# Critical Understanding of Information Communication Technology [ICT]

EPC-3

# Unit-3
# Internet & Educational Resources

# Introduction

- Network of Networks
- It is a collection of LANs connected by a WAN.
- It is a network of computers that links many different type of computer networks all over the world.
- The way of information sharing where computers are the medias of communication

# History

- ARPANET in 1960s by The US Department of Defence.
- The first message was sent over ARPANET from Computer Science Professor Leonard Kleinrock's Laboratory at University of California, LA to Stanford Research Institute [SRI]
- In 1962, J.C.R Licklider of MIT first proposed a global network of computers and moved over the **DARPA [Defence Advanced Research Projects Agency]**
- In 1969, It was renamed as **Advanced Research Projects Agency [ARPA]**
- In 1970s, TCP/IP architecture first proposed by Bob Kahn and further developed by Kahn and Vint Cerf at Stanford.

# Contd.

- In 1980, It was adopted by Defence Department
- NSFNET [National Science Foundation Network] was created.
- Now, other computers are allowed to linked with other any computers of NSFNET.
- Finally in 1980, Internet was available for global use.
- In 1982, Internet Protocol Suite(TCP/IP) was Introduced as a standard protocol on ARPANET
- Commercial Internet Service Providers (ISPs) began to emerge in late 1980s.
- ARPANET was decommissioned in 1990 & NSFNET decommissioned in 1995.
- They removed their last restrictions on the use of Internet to carry commercial traffic.
- Private Limited connections are became parts of Internet by officially commercial entities

# Contd.

- In 1980s, at CERN in Switzerland, British Computer Scientist Tim Berners-Lee resulted in World Wide Web by linking hypertext documents into an information system, accessible from anywhere on the network.
- In mid-1990s, Internet has its revolutionary impact on culture, commerce and technology by including instant communication by electronic mail, Voice over Internet Protocol (VoIP), Telephone Calls, Two-way Video Calls and the social networking, online shopping, discussion forums & blogging sites .
- In India, Educational Research Network [ERNET] in 1986
- The First publicly available internet service in India was launched by state-owned Videsh Sanchar Nigam Limited (VSNL) on 14$^{th}$ August 1995 which was a multi protocol network with both TCP/IP & OSI-IP stacks running over leased line portion of the backbone

# Advantages of Using Internet

- Information Resources
- Faster Communication
- Online Services
- Marketing & Sales
- Financial Services
- Teleconferencing

# Internet in the Field of Education

- Research
- Online Library
- Online Books
- Email Facility
- Current Events
- Networking
- Blogging

# Internet in Education Field

- Research
- Online Library
- Online Books
- Networking
- Other Resources

# Internet History

| Year | Event | Year | Event |
|---|---|---|---|
| 1961 | Packet swtching network founded | 1973 | CYCLADES network demonstrated |
| 1966 | Merit Network founded | 1974 | Telnet Packet switched network founded |
| 1966 | ARPANET(Advanced Research Projects Agency Network) Planning Starts | 1976 | X.25 protocol approved |
| 1969 | ARPANET carries its first Packets | 1978 | Minitel Introduced |
| 1970 | Mark-I Network Founded | 1980 | Ethernet standard Introduced |
| 1971 | Tymmet Packet-switched network founded | 1981 | BITNET established |

# Contd.

| Year | Event | Year | Event |
|---|---|---|---|
| 1981 | Computer Science Network (CSNET) founded | 1988 | OSI Reference Model Released |
| 1982 | TCP/IP Protocol Suite formalized | 1989 | Border Gatway Protocol (BGP)established |
| 1982 | Simple Main Transfer Protocol (SMTP) formalized | 1989 | PSINet Network Founded |
| 1983 | Domain Name System (DNS) established | 1990 | Archie search engine founded |
| 1986 | NSFNET Network Founded | 1991 | Wide Area information server(WAIS) founded |
| 1987 | UUNET Network Founded | 1991 | Gopher Founded |

# Contd.

| Year | Event | Year | Event |
|---|---|---|---|
| 1991 | Commercial Internet eXchange(CIX) established | 2003 | LinkedIn Business networking founded |
| 1991 | Worl Wide Web | 2003 | Myspace social networking site formalized |
| 1992 | Internet Society (ISOC) founded | 2003 | Skype Internet Voice Call service founded |
| 1998 | Yahoo! Groups founded | 2003 | iTunes Store founded |
| 1999 | IEEE 802.11b wireless networking established | 2004 | Facebook Social networking site founded |
| 1999 | Napster peer to peer file sharing service established | 2004 | Podcast media file series founded |
| 2001 | Wikipedia founded | 2004 | Flicker Image hosting service founded |

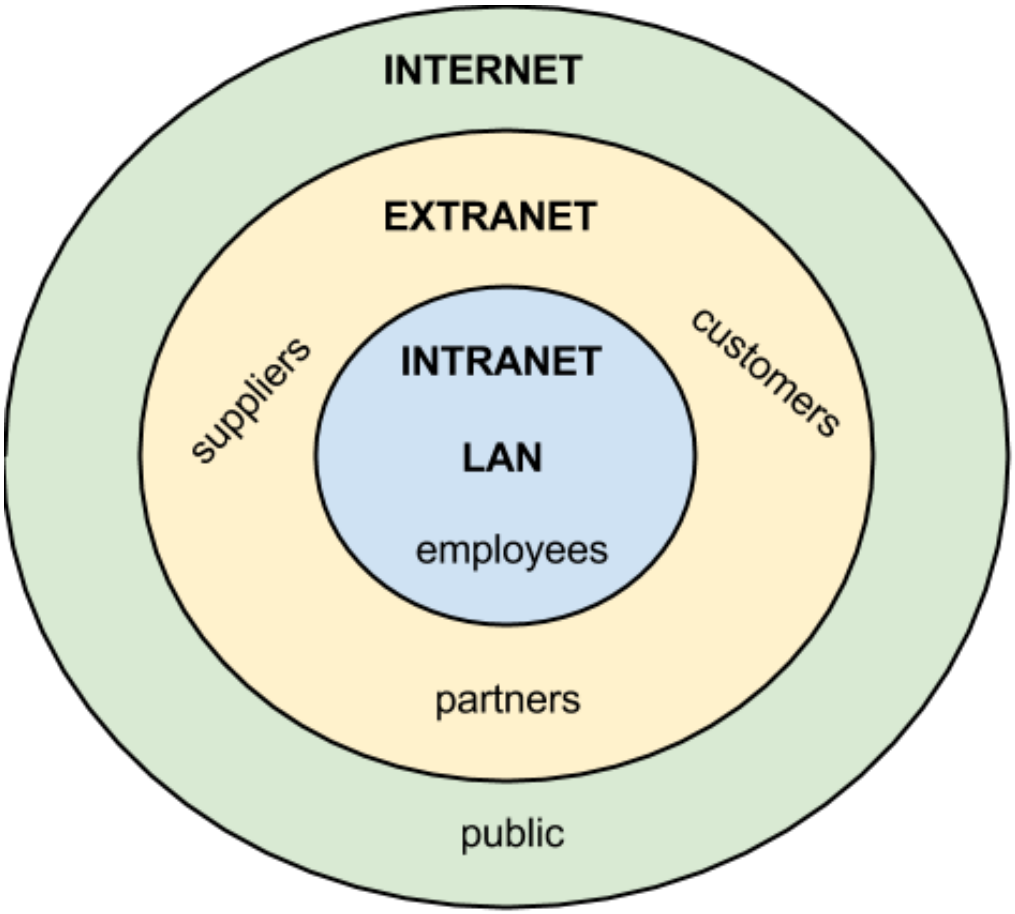
# Contd.

| Year | Event | Year | Event |
|---|---|---|---|
| 2005 | YouTube Video sharing service Founded | 2008 | Google Chrome Web Browser Launched |
| 2005 | Google Earth formalized | 2009 | Bing Search Engine Formalized |
| 2006 | Twitter micro-blogging service founded | 2009 | WhatsApp establised |
| 2007 | Google Street View Service founded | 2010 | Pinterest & Instagram Photo Sharing services launched |
| 2008 | Amazon Elastic Compute Cloud service founded | 2011 | Google+ social networking service founded |
| 2008 | DropBox Cloude based file hosting service founded | 2014 | Facebook takeover Whatsaap |

# Internet Connectivity

- Five ways of internet connectivity
  - Dial Up Connection
    - Modem
  - Leased Connection
    - Permanent Telephone Connection
  - DSL (Digital Subscriber Line) Connection
    - Parallel use of Permanent Telephone Connection
  - Cable Modem Connection
    - Cable Modem
  - Very Small Aperture Terminal (VSAT)
    - Satellite Communication of Data through a ground station computer acting as a hub using star topology

# Internet, Intranet & Extranet




Relationship between Internet, Intranet & Extranet

# Terminologies

- Internet Service Provider (ISP)
- Internet Protocol (IP)
- Address
  - IP Address
  - Mac Address
- Web Server
- Web Page
- Home Page
- Website
- Internet Relay Chat (IRC)
  - Allows Live discussion
  - Established in 1988
- Web Browser
- World Wide Web
- Domain
- Domain Name System(DNS)
- HTTP

# Terminologies
# DNS

https://raktimchakraborty.in/

| TLDs | ccTLDs | g-TLDs |
|---|---|---|
| .gov | .in | .asia |
| .edu | .au | etc. |
| .biz | .us | |
| .com | etc. | |
| .net | | |
| .org | | |
| .info | | |

# Terminologies Contd.

- Hyper Text Transfer Protocol (HTTP)
- File Transfer Protocol (FTP)
- Telnet/Terminal Network
- Dynamic Host Configuration Protocol (DHCP)
- Firewall
  - Hardware Firewall
  - Software Firewall
- Software
  - Free-ware
  - Share-ware
  - Gopher

# E-mail

- Electronic Mail
- Email Service Providers
  - Google
  - Microsoft
  - Yahoo etc.
- Categories of Email
  - Client-based e-mail
  - Webmail
- Parts of email
  - Username(First part)
  - Domain name (Second part)
  - e.g. raktimchakraborty27@gmail.com

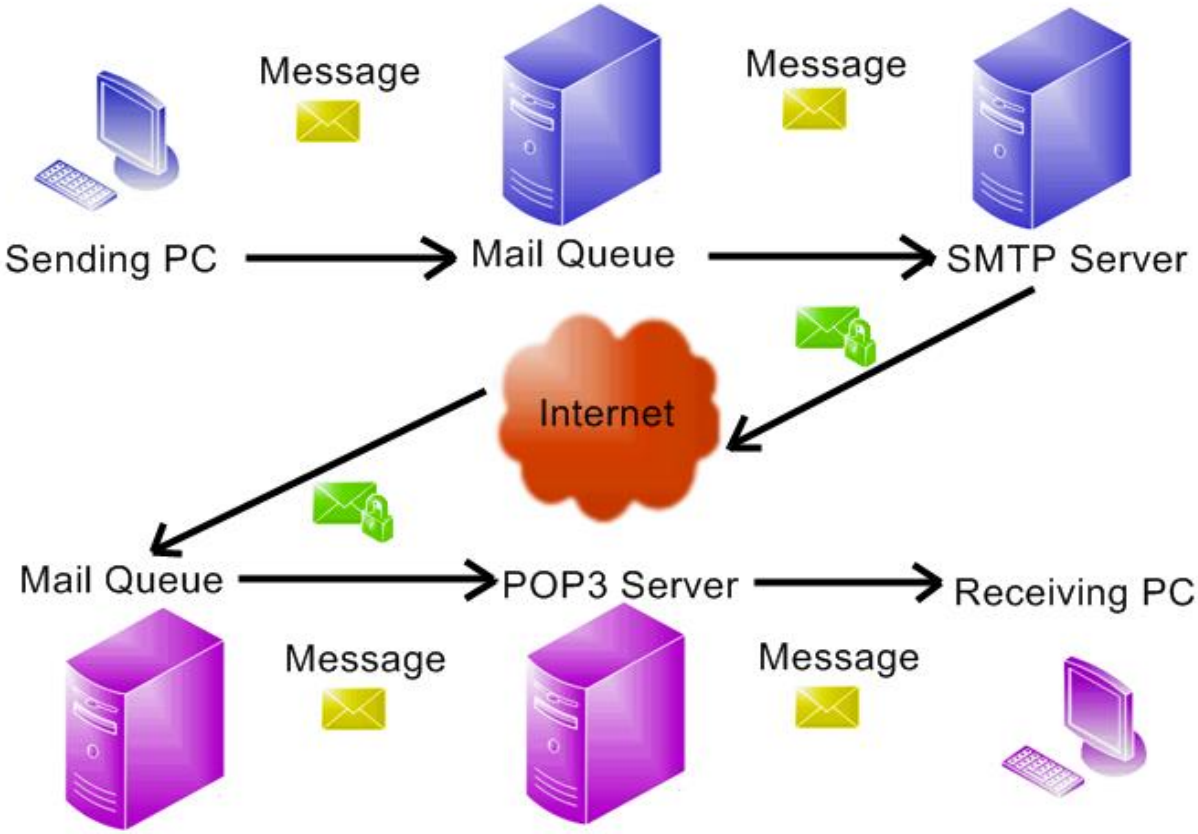
# Concepts of E-mail

- **To-** to send mail to the people put the e-mail address (if multiple put comma to separate them) in the **‘To’** filed
- **Cc-** *Carbon Copy*. The address/addresses are in this field will receive a carbon copy of the mail along with a cc header and can able to view other recipients of the mail.
- **Bcc-** *Blind Carbon Copy.* Similar to cc except the receiver will not able to see other recipients of the mail.
- **Send-** After clicking this button, the mail will be sent to the addresses which are present inside of **‘To’, ‘Cc’** & **‘Bcc’** fields.
- **Reply-** It is response only to the person who have sent the e-mail.
- **Reply to All-** This feature allows user to not only send reply to the user who have sent the e-mail but to all the users who have received the same e-mail.
- **Forward-** It allows user to forward a received message to another e-mail recipient.
- **Inbox-** It is a place where all the incoming e-mails will be stored.
- **Outbox-** It is a place where sent e-mails are to be stored till the e-mails are not fully sent.
- **Draft-** It is a place where the e-mails which haven't yet sent are stored
- **Sent Mail-** It is a place where all the copies of sent e-mails are stored
- **Trash-** It is a place where all the self deleted e-mails are stored
- **Spam-** It is a place/ category of Inbox where those e-mails are to be stored whose
  - **Source is not verified**
  - **Contains Attachments which may harmful to your Computer etc.**

# Contd.

- E-mail Servers
  - Simple Mail Transfer Protocol(SMTP) Servers
  - Post Office Protocol(POP) Servers
  - Internet Message Access Protocol(IMAP) Servers
- E-mail Clients
  - Also known as Mail User Agent(MUA)
  - e.g. Microsoft Outlook etc.

# Contd.




How E-mail Works

# Advantages

- Delivered extremely fast
- It can be sent & receive from anywhere & and from any computer which/where an internet connectivity is present
- Easy to use
- Languages are easy and informal
- Automated mails can be sent
- It can carry attachments(pictures, documents etc.)
- Promotions can be done very easily with a large reachability
- etc.

# Search Engines

- *A program that searches for and identifies items in a database that correspond to keywords or characters specified by the user, used especially for finding particular sites on the World Wide Web.*
- *Google*
- *Bing*
- *Yahoo!*

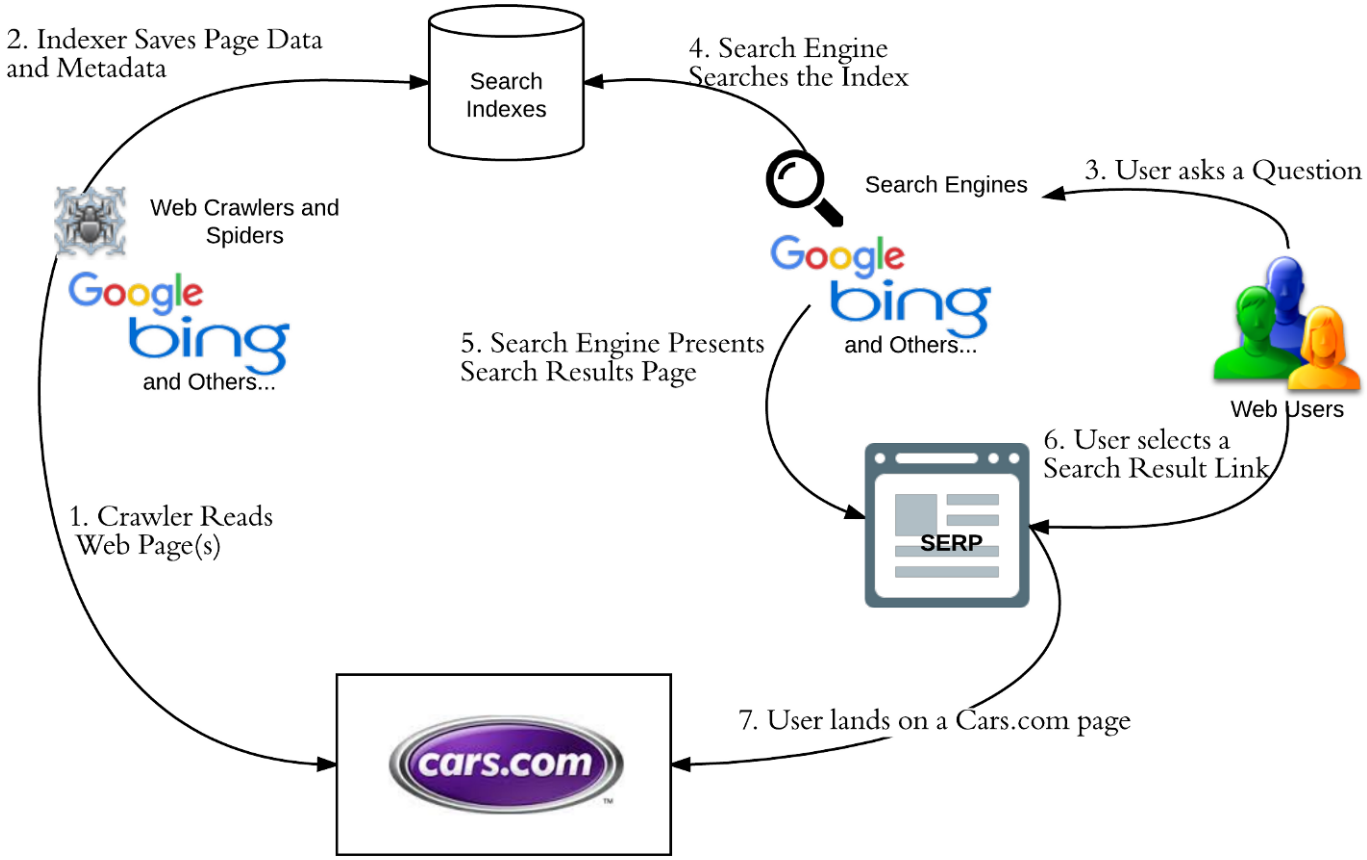
# Types of Search Engine

- Primary Search Engine
  - Yahoo!, Google etc.
- Secondary Search Engine
  - Ask.com, Lycos, LookSmart etc.
- Targeted Search Engine
  - CitySearch. Yahoo! Travel, Music Search etc.

# Contd.

- Crawler based Search Engines
  - Google, Yahoo, Ask.com etc.
- Directories based Search Engines
  - Yahoo Directory, Open Directory etc.
- Hybrid Search Engine
  - Yahoo.com, Google.com etc.
- Meta Search Engine
  - Metacrawler, Dogpile etc.
- Speciality Search Engine
  - Froggle, Yahoo Shopping etc.

# How do search engines work



# Web Browser

- A **web browser** (commonly referred to as a **browser**) is a software application for accessing information on the World Wide Web.
  - Google Chrome,
  - Mozilla Firefox,
  - Microsoft Edge etc.

# Info-Savvy Skills

- A kind of skill/skillset that deals with
  - Raising problem specific questions analytically
  - Seeking related information from various media
  - Analysing information meticulously
    - Authentic or inauthentic, good or bad, fact or opinion etc.
- According to Jean-LUC Picard, the info-savvy skills are,

# Contd.

- Asking Skill
  - Identification of problem
  - Identifying keywords and forming question around them
  - Brainstorming
  - Thinking laterally
  - Understanding ethical issues
    - Trustworthiness, Respect, Fairness, Responsibility, Caring, Citizenship etc.
  - Listening deeply, viewing wisely & speaking critically
  - Filtering information from noise
  - Sharing personal knowledge and experience

# Contd.

- Accessing Skill
  - Determining where the information is located
  - Determining what skills are needed to find information
  - Using a variety of paper and electronic sources
  - Prioritizing searching strategies
  - Skimming and scanning resources for pertinent data
  - Using Filtering skills
  - Taking smart nores

# Contd.

- Analysing Skill
  - Differentiating the data into different categories
  - Identification of relevant data
  - Establishing authenticity and credibility of the data
  - Differentiating the facts from the opinion
  - Finding relationships among different data
- Applying Skill
  - Presentations are created in a variety of ways using 4 formats of information
    - Text , images, video and sound
  - Converts Data into Information

# Contd.

- Assessing Skill
  - Is the problem identified in proper manner?
  - Is related question asked?
  - Is data collected sufficient?
  - Is the data analysed properly ?
  - Is information applied usefully?
  - Is problem solved or remaining?

# Digital Age Skills

- Digital literacy
  - Combination of knowledge, skills & behaviours used in a broad range of digital devices such as smart phones, tablets, laptops etc.
- Digital Literacy & Computer Literacy
- Digital Age Skills
  - Basic Literacy Skill
  - Scientific Literacy Skill
  - Economic Literacy Skill
  - Technological Literacy Skill
  - Visual Literacy Skill
  - Information Literacy Skill
  - Multicultural Literacy Skill
  - Global Awareness Skill

# Basic Literacy Skill

- Language Proficiency
- Have the ability to read, write, listen & speak
- Recognition of need of information, locating information, ability to evaluate all forms of information and using information effectively

# Scientific Literacy Skill

- Having the knowledge & scientific concepts and processes for participation in a Digital Age Society.
- Can ask, find or determine answers to the questions derived from curiosity and daily experience.
- Can able to read and understand scientific articles to engage social conversation about the validity of the conclusions.
- Have the ability to describe, explain and predict natural phenomena.
- Are able to evaluate the quality of scientific information on the basis of source and methods. Etc.

# Economic Literacy Skill

- Can able to identify economic problems
- Alternative solutions to the economic problems
- Can evaluate cost and benefits
- Able to analyse the incentives at work in economic situations
- Can able to examine the consequences of changes in economic situations and public policies. etc.

# Technological Literacy Skill

- Have the knowledge about the nature, uses, positivity, effectivity of technology and how does it works
- Uses of variety of technological tools to find effective ways to increase the productivity
- Use technology to solve complex problems etc.

# Visual Literacy Skill

- The ability interpret, use, appreciate and create images and video using both conventional and 21st century media in the way of
  - Advance thinking
  - Decision making
  - Communication
  - Learning

# Information Literacy Skill

- The ability to
  - Evaluate information across a range of media
  - Recognize when information is needed
  - Locate & use the information effectively
  - Use the electronic resources
  - Use the communication networks effectively

# Multicultural Literacy Skill

- The ability to
  - Understand different cultures and beliefs
  - Understand how technology impacts culture
  - Take perspectives of other cultural groups
  - Understand the history of mainstream and non-mainstream culture
  - Understand sensitive issues of bias, racism, prejudice and stereotyping  etc.

# Global Awareness Skill

- The ability to
  - Recognise and understand inter-relationships among international organisations
  - Understand the concept of nation & state
  - Understand the concepts of public-private economic entities, socio-cultural groups and individuals throughout the globe.

# Safe Surfing Mode

- Precautions
  - Visit only trusted sites
  - Avoid pornographic websites as much as possible as they are the main sources of harmful malwares, spams, pop-up ads and security threats.
  - Clear browser cache
  - Be attentive when sensitive information are asked
  - Be attentive when using downloaders as then can download malwares also.
  - Never disclose passwords
  - Careful when using USB drives
  - Logout always from any account you have logged in. etc.

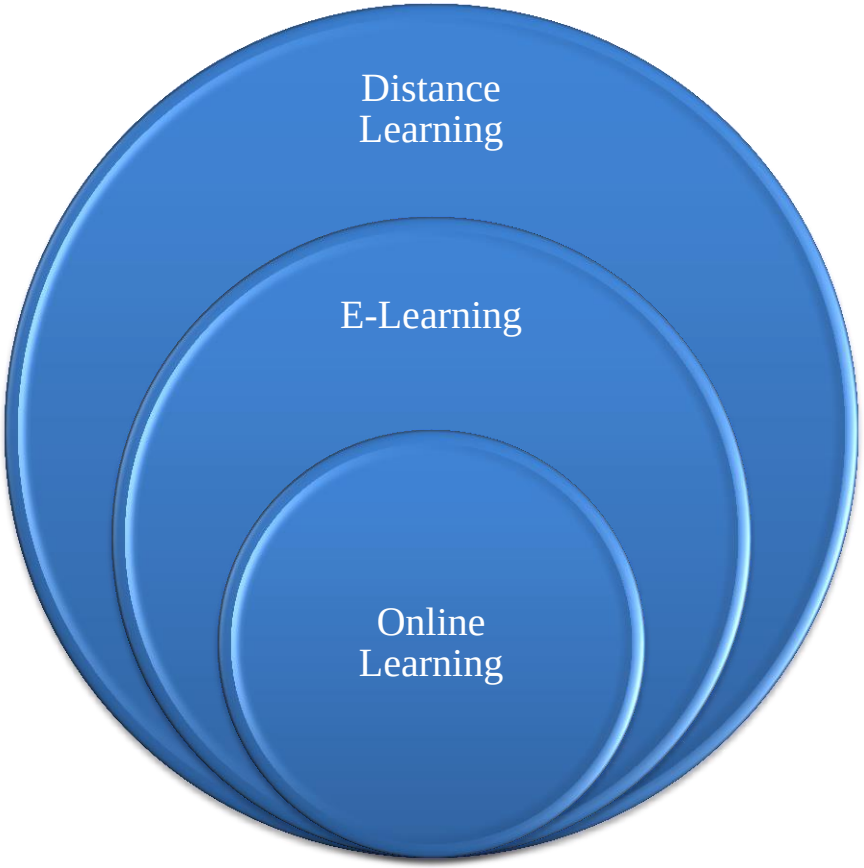
Critical Understanding of ICT

# Internet Resources

# E-Learning, Mobile Learning, Distance Learning, Online Learning

# E-Learning

- Virtual Learning
- E-Learning also known as Internet-enabled learning
- The use of new multimedia technologies and the internet to develop the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration.
- *Bernard Luskin* is the pioneer of e-learning.
- Delivering content by using electronic media.



# Components of E-Learning

- Instructional Design
- Multimedia Component
- Internet Tools
- Computers and storage devices
- Connections and Service Providers
- Software Tools

# Characteristics of E-Learning

- Fully controlled by digital technology
- Provides very easy and simple interface to the users
- Any courses are accessible in simple and easy way.
- Keep users updated. etc.

# Types & Advantages of E-Learning

- Types of e-learning
  - Computer Based Training
  - Internet Based Training
  - Web Based Training
- Advantages
  - Learners can learn anything from anywhere at their own pace.
  - No compatibility issues
  - Cost effective
  - Assessments are powerful and helpful for learning process

# Disadvantages of E-Learning

- It requires reasonable technological infrastructure
- Learners may fell isolated from the classroom and the instructor.
- Slow internet/old computer may make the courses inaccessible.
- Lab work is difficult to simulate.
- Learners with beginner level computer skill may face difficulties.

# Differences between Traditional learning & E-Learning

| Traditional Learning | E-Learning |
|---|---|
| The teacher usually talks more than the learner | The learner talks at least as much as more than the teacher |
| The learning is focused on whole class, no scope for individual study or group study | Learning process is focused on individual or group of learners |
| The teacher conducts the lesson according to study program or existing curriculum | The learner participate to determining the subject matter and study is based on various sources |
| The learners' motivation is low | The learners' motivation is high due to the involvement |
| The teacher is the authority | The teacher directs the learner to the information |
| The learning takes place in classrooms and in the school/colleges | There is no fixed location |

# Mobile Learning

It is a kind of learning allowing learning to acquire learning materials anywhere anytime using mobile technologies and the internet.

# Characteristics of Mobile Learning

- It is more spontaneous than other learning types
- The learning tools are very small and portable
- This learning is very flexible in nature.
- Information can be exchanged very fast through mobile learning

# Elements of Mobile Learning

- According to Ozdamlia & Cavusb (2011),
- Learners
- Teachers
- Environment
- Content
- Assessment

# Advantages of Mobile Learning

- It provides multimedia content delivery and creation options
- It supports continuous and situated
- It is a time saving learning process
- It supports preferred modes of interaction
- It gives immediate feedback on learner's learning experience.
- It provides better opportunities to acquire skills at one's own pace with a degree of privacy etc.

# Disadvantages of Mobile Learning

- Mobile devices with less memory storage can’t record more online content at a time.
- This learning possess technical problems most of time.
- Technical knowledge and expertise are required.
- It has limitation in network connectivity. Etc.

# Differences between E-Learning & M-Learning

| E-Learning | Mobile-Learning |
|---|---|
| Lecture in classroom or internet labs | Learning anywhere, anytime |
| Asynchronous | synchronous |
| Mass/Standardized instruction | Customized instruction |
| Dedicated Time | 24/7 instantaneous |
| Hand delivery of assignments at a particular place and time | E-Delivery of assignments at any place and time |
| Usually delayed feedback | Instant feedback possible |
| Paper based | Less paper, less printing, lower cost |
| Simulations and lab based experiments | Real life cases and on the site experiments |
| Private location | No geographic boundaries |
| Instructor's time used to deliver lectures | Instructor's time used to offer individualized instructions and help |

# Distance Learning

According to **Holmberg(1983),** It denotes the form of the study not led by teachers present in the classrooms but supported by the tutors and an organisation at a distance from the learner

# Differences between Traditional & Distance system of Education

| Traditional System of Education | Distance System of Education |
|---|---|
| Learning is a full time major activity | Learning is a part time secondary activity |
| Learner belongs to an institution | Learner is a member of many institution |
| The learner is in easy contact with fellow learners | Contact with the fellow members may not be easy |
| The learner has easy access to the institutional resources | The learner's interaction with the institution is very less and infrequent and often take place across a distance |

# Characteristics of Distance Learning

- It is self-instructional learning system
- Different types of media are used to communicate with the learners
- It provides a platform to involve learners for interaction with information without bounding themselves with a set time and place.
- It provides & encourages the use of web- based information sources to retrieve information timely in rapidly changing field of studies. etc.

# Advantages of Distance Learning

- It provides the opportunity to study more subjects and reach out to programmes that are not available in the immediate area.
- Learners can learn at very little cost
- The learning encourages learners for self learning
- Lots of learners get the opportunity to learn together
- Contents are easily accessible etc.

# Problems of Distance Learning

- Problem faced by learners
  - Nature of Study Material
  - Lack of Multi-Media Instruction
  - Insecurities about learning
  - Lack of feedback or contact with the teacher
  - Lack of social interaction
  - Lack of learner training etc.

# Contd.

- Problems associated with distance learning
  - Lack of presence of a teacher
  - Low status of distance education institutions
  - Rigidity imposed by university regulations
  - Lack of support by the faculty
  - Learner assessment

# Virtual University

- **Whittington** defined the virtual university as anything that delivers higher education to learners via WWW.
- **Examples in India,**
  - IGNOU Virtual Campus
  - Net Varsity
  - Punjab Technical University-Online Virtual Campus
  - Yashwant Rao Chavan Maharashtra Open University etc.

# Characteristics of Virtual University

- It must use ICT sophisticatedly.
- It doesn’t have classrooms, labs, campus etc.
- It is run by a management office
- This universities rely on methodical research methods, publication or academic and educational consultancy for each member in the field of study
- The mission is to increase educational opportunities
- Co-operation, collaboration and communication etc.

# Elements of Virtual University

- Flexibility in delivery
- Learner’s friendly technology
- Redefining pedagogy
- Computer & IT training for staffs
- Learner’s support mechanism
- Appropriate software infrastructure
- Assessment methodologies
- Self assessment & summative assessment
- Adequate legal policies and procedures

# Pedagogical Perspective for Virtual University

- Cognitive perspective
- Emotional perspective
- Behavioural perspective
- Social perspective

# Types of Virtual University

- According to Territorial span
  - Global, National, Regional Virtual Universities
- According to Pedagogical & Administrative methods
  - Established with commercial goals, focusing on learning, Virtual campuses etc.
- According to Target group
  - Universal, Professional, corporations VUs etc.
- According to no. of Programs and Courses
  - Small(upto 20), Medium (20-2000) etc.

# Reason for Virtual Universities

- To cater the huge educational supply pressure
- The influence of knowledge based society & economy.
- To fulfil the increasing and diverse learning needs.
- To address the changing and demanding learning preferences such as demand driven education
- To manage the excessive knowledge explosion
- To keep pace with technological advancements such as IT, the growing presence of the internet and cyberspace.
- E-learning, m-learning & virtual learning etc.

# Advantages

- No need of physical presence of professors and learners in the class.
- Large number of learners can register
- Learners are more motivated
- It offers new ways of teaching learning process
- Learners can access resources from anywhere anytime.
- It provides higher education opportunities in prestigious universities etc.

# Disadvantages

- Lack of competitiveness amongst learners
- No success in the field of practical & engineering education
- No face to face interaction
- Learners need o be familiar with new technological trends etc.

# Wikipedia

- World’s largest & richest resources on the Internet
- Serving since 2000 as Nupedia
- Many projects of this foundation
  - Metawiki
  - Wikibooks
  - Wikimedia commons etc.

# Contd.

- Contents are divided into 12 sections
  - General reference
  - Cultural & Arts
  - Geography & Places
  - Health & Fitness
  - History & Events
  - Mathematics & Logic
  - Natural & Physical Science
  - People
  - Philosophy
  - Religion
  - Society
  - Technology & Applied Sciences

# Contd.

WIKIPEDIA

*The Free Encyclopedia*

# Contd.

- Benefits
  - It provides open and free platform to the learners to access different types of resources
  - Wiki’s can be modified by anyone, always get instantaneous information.
  - It’s a combination of web pages etc.

# Massive Open Online Courses (MOOCs)

- It’s a free web based distance learning program
- Provides education which may enable certification, employment and further studies.
- From 2011, MIT (Edx)
- Categories
  - cMOOC
  - xMOOC

# By
# Govt. of India

- SWAYAM (**Study Webs of Active –Learning for Young Aspiring Minds**)
- SWAYAM Prabha
- Launched by Shri Pranab Mukherjee

# Benefits of MOOC

- Learners can improve lifelong learning skills through MOOC
- Enhances active learning
- “No exam Fever” encourages deep approach of learning against the surface & strategic approach of learning
- Contextualized content can be shared by all through the course
- It provides opportunities to learn from well known & prestigious institution throughout the globe

# Social Networking

According to **Taylor(2011)**, Social media is the newly formed web based applications in which content is created by participatory communication where users create and share information.

# Contd.

- Categories of Social Media
  - Collaborative projects
    - Wikipedia
  - Blogs & Microblogs
    - Google Blogs, Word press, Tumbler
  - Content Communities
    - Google Groups
  - Virtual Worlds
    - Virtual Game World
      - PUBG, MMORPG
    - Virtual Social World
      - Criminal Case
  - Social Networking Sites
    - Facebook

# Characteristics of Social Networking

- They are open to feedback and participation
- It always provides a simple Users Interface (UI)
- Helps to build global relationship (e.g make friends of different countries)
- Provide services like chartrooms, discussion forums etc.
- Allows users to write blogs, upload picture, audios and videos
- Provide free web space etc.

# Advantages of Social Networking

- It’s a great way to meet new people
- It transforms whole world into a family by establishing global relationship
- It helps to find people with similar area of interest
- Allows users to create networks
- Helps to create online resources etc.

# Disadvantages of Social Networking

- Security
- Cyber Crime
- Addiction towards Virtual World
- Sharing wrong information (Fake news)
- Health Issues

# Examples

- Facebook (22/08/2006)
- Instagram (10/2010)
- LinkedIn (28/12/2003)
- Twitter (7/2006)
- Tumbler (2007) etc.