technologies and Assistive Technology Access will be studied in detail.

12.2: Objectives

After the completion of the module the participants are expected to;

1. Describe the nature of different disabilities and relate with various AT
2. Explain the concept of UDL and Assistive Technology for inclusive education.
3. Differentiate between assistive technology devices and assistive technology services.
4. Install and use of application of assistive technology for the students with disabilities.
5. Select and use AT for students with different disability.

12.3: Theoretical Frame work

12.3.1: Concept of UDL:

Universal Design for Learning is a set of principles for curriculum development that give all individuals equal opportunities to learn.UDL provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone--not a

single, one-size-fits-all solution but rather flexible approaches that can be customized and adjusted for individual needs.

UDL helps address learner variability by suggesting flexible goals, methods, materials, and assessments that empower educators to meet these varied needs. Curricula that is created using UDL is designed from the outset to meet the needs of all learners, making costly, time-consuming, and after-the-fact changes unnecessary. The UDL framework encourages creating flexible designs from the start that have customizable options, which allow all learners to progress from where they are and not where we would have imagined them to be. The options for accomplishing this are varied and robust enough to provide effective instruction to all learners.

12.3.2: Assistive Technology Devices and Services according to Learning Problems.

What types of learning problems does assistive technology address?

AT can address many types of learning difficulties. A student who has difficulty writing can compose a school report by dictating it and having it converted to text by special software. A child who struggles with math can use a hand-held calculator to keep score while playing a game with a friend. And a teenager with dyslexia may benefit from AT that will read aloud his employer's online training manual. There are AT tools to help students who struggle with:

Listening

Certain assistive technology (AT) tools can help people who have difficulty processing and remembering spoken language. Such devices can be used in various settings (e.g., a class lecture, or a meeting with multiple speakers).

Math

Assistive technology (AT) tools for math are designed to help people who struggle with computing, organizing, aligning, and copying math problems down on paper. With the help of visual and/or audio support, users can better set up and calculate basic math problems.

Organization and memory

Assistive technology (AT) tools can help a person plan, organize, and keep track of his calendar, schedule, task list, contact information, and miscellaneous notes. These tools allow him to manage, store, and retrieve such information with the help of special software and hand-held devices.

Reading

There is a wide range of assistive technology (AT) tools available to help individuals who struggle with reading. While each type of tool works a little differently, all of these tools help by presenting text as speech. These tools help facilitate decoding, reading fluency, and comprehension.

Writing

There is a wide range of assistive technology (AT) tools available to help students who struggle with writing. Some of these tools help students circumvent the actual physical task of writing, while others facilitate proper spelling, punctuation, grammar, word usage, and organization.

12.3.2: What kinds of assistive technology tools are available?

The term "assistive technology" has usually been applied to computer hardware and software and electronic devices. However, many AT tools are now available on the Internet. AT tools that support kids with LD include:

Abbreviation expanders

Used with word processing, these software programs allow a user to create, store, and re-use abbreviations for frequently-used words or phrases. This can save the user keystrokes and ensure proper spelling of words and phrases he has coded as abbreviations.

Alternative keyboards

These programmable keyboards have special overlays that customize the appearance and function of a standard keyboard. Students who have LD or have trouble typing may benefit from customization that reduces input choices, groups keys by color/location, and adds graphics to aid comprehension.

Audio books and publications

Recorded books allow users to listen to text and are available in a variety of formats, such as audiocassettes, CDs, and MP3 downloads. Special playback units allow users to and search and bookmark pages and chapters. Subscription services offer extensive electronic library collections.

Electronic math work sheets

Electronic math worksheets are software programs that can help a user organize, align, and work through math problems on a computer screen. Numbers that appear onscreen can also be read aloud via a speech synthesizer. This may be helpful to people who have trouble aligning math problems with pencil and paper.

Freeform database software

Used in conjunction with word processing or other software, this tool allows the user to create and store electronic notes by "jotting down" relevant information of any length and on any subject. He can later retrieve the information by typing any fragment of the original note.

Graphic organizers and outlining

Graphic organizers and outlining programs help users who have trouble organizing and outlining information as they begin a writing project. This type of program lets a user "dump" information in an unstructured manner and later helps him organize the information into appropriate categories and order.

Information/data managers

This type of tool helps a person plan, organize, store, and retrieve his calendar, task list, contact data, and other information in electronic form. Personal data managers may be portable, hand-held devices, computer software, or a combination of those tools working together by "sharing" data.

Optical character recognition

This technology allows a user to scan printed material into a computer or handheld unit. The scanned text is then read aloud via a speech synthesis/screen reading system. Optical Character Recognition (OCR) is available as stand-alone units, computer software, and as portable, pocket-sized devices.

Personal FM listening systems

A personal FM listening system transmits a speaker's voice directly to the user's ear. This may help the listener focus on what the speaker is saying. The unit consists of a wireless transmitter (with microphone) worn by the speaker and a receiver (with earphone) worn by the listener.

Portable word processors

A portable word processor is a lightweight device that is easy to transport (e.g., from classroom to home). It can be helpful to kids who may have trouble writing by hand and prefer to use a keyboard. Word processing allows the user to edit and correct his written work more efficiently than doing so by hand.

Proofreading programs

Students who struggle with writing (e.g., spelling, grammar, punctuation, word usage, and sentence structure) may benefit from software programs (included in many word processing systems) that scan word processing documents and alert the user to possible errors.

Speech-recognition programs

A speech recognition program works in conjunction with a word processor. The user "dictates" into a microphone, and his spoken words appear on the computer screen as text. This can help a user whose oral language ability is better than his writing skills.

Speech synthesizers/screen readers

These systems can display and read aloud text on a computer screen, including text that has been typed by the user, scanned in from printed pages (e.g., books, letters), or text appearing on the Internet.

Talking calculators

A talking calculator has a built-in speech synthesizer that reads aloud each number, symbol, or operation key a user presses; it also vocalizes the answer to the problem. This auditory feedback may help him check the accuracy of the keys he presses and verify the answer before he transfers it to paper.

Talking spell checkers and electronic dictionaries

Talking spell checkers and electronic dictionaries can help a poor speller select or identify appropriate words and correct spelling errors during the process of writing and proofreading. Talking devices "read aloud" and display the selected words onscreen, so the user can see and hear the words.

Variable-speed tape recorders

Tape recorders/players allow a user to listen to pre-recorded text or to capture spoken information (e.g., a classroom lecture) and play it back later. Variable speed control (VSC) tape recorders speed up or slow down the playback rate without distorting the "speaker's" voice.

Word-prediction programs

Word prediction software can help a user during word processing by "predicting" a word the user intends to type. Predictions are based on spelling, syntax, and frequent/recent use. This prompts kids who struggle with writing to use proper spelling, grammar, and word choices, with fewer keystrokes.

12.3.3: Here are 7 essential apps for students with learning disabilities:

1. **ModMath.** ModMath is a free app for the iPad, targeted at helping students with dyslexia and dysgraphia do math. It was created by parents of a child with dysgraphia, and remains focused on providing a clear tool to solve math problems without ever picking up a pencil.
2. **MyTalkTools Mobile.** This is an innovative app which enables students with communication difficulties to say what they want, using a sequence of words, sounds and images. It can be configured to feature certain images and play certain sounds, so it can be set up for a particular student to best aid them.
3. **Dyslexia Toolbox.** Marketed as being "by dyslexic people, for dyslexic people", this toolbox features a whole host of assistive technology features for K-12 students with dyslexia. Type pads, word prediction, digital overlays and text readers are all included, along with many more neat features designed with dyslexia in mind.

4. **If... The Emotional IQ Game.** An excellent example of gamification in action, *If...* helps children aged between 6-12 years develop the skills that lead to emotional intelligence. Parents and teachers can view reports on a student's progress, potentially opening further productive conversations and opportunities.
5. **Stop, Breathe & Think.** Fantastic for students with anxiety and stress disorders, this is a meditation app which encourages users to think about how they're feeling, while also providing short mindfulness and meditation exercises tailored to their mood.
6. **Voice Dream Reader.** For children and adults with reading disabilities and ADD/ADHD, Voice Dream Reader allows a student to highlight text which will then be read to them. For a learner who comprehends things better aurally, Voice Dream Reader is a must have.
7. **Autism Xpress.** A simple app designed to help young people with autism express their emotions, Autism Xpress uses a feeling finder and games in a fun and easy-to-use package.

Reference:

<http://inclusive.tki.org.nz/assets/inclusive-education/MOE-UDL-guide-summary.pdf>

Retrieved dated on 13/12/2017

<http://www.udlcenter.org/>

<http://www.readingrockets.org/article/assistive-technology-kids-learning-disabilities-overview>

<https://www.teachthought.com/technology/34-assistive-technology-apps-from-edshelf/>

<http://www.thetechadvocate.org/7-must-app-andtools-students-learning-disabilities/>

Activities for the Trainer

Activity 1:- Reading and group discussion: The trainer will ask the participant to discuss the availability of AT in their school and follow it with group discussion on all the concepts and sources with their limitation. Review of the different policies and practices of inclusive education, which are available on government websites and go through the handbooks of AT published by state governments (30min).

Activity 2:- Explore and Identify different AT according to the different disability of students. Participants should categorize assistive technology in group and discuss which AT is used for which disabilities. (30min)

Activity 3:- Find the appropriate AT for the particular students with disabilities and discuss in the group. The trainer will ask participants that they will install particular application and find the different usages for the students with disabilities.

Resources Required

- This module on UDL and AT
- This session for different assistive technology for students with different disabilities.
- Introductory Videos
- Write up on AT
- Exhaustive list of AT according to different disabilities.
- The trainer must have known about the development of AT

Module-XIII

EMERGING TRENDS IN ICT

13.1: Introduction

As ICT is rapidly becoming an integral part of the social environment and as our jobs are being transformed rapidly into tapping on keyboards and looking at screens, traditional literacy is no longer sufficient—what could be called, “literacy,” becomes imperative. Learning to work a PC and surfing the Internet is becoming crucial for functioning in the workplace, for effective citizenship, for entertainment, and for personal growth. With the rapid change in technology, training cannot be a one-shot affair; we have to be updated continuously to stay abreast of developments. Planning and designing educational systems so that they familiarize students with a technology that is being modified and evolving continuously is not just an intellectual challenge, it is also an economic one. The Information and Communications Technology (ICT) industry is experiencing profound change across a broad range of areas.

13.2. Objectives

After the completion of the module the participants are expected to;

1. Explain different emerging trends in ICT for teaching learning
2. Develop skills and competencies in using virtual reality, 3D printing, artificial intelligence etc

13.3.1. Virtual Reality

Virtual reality (VR) is a computer technology that uses virtual reality headsets or multi-projected environments, sometimes in combination with physical environments or props, to generate realistic images, sounds and other sensations that simulate a user's physical presence in a virtual or imaginary environment. A person using virtual reality equipment is able to "look around" the artificial world, and with high quality VR move around in it and interact with virtual features or items. The effect is commonly created by VR headsets consisting of a head-mounted display with a small screen in front of the eyes, but can also be created through specially designed rooms with multiple large screens.

VR systems that include transmission of vibrations and other sensations to the user through a game controller or other devices are known as haptic systems. This tactile information is generally known as force feedback in medical, video gaming and military training applications. Virtual reality also refers to remote communication environments which provide a virtual presence of users with through telepresence and telexistence or the use of a virtual artifact (VA). The immersive environment can be similar to the real world in order to create a lifelike experience grounded in reality or sci-fi.

The definition of virtual reality comes, naturally, from the definitions for both 'virtual' and 'reality'. The definition of 'virtual' is near and reality is what we experience as human beings. So the term 'virtual reality' basically means 'near-reality'. This could, of course, mean anything but it usually refers to a specific type of reality emulation.

We know the world through our senses and perception systems. In school we all learned that we have five senses: taste, touch, smell, sight and hearing. These are however only our most obvious sense organs. The truth is that humans have many more senses than this, such as a sense of balance for example. These other sensory inputs, plus some special processing of sensory information by our brains ensures that we have a rich flow of information from the environment to our minds.

Everything that we know about our reality comes by way of our senses. In other words, our entire experience of reality is simply a combination of sensory information and our brains sense-making mechanisms for that information. It stands to reason then, that if you can present your senses with made-up information, your perception of reality would also change in response to it. You would be presented with a version of reality that isn't really there, but from your perspective it would be perceived as real. Something we would refer to as a virtual reality.

So, in summary, virtual reality entails presenting our senses with a computer generated virtual environment that we can explore in some fashion.

In technical terms

Answering “what is virtual reality” in technical terms is straight-forward. Virtual reality is the term used to describe a three-dimensional, computer generated environment which can be explored and interacted with by a person. That person becomes part of this virtual world or is immersed within this environment and whilst there, is able to manipulate objects or perform a series of actions.

- **Uses**
- Video games
- Cinema and entertainment
- Social science and psychology
- Altering perception, emotion and physiological state
- Understanding bias and stereotypes
- Healthcare and clinical therapies
- Surgery training
- Anxiety disorder treatment
- Pain management
- Education and training
- Military uses
- Space training
- Flight and vehicular applications
- Medical training
- Fine arts
- Engineering
- Virtual reality in occupational safety and health
- Heritage and archaeology
- Architectural and urban design
- Music and concerts
- Marketing

13. 3.2. 3D Printing

3D Printing is an additive manufacturing process that creates a physical object from a digital design. There are different 3D printing technologies and materials you can print with, but all are based on the same principle: a digital model is turned into a solid three-dimensional physical object by adding material layer by layer.

How does 3D Printing Work?

Every 3D print starts as a digital 3D design file – like a blueprint – for a physical object. Trying to print without a design file is like trying to print a document on a sheet of paper without a text file. This design file is sliced into thin layers which is then sent to the 3D printer.

From here on the printing process varies by technology, starting from desktop printers that melt a plastic material and lay it down onto a print platform to large industrial machines that use a laser to selectively melt metal powder at high temperatures. The printing can take hours to complete depending on the size, and the printed objects are often post-processed to reach the desired finish.

Available materials also vary by printer type, ranging from plastics to rubber, sandstone, metals and alloys - with more and more materials appearing on the market every year.

The Pros and Cons of 3D Printing

- Create complex designs
- Customize each and every item
- No need for tools and molds, lower fixed costs
- Speed and ease of prototyping, faster and less risky route to market
- Less waste
- Higher cost for large production runs
- Less material choices, colors, finishes
- Limited strength and endurance
- Lower precision

Who is Using 3D Printing?

One of the greatest things about 3D printing is that it can be beneficial for anyone, regardless of industry or profession.

- Manufacturing applications
- Cloud-based additive manufacturing
- Mass customization
- Rapid manufacturing
- Rapid prototyping
- Research
- Food
- Agile tooling
- Medical applications
- Bio-printing
- Medical devices
- Pills
- Industrial applications
- Apparel
- Industrial Art and Jewelry
- Automotive industry
- Construction
- Firearms
- Computers and robots
- Soft Sensors and Actuators
- Space
- Sociocultural applications
- Art and Jewelry
- 3D Selfies
- Communication
- Domestic use

- Education and research
- Environmental use
- Cultural Heritage
- Specialty materials

13.3.3. Artificial Intelligence

Artificial intelligence (AI, also machine intelligence, MI) is intelligence displayed by machines, in contrast with the natural intelligence (NI) displayed by humans and other animals.

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using the rules to reach approximate or definite conclusions), and self-correction. Particular applications of AI include expert systems, speech recognition and machine vision.

AI was coined by John McCarthy, an American computer scientist, in 1956 at The Dartmouth Conference where the discipline was born. Today, it is an umbrella term that encompasses everything from robotic process automation to actual robotics. It has gained prominence recently due, in part, to big data, or the increase in speed, size and variety of data businesses are now collecting. AI can perform tasks such as identifying patterns in the data more efficiently than humans, enabling businesses to gain more insight out of their data.

Examples of AI technology

Automation is the process of making a system or process function automatically. Robotic process automation, for example, can be programmed to perform high-volume, repeatable tasks normally performed by humans. RPA is different from IT automation in that it can adapt to changing circumstances.

Machine learning is the science of getting a computer to act without programming. Deep learning is a subset of machine learning that, in very simple terms, can be thought of as the automation of predictive analytics. There are three types of machine learning

algorithms: supervised learning, in which data sets are labeled so that patterns can be detected and used to label new data sets; unsupervised learning, in which data sets aren't labeled and are sorted according to similarities or differences; and reinforcement learning, in which data sets aren't labeled but, after performing an action or several actions, the AI system is given feedback.

Machine vision is the science of making computers see. Machine vision captures and analyzes visual information using a camera, analog-to-digital conversion and digital signal processing. It is often compared to human eyesight, but machine vision isn't bound by biology and can be programmed to see through walls, for example. It is used in a range of applications from signature identification to medical image analysis. Computer vision, which is focused on machine-based image processing, is often conflated with machine vision.

Natural language processing (NLP) is the processing of human -- and not computer -- language by a computer program. One of the older and best known examples of NLP is spam detection, which looks at the subject line and the text of an email and decides if it's junk. Current approaches to NLP are based on machine learning. NLP tasks include text translation, sentiment analysis and speech recognition.

Pattern recognition is a branch of machine learning that focuses on identifying patterns in data. The term, today, is dated.

Robotics is a field of engineering focused on the design and manufacturing of robots. Robots are often used to perform tasks that are difficult for humans to perform or perform consistently. They are used in assembly lines for car production or by NASA to move large objects in space. More recently, researchers are using machine learning to build robots that can interact in social settings.

AI Applications

AI in Healthcare: The biggest bets are on improving patient outcomes and reducing costs. Companies are applying machine learning to make better and faster diagnoses than humans. One of the best known healthcare technologies is IBM Watson. It understands

natural language and is capable of responding to questions asked of it. The system mines patient data and other available data sources to form a hypothesis, which it then presents with a confidence scoring schema. Other AI applications include chatbots, a computer program used online to answer questions and assist customers, to help schedule follow-up appointments or aiding patients through the billing process, and virtual health assistants that provide basic medical feedback.

AI in Business: Robotic process automation is being applied to highly repetitive tasks normally performed by humans. Machine learning algorithms are being integrated into analytics and CRM platforms to uncover information on how to better serve customers. Chatbots have been incorporated into websites to provide immediate service to customers. Automation of job positions has also become a talking point among academics and IT consultancies such as Gartner and Forrester.

AI in Education: AI can automate grading, giving educators more time. AI can assess students and adapt to their needs, helping them work at their own pace. AI tutors can provide additional support to students, ensuring they stay on track. AI could change where and how students learn, perhaps even replacing some teachers.

AI in Finance: AI applied to personal finance applications, such as Mint or Turbo Tax, is upending financial institutions. Applications such as these could collect personal data and provide financial advice. Other programs, IBM Watson being one, have been applied to the process of buying a home. Today, software performs much of the trading on Wall Street.

AI in Law: The discovery process, sifting through of documents, in law is often overwhelming for humans. Automating this process is a better use of time and a more efficient process. Startups are also building question-and-answer computer assistants that can sift programmed-to-answer questions by examining the taxonomy and ontology associated with a database.

AI in Manufacturing: This is an area that has been at the forefront of incorporating robots into the workflow. Industrial robots used to perform single tasks and were separated from human workers, but as the technology advanced that changed.

13.3.4. Internet of Things

The "Internet of things" (IoT) is becoming an increasingly growing topic of conversation both in the workplace and outside of it. It's a concept that not only has the potential to impact how we live but also how we work. But what exactly is the "Internet of things" and what impact is it going to have on you, if any?

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and network connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure.

Simply put, this is the concept of basically connecting any device with an on and off switch to the Internet (and/or to each other). This includes everything from cellphones, coffee makers, washing machines, headphones, lamps, wearable devices and almost anything else you can think of. This also applies to components of machines, for example a jet engine of an airplane or the drill of an oil rig. If it has an on and off switch then chances are it can be a part of the IoT.



How Does This Impact You?

The new rule for the future is going to be, "Anything that can be connected, will be connected." But why on earth would you want so many connected devices talking to each other? There are many examples for what this might look like or what the potential value might be. Say for example you are on your way to a meeting; your car could have access to your calendar and already know the best route to take. If the traffic is heavy your car might send a text to the other party notifying them that you will be late. What if your alarm clock wakes up you at 6 a.m. and then notifies your coffee maker to start brewing coffee for you? What if your office equipment knew when it was running low on supplies

and automatically re-ordered more? What if the wearable device you used in the workplace could tell you when and where you were most active and productive and shared that information with other devices that you used while working?

13.3.5.BIT coins

Bitcoin – the initial virtual banking currency of the internet – has existed for several years now and many people have questions about them. Where do they come from? Are they legal? Where can you get them? Why did they split into Bitcoin and Bitcoin Cash? Here are the basics you need to know.

Cryptocurrency Defined

Cryptocurrencies are just lines of computer code that hold monetary value. Those lines of code are created by electricity and high-performance computers.

Cryptocurrency is also known as digital currency. Either way, it is a form of digital public money that is created by painstaking mathematical computations and policed by millions of computer users called 'miners'. Physically, there is nothing to hold.

'Crypto' comes from the word cryptography, the security process used to protect transactions that send the lines of code out for purchases. Cryptography also controls the creation of new 'coins', the term used to describe specific amounts of code.

Governments have no control over the creation of cryptocurrencies, which is what initially made them so popular. Most cryptocurrencies begin with a market cap in mind, which means that their production will decrease over time thus, ideally, making any particular coin more valuable in the future.

What Are Bitcoins?

Bitcoin was the first cryptocoin currency ever invented. No one knows exactly who created it – cryptocurrencies are designed for maximum anonymity – but bitcoins first appeared in 2009 from a developer supposedly named Satoshi Nakamoto. He has since disappeared and left behind a Bitcoin fortune.

Because Bitcoin was the first cryptocurrency to exist, all digital currencies created since then are called Altcoins, or alternative coins. Litecoin, Peercoin, Feathercoin, Ethereum and hundreds of other coins are all Altcoins because they are not Bitcoin.

One of the advantages of Bitcoin is that it can be stored offline on a person's local hardware. That process is called cold storage and it protects the currency from being taken by others. When the currency is stored on the internet somewhere (hot storage), there is high risk of it being stolen.

On the flip side, if a person loses access to the hardware that contains the bitcoins, the currency is simply gone forever. It's estimated that as much as \$30 billion in bitcoins have been lost or misplaced by miners and investors. Nonetheless, Bitcoins remain incredibly popular as the most famous cryptocurrency over time.

Why Bitcoins Are So Controversial

Various reasons have converged to make Bitcoin currency a real media sensation.

From 2011-2013, criminal traders made bitcoins famous by buying them in batches of millions of dollars so they could move money outside of the eyes of law enforcement. Subsequently, the value of bitcoins skyrocketed.

Scams, too, are very real in the cryptocurrency world. Naive and savvy investors alike can lose hundreds or thousands of dollars to scams.

Ultimately, though, bitcoins and altcoins are highly controversial because they take the power of making money away from central federal banks, and give it to the general public.

Bitcoin accounts cannot be frozen or examined by tax men, and middleman banks are completely unnecessary for bitcoins to move. Law enforcement and bankers see bitcoins as 'gold nuggets in the wild, wild west', beyond the control of traditional police and financial institutions.

How Bitcoins Work

Bitcoins are completely virtual coins designed to be 'self-contained' for their value, with no need for banks to move and store the money. Once you own bitcoins, they behave like physical gold coins: they possess value and trade just as if they were nuggets of gold in your pocket. You can use your bitcoins to purchase goods and services online, or you can tuck them away and hope that their value increases over the years.

Bitcoins are traded from one personal 'wallet' to another. A wallet is a small personal database that you store on your computer drive (i.e cold storage), on your smartphone, on your tablet, or somewhere in the cloud (hot storage).

For all intents, bitcoins are forgery-resistant. It is so computationally-intensive to create a bitcoin, it isn't financially worth it for counterfeiters to manipulate the system.

Bitcoin Values and Regulations

A single bitcoin varies in value daily; you can check places like Coindesk to see today's value. There are more than two billion dollars worth of bitcoins in existence. Bitcoins will stop being created when the total number reaches 21 billion coins, which will be sometime around the year 2040. As of 2017, more than half of those bitcoins had been created.

Bitcoin currency is completely unregulated and completely decentralized. There is no national bank or national mint, and there is no depositor insurance coverage. The currency itself is self-contained and un-collateraled, meaning that there is no precious metal behind the bitcoins; the value of each bitcoin resides within each bitcoin itself.

Bitcoins are stewarded by 'miners', the massive network of people who contribute their personal computers to the Bitcoin network. Miners act as a swarm of ledger keepers and auditors for Bitcoin transactions. Miners are paid for their accounting work by earning new bitcoins for each week they contribute to the network.

How Bitcoins Are Tracked

A Bitcoin holds a very simple data ledger file called a blockchain. Each blockchain is unique to each individual user and his/her personal bitcoin wallet.

All bitcoin transactions are logged and made available in a public ledger, helping ensure their authenticity and preventing fraud. This process helps to prevent transactions from being duplicated and people from copying bitcoins.

Note: While every Bitcoin records the digital address of every wallet it touches, the bitcoin system does NOT record the names of the individuals who own wallets. In practical terms, this means that every bitcoin transaction is digitally confirmed but is completely anonymous at the same time.

So, although people cannot easily see your personal identity, they can see the history of your bitcoin wallet. This is a good thing, as a public history adds transparency and security, helps deter people from using bitcoins for dubious or illegal purposes.

Banking or Other Fees to Use Bitcoins

There are very small fees to use bitcoins. However, there are no ongoing banking fees with bitcoin and other cryptocurrency because there are no banks involved. Instead, you will pay small fees to three groups of bitcoin services: the servers (nodes) who support the network of miners, the online exchanges that convert your bitcoins into dollars, and the mining pools you join.

The owners of some server nodes will charge one-time transaction fees of a few cents every time you send money across their nodes, and online exchanges will similarly charge when you cash your bitcoins in for dollars or euros.

Additionally, most mining pools will either charge a small one percent support fee or ask for a small donation from the people who join their pools.

In the end, while there are nominal costs to use Bitcoin, the transaction fees and mining pool donations are much cheaper than conventional banking or wire transfer fees.

Bitcoin Production Facts

Bitcoins can be 'minted' by anyone in the general public who has a strong computer. Bitcoins are made through a very interesting self-limiting system called cryptocurrency mining and the people who mine these coins are called miners. It is self-limiting because

only 21 million total bitcoins will ever be allowed to exist, with approximately 11 million of those Bitcoins already mined and in current circulation.

Bitcoin mining involves commanding your home computer to work around the clock to solve 'proof-of-work' problems (computationally-intensive math problems). Each bitcoin math problem has a set of possible 64-digit solutions. Your desktop computer, if it works nonstop, might be able to solve one bitcoin problem in two to three days, likely longer.

For a single personal computer mining bitcoins, you may earn perhaps 50 cents to 75 cents USD per day, minus your electricity costs.

For a very large-scale miner who runs 36 powerful computers simultaneously, that person can earn up to \$500 USD per day, after costs.

Indeed, if you are a small-scale miner with a single consumer-grade computer, you will likely spend more in electricity that you will earn mining bitcoins. Bitcoin mining is only really profitable if you run multiple computers, and join a group of miners to combine your hardware power. This very prohibitive hardware requirement is one of the biggest security measures that deters people from trying to manipulate the Bitcoin system.

Bitcoin Security

They are as secure as possessing physical precious metal. Just like holding a bag of gold coins, a person who takes reasonable precautions will be safe from having their personal cache stolen by hackers.

As mentioned earlier, your bitcoin wallet can be stored online (i.e. a cloud service) or offline (a hard drive or USB stick). The offline method is more hacker-resistant and absolutely recommended for anyone who owns more than 1 or 2 bitcoins but it is not without risk.

More than hacker intrusion, the real loss risk with bitcoins revolves around not backing up your wallet with a failsafe copy. There is an important .dat file that is updated every time you receive or send bitcoins, so this .dat file should be copied and stored as a duplicate backup every day you do bitcoin transactions.

Security note: The collapse of the Mt.Gox bitcoin exchange service was not due to any weakness in the Bitcoin system. Rather, that organization collapsed because of mismanagement and their unwillingness to invest any money in security measures. Mt.Gox, for all intents and purposes, had a large bank with no security guards, and it paid the price.

Abuse of Bitcoins

There are currently three known ways that bitcoin currency can be abused.

1) Technical weakness – time delay in confirmation: bitcoins can be double-spent in some rare instances during the confirmation interval. Because bitcoins travel peer-to-peer, it takes several seconds for a transaction to be confirmed across the P2P swarm of computers. During these few seconds, a dishonest person who employs fast clicking can submit a second payment of the same bitcoins to a different recipient.

While the system will eventually catch the double-spending and negate the dishonest second transaction, if the second recipient transfers goods to the dishonest buyer before they receive confirmation, then that second recipient will lose both the payment and the goods.

2) Human dishonesty – pool organizers taking unfair share slices: Because bitcoin mining is best achieved through pooling (joining a group of thousands of other miners), the organizers of each pool get the privilege of choosing how to divide up any bitcoins that are discovered. Bitcoin mining pool organizers can dishonestly take more bitcoin mining shares for themselves.

3) Human mismanagement – online exchanges: With Mt. Gox being the biggest example, the people running unregulated online exchanges that trade cash for bitcoins can be dishonest or incompetent. This is the same as Fannie Mae and Freddie Mac investment banks going under because of human dishonesty and incompetence. The only difference is that conventional banking losses are partially insured for the bank users, while bitcoin exchanges have no insurance coverage for users.

Four Reasons Why Bitcoins Are Such a Big Deal

There is a lot of controversy around bitcoins. These are the top reasons why:

1) Bitcoins are not created by any central bank, nor regulated by any government. Accordingly, there are no banks logging your money movement, and government tax agencies and police cannot track your money. This is bound to change eventually, as unregulated money is a real threat to government control, taxation, and policing.

Indeed, bitcoins have become a tool for contraband trade and money laundering, precisely because of the lack of government oversight. The value of bitcoins skyrocketed in the past because wealthy criminals were purchasing bitcoins in large volumes. Because there is no regulation, however, you can lose out immensely as a miner or investor.

2) Bitcoins completely bypass banks. Bitcoins are transferred via a peer-to-peer network between individuals, with no middleman bank to take a slice.

Bitcoin wallets cannot be seized or frozen or audited by banks and law enforcement. Bitcoin wallets cannot have spending and withdrawal limits imposed on them. For all intents: nobody but the owner of the bitcoin wallet decides how their wealth will be managed.

This is really threatening to banks, as you might guess.

3) Bitcoins are changing how we store and spend our personal wealth. Since the advent of printed (and eventually virtual) money, the world has handed over the power of currency to a central mint and various banks. These banks print our virtual money, store our virtual money, move our virtual money, and charge us for their middleman services.

If banks need more currency, they simply print more or conjure more digits in their electronic ledgers. This system is easily abused and gamed by banks because paper money is essentially paper checks with a promise to have value, with no actual physical gold behind the scenes to back those promises.

Bitcoins are designed to put the control of personal wealth back into the hands of the individual. Instead of paper or virtual bank balances that promise to have value, Bitcoins are actual packages of complex data that have value in themselves.

4) Bitcoin transactions are irreversible. Conventional payment methods, like a credit card charge, bank draft, personal checks, or wire transfer, do have the benefit of being insured and reversible by the banks involved. In the case of bitcoins, every time bitcoins change hands and change wallets, the result is final. Simultaneously, there is no insurance protection of your bitcoin wallet: If you lose your wallet's hard drive data or even your wallet password, remember: your wallet's contents are gone forever.

13.3.6. Augmented Reality

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are "augmented" by computer-generated perceptual information, ideally across multiple sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory. The overlaid sensory information can be constructive (i.e. additive to the natural environment) or destructive (i.e. masking of the natural environment) and is spatially registered with the physical world such that it is perceived as an immersive aspect of the real environment. In this way, Augmented reality alters one's current perception of a real world environment, whereas virtual reality replaces the real world environment with a simulated one. Augmented Reality is related to a synonymous term called computer-mediated reality.

Augmented reality is used to enhance the natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Information about the environment and its objects is overlaid on the real world. This information can be virtual or real, e.g. seeing other real sensed or measured information such as electromagnetic radio waves overlaid in exact alignment with where they actually are in space.

Possible Applications

- Education

In educational settings, AR has been used to complement a standard curriculum. Text, graphics, video, and audio may be superimposed into a student's real-time environment. Textbooks, flashcards and other educational reading material may contain embedded "markers" or triggers that, when scanned by an AR device, produced supplementary information to the student rendered in a multimedia format. This makes AR a good alternative method for presenting information and Multimedia Learning Theory can be applied.

As AR evolved, students can participate interactively and interact with knowledge more authentically. Instead of remaining passive recipients, students can become active learners, able to interact with their learning environment. Computer-generated simulations of historical events allow students to explore and learning details of each significant area of the event site.

In higher education, Construct3D, a Studierstube system, allows students to learn mechanical engineering concepts, math or geometry. Chemistry AR apps allow students to visualize and interact with the spatial structure of a molecule using a marker object held in the hand. Anatomy students can visualize different systems of the human body in three dimensions.

Augmented reality technology enhances remote collaboration, allowing students and instructors in different locales to interact by sharing a common virtual learning environment populated by virtual objects and learning materials.

Primary school children learn easily from interactive experiences. Astronomical constellations and the movements of objects in the solar system were oriented in 3D and overlaid in the direction the device was held, and expanded with supplemental video information. Paper-based science book illustrations could seem to come alive as video without requiring the child to navigate to web-based materials.

For teaching anatomy, teachers could use devices to superimpose hidden anatomical structures like bones and organs on any person in the classroom.

While some educational apps were available for AR in 2016, it was not broadly used. Apps that leverage augmented reality to aid learning included SkyView for studying astronomy, AR Circuits for building simple electric circuits, and SketchAr for drawing.

AR would also be a way for parents and teachers to achieve their goals for modern education, which might include providing a more individualized and flexible learning, making closer connections between what is taught at school and the real world, and helping students to become more engaged in their own learning.

- Literature
- Archaeology
- Architecture
- Visual art
- Commerce
- Emergency management/search and rescue
- Video games
- Industrial design
- Medical
- Spatial immersion and interaction
- Flight training
- Military
- Navigation
- Workplace
- Broadcast and live events
- Tourism and sightseeing
- Translation
- Music
- Retail

- Snapchat

References

- <http://blogs.skillsoft.com/learning-re-imagined/2016/02/key-trends-in-information-and-communications-technology-ict-a-look-at-2016-and-beyond.html>
- file:///C:/Users/user/Downloads/Emerging_trends_in_ICT_and_challenges_to_education.pdf
- https://en.wikipedia.org/wiki/Virtual_reality
- <https://www.vrs.org.uk/virtual-reality/what-is-virtual-reality.html>
- <https://www.3dhubs.com/what-is-3d-printing>
- https://en.wikipedia.org/wiki/Applications_of_3D_printing
- <http://searchcio.techtarget.com/definition/AI>
- https://en.wikipedia.org/wiki/Artificial_intelligence
- <https://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/#41867e751d09>
- https://en.wikipedia.org/wiki/Internet_of_things
- <https://www.lifewire.com/what-are-bitcoins-2483146>
- https://en.wikipedia.org/wiki/Augmented_reality