

AIR-1 Notes

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ICT

(Information, Communication & Technology)

→ ICT is the convergence of telecommunication tools on a single link system which is controlled by computer systems. It acts as a unified communication tool which helps to integrate following:

- 1) Telecommunication tools and telephone lines.
- 2) Wireless communication tools and mobile phones.
- 3) Computers and computer networks
- 4) Enterprise softwares
- 5) Middlewares [help to increase user accessibility]
- 6) Storage devices.
- 7) Audio Video signals etc.

⇒ Middleware - They act as a software glue. It helps to provide additional applications to a software and a program according to user accessibility. they can be an extension to Operating System, Applications or softwares.

Types of Middlewares:

- ① Enterprise Application Integration - It helps to integrate distributed applications of enterprise programs and softwares.
eg- Supply Chain Management Middleware, Human Resource management middleware etc.
- ② Data Integration Middleware (DIM) - It helps to synchronise distributed data to provide a unified view.
eg- Bio Informatics, Big Data.
- ③ Message Oriented Middle ware - These are used as a software or hardware which helps in sending and receiving messages over a distributed system.

④ Enterprise Service Bus (ESB) - It acts as a communication system b/w mutually interacting softwares.

⇒ Unified Communication

→ It acts as integration of many communication tools which helps to optimize processes and increase communication efficiency.
→ Unified communication helps to unify human and device communication in a common context and experience. It has following tools:

- ① Instant Messaging
- ② Mobile Communications
- ③ Location features and presence information
- ④ Audio, video and web conferencing
- ⑤ Desktop and data sharing.
- ⑥ Unified Call control.

⇒ Advantages of ICT

- ① It helps in electronic distribution of information
- ② It helps in electronic data storage.
- ③ It helps in abolishing language and cultural barriers
- ④ It reduces response time in communication.
- ⑤ It increases communication reliability and reduces communication gaps and glitches.
- ⑥ It helps to increase social participation, reduces barriers between governments and citizens
- ⑦ It helps to transform society into knowledge society
- ⑧ It helps in inclusive growth and increases human development
- ⑨ It helps in resource management, mobilization and sustainability

Hence it is one of the powerful tool for sustainable development.

⇒ Disadvantages of ICT

- ① Unemployment - ICT leads to loss of employment for core, unskilled and unorganised sectors whereas it can also increase skill development which may improve the quality of jobs.
- ② Overuse of ICT would lead to loss of Emotional Quotient of citizen service delivery where the emotional values of front end human customer service would be lost.
- ③ ICT may lead to loss of personal privacy, data privacy and social equilibrium.
- ④ Overuse of social media tools may also lead to social polarization which can disturb the knowledge society.
- ⑤ ICT can also lead to loss of social, data and device security.

⇒ Roles of ICT

⇒ Role of ICT in Internal Administration

- It helps in following:
- ① Centralized storage of files and data.
 - ② Reduced delay in file processing.
 - ③ Efficient communication and transparent platforms of communication between all the stakeholders.
 - ④ It makes administration paperless.
 - ⑤ It helps in skill improvement of employees.
 - ⑥ It helps in development of electronic administration.

Tools used in Internal Administration are:

- ① Componentware: It helps to unify computers and different physical equipments used in file processing and communication.
- ② Groupware: It helps to integrate different works of a project together on a single point.
- ③ Wireless devices like phones and wireless networks.
- ④ Unified messaging: It integrates messaging, mail and fax services together.
- ⑤ File tracking module: It acts as a software system to provide file tracking tokens and logins.
- ⑥ Intranet - It acts as an internal communication network of any organization. It acts as a wide Area Network which can have search engines, profiles, blogs etc.
- ⑦ Video conferencing - It is a real-time audio video signal transmission tool which helps in peer to peer communication using a public network, a lease line, a wireless network or a private network.

Ex- PRAGATI - Initiated in 2015 as an internal administration tool. It is headed by the PM and uses Geo video conferences, digital data management and Geospatial technology in management of hurdles related to policy implementation.

→ It connects PM to Union secretaries and chief secretaries of states to discuss problems in governance and implementation.

→ It is an example of cooperative federalism.

→ Every month 4th Wednesday is celebrated as PRAGATI day in internal administration.

→ Issues to be discussed on PRAGATI day are flagged on every 3rd Wednesday and are to be answered in 2 working days after the PRAGATI day.

→ Role of ICT in planning and Management

→ ICT in planning and management can utilize following tools

- ① Transaction Processing systems - It helps to create indivisible units of work, hence it is used to divide and distribute works to lower level employees, clerks etc. It is a hardware and a software combination. which is used in batch processing or real time.
- ② Management Information System - It is useful for control analysis and visualisation of information required for coordination, management and planning. It is utilized by middle level officers or managers in an organization. Types of MIS are:
 - (a) Human Resource MIS - For jobs and employment management
 - (b) Accounting MIS - For bills and wages
 - (c) Decision support systems - For planning and making decisions by senior managers.
 - (d) Executive Information system (EIS) - Helps in decision making of executives and highest officials.

→ Advantages of MIS

- ① Paperless administration
- ② Increased productivity and efficiency
- ③ Integration of distributed systems.
- ④ Centralization
- ⑤ Electronic records and feedbacks.

→ GIS / Geographic Information System

- It helps to provide geo spatial information about any area which can be utilized, edited, mobilized and used in planning and management
- GIS act as a large scale imaging tool which consists of 3 components

- ① Imaging component which help in local, regional and satellite imaging
- ② Software component helps in integration of images collaterally.
- ③ observation stations - These are ground based stations which help to validate geospatial information.

Uses of GIS

- (a) Provides geospatial data for internal administration and planning
- (b) Used in remote sensing search and rescue
- (c) It is used in agricultural irrigation planning.
- (d) It is used in validation of land and revenue records.
- (e) It is useful in natural resource management
- (f) Useful in wildlife and forest management.
- (g) Quantification of MNREGA works and its wage distribution.

Q Which of the above are applications of ICT in administration.

- ① It helps to create inter-departmental coordination, hence reduce delay due to interdepartmental barriers.
- ② It helps to establish centralized governance
- ③ ICT in administration helps to increase public participation which also helps in new public management.
- ④ ICT in administration helps in improvement of delivery of citizen services and large scale analysis of citizen service requirements.

(a) only ① and ③ (b) ① ③ and ④ (c) ① ② and ④ (d) All of the above.

Q- Which of the following can be applications of ICT:

- ① In management of wages and payments for Dept of Personnel and Training (Accounting MIS) (MIS)
- ② Development of watershed management plan by central Water Commission.
- ③ Management of Rural Infrastructural project by State PWD
- ④ Management of Tiger conservation by NTCA (National Tiger Conservation Authority) (Forest MIS)

- (a) Only ① and ② (b) Only ② and ③ (c) ③, ② and ④ (d) All of these

⇒ E-governance

→ It is development of electronic citizen service delivery where government, its stakeholders, administration and citizens can be synchronised to singular participation ~~over~~ mediated by ICT tools.

APT
Abdul Kalam

→ E-governance is inter-departmental participation through computer mediated tools, telephone lines, communication medium, which helps to reduce hurdles and increase efficiency of government policy implementation.

→ Stages of e-governance

- ① Emerging presence - It is meant by computerization and computer data generation.
- ② Enhanced presence - It is meant by electronic data generation and development of web resources for citizen information and services.
- ③ Transactional Presence - It is development of ICT network to initiate government citizen transactions.
- ④ Network Presence - It is development of large scale public policies over ICT tools to generate networked benefits
- ⑤ Transformational Presence - It is large scale transformation mediated by ICT based service delivery. It can relate to infrastructural development, improvement in service delivery and a large scale social transformation.

⇒ Models of e-governance

① G2C - Government to Citizen

It refers to benefits provided by governments to citizens through ICT. It involves following:

① e-registration - to register for government policy and benefits.

eg- Online examination forms etc.

② e-citizenship - to get citizenship related documents online.

eg- AADHAR, PAN Card, Voter's ID, Passports etc.

③ e-transport - to achieve transport benefits.

eg- e-tickets, online driver's license, RTO registration.

④ e-education - to provide education tools electronically.

eg- e-Basta

⑤ e-health - for patient registries, online appointment etc.

⑥ e-Help - to provide search, rescue, preparedness etc during the state of disaster.

⑦ e-Taxation - for online income Tax submission.

② G2G - Government to Government Initiatives

① e-Administration - for improvement of Internal administration.

eg- Bhumii Project for Land Revenue in Rajasthan, e-Chaupal initiatives, Lok-Mitra initiatives for grievance redressal etc.

② e-Courts - for web-based judicial documents.

③ e-Police - for online police records, inter-state police coordination, centralized Criminal Tracking and System (CCT&S)

③ C2G - Citizen to Government Initiatives

① e-Democracy - to participate in democratic practices.

② e-Feedback - To provide public policy feedback.

④ G2B - Government to Business Initiatives

① e-Taxation - for corporate tax, GST, Sales Tax

- ② - e-Tenders
- ③ e-Licensing

⇒ Advantages of e-governance

- ① It makes the government a SMART government which is Simple, Moral, Accountable, Responsive and Transparent.
- ② It reduces response time and increases efficiency and grievance redressal.
- ③ It reduces Red-Tappism of bureaucracy.
- ④ It increases citizen-centric policy making.
- ⑤ It establishes new public management.
- ⑥ It utilises participatory governance or P4 governance (People-Public-Private-Partnership).

⇒ Disadvantages of e-governance

- ① Low Emotional Quotient (EQ).
- ② Privacy and security.
- ③ Overdependency may lead to chaos during failures due to glitches.

⇒ ICT in Education

It is helpful in qualitative and quantitative improvement of education.

It helps in following:

- ① Management of Education system and Syllabus.
- ② Training and skill improvement of teachers.
- ③ Remote access to education.
- ④ To reduce effort and cost spent in education.
- ⑤ To reduce language barriers of education.
- ⑥ Helps to increase learner's interaction and motivation.
- ⑦ Helps to link academic institutes together and develop a knowledge network.

- ⑧ It helps to reduce, physical, regional and cultural barriers to attain education.
- ⑨ It increases flexibility of the learner and the educator.
- ⑩ It can bring self paced learning tools
- ⑪ It helps to promote technology based learning and increases involvement of engaging tools in education.

⇒ Tools used in education

- ① Smart books - They are web-based repositories of books or content sources which can be distributed easily.
- ② Smart diaries - It is a web based resource which can help to store notes, notices and notifications required for education. It helps to connect educator, learner and parent together in education assessment.
- ③ Smart Boards - It is a LED or OLED ~~monitor~~ monitor which can be connected to internet and used to display pictures, write, edit and provide print commands.
- ④ OCR (Optical Character Recognition) - It is a scanner based tool which can convert offline data or content into editable electronic data. It is used to achieve editable soft copies of books and education resources.
- ⑤ Speech Recognition - It is a real time transliteration and translation tool, which helps in translation of 1 language to another based on an electronic database. It has 3 components:
 - (a) Input audio device or mike
 - (b) Output audio device or speakers
 - (c) Universal software for translation.

Uses of speech Recognition

- ① Development of Indic language tools for education.
- ② Used in Kisan Call centres to provide technical help in local languages.
- ③ Used to reduce cultural and language barriers in international diplomacy.
eg- SARTHAK by Ministry of Agriculture.

⑥ 3-D displays - It is a projection tool to provide depth perception in imaging. It places barriers b/w image source and observer such that light reaches to one eye of observer prior to other which forms a 2-resolved images with a depth perception.

Uses of 3D displays

- ① In display of education models and interactive learning.
- ② Gaming, animation
- ③ Geomorphological and Geological exploration.
- ④ Marketing and advertisement.
- ⑤ Town and country planning etc.

⑦ Virtual Reality - It is an integration tool of display and observer such that light reaches from display to observer in its complete angle of sight which creates perception of one-ness. Hence, observer realises itself to be integral part of virtual surrounding.

Uses of VR

- ① Display of education models and increased classroom interaction.
- ② Animation, Gaming.
- ③ Search and Rescue and disaster planning.
- ④ Urban Planning and management.

⑧ Augmented Reality: It integrates VR and physical world objects together such that observer and physical objects have a closed interaction and observer finds the object to be extension of virtual surrounding.

⑨ Uses of AR

- ① Education Models
- ② Planning
- ③ Mining
- ④ Animation.

Eg - SAAKAR - It is an AR tool of ISRO which is used for space ~~extra~~ exploration education to school students of class 9th to 12th.

⑩ Merged Reality - It is an integration of Augmented Reality such that the physical objects can control Virtual Reality surrounding.

Uses of MR

- ① Animation - ~~Project Alloy~~
- ② Project Alloy: Developed by IBM in 2016. It is an headset which can control VR functions.

⇒ ICT and Distance Education - ① Internet Forums

They are web based platforms which help to develop electronic info. to aid education. It can operate as a blog, or microblogging platform to share educational content and to discuss hurdles in education.

② MOOC (Massive open Online Courses)

They act as an open source platform that can help to host large scale multimedia, audio and video formats related to

educational content delivery - eg - NPTEL (National Programme on Technology Enabled Learning).

I) NPTEL - It is an initiative of MHRD. It was started in 2003 by IITSC Bangalore and 7 major IITs. It is divided into 2 phases.

(a) Phase I (2003-2008) where it hosted 235 courses of engineering discipline through audio-video lectures.

(b) Phase II (2008-2014) where it hosted 600 courses of engineering and fundamental science disciplines.

II) Swayam - MOOC - It is an initiative of MHRD. It is developed for providing school education to remote inaccessible students and elderly. Initially it provided education from class 9th to post graduation through video lectures, self assessment tools and online content.

→ It is also supported by AICTE (All India Council for Technical Education)

③ VSAT (Very Small Aperture Technology / terminals)

→ It is a peer to peer communication tool which is developed through a small satellite operable at a narrow radio bandwidth.

→ It helps to communicate b/w classroom relay centres and remote reception centres.

→ It helps in distance education and providing quality teaching to remote inaccessible areas.

⇒ Other tools in Distance Education:

① Data Storage tools like CD, DVD, BluRay and Holograms.

② Cloud Computing.

③ Public and Private Networks.

- (4) USB and other solid state storage devices
- (5) video conferencing.

⇒ Learning Management System (LMS)

- (1) It is a tool which helps to develop management Information Systems (MIS) and other integrated systems for improvement of education, administration, quality and delivery.
- (2) It is useful in:
 - (a) Improvement in administration
 - (b) Develop learning, research and development programs
 - (c) Organise training programs.
 - (d) Documentation, tracking and reporting errors during education delivery and reception.
 - (e) Development and management of curriculum and syllabus.
 - (f) Online delivery of education and its processes.
- (3) eg - School Management Systems, College Management Systems, University Integration Systems etc.

⇒ Knowledge Networks

- They help to create inter-communicated channels or open source platforms to share educational content and information.
- It helps in improving content distribution and Intellectual Property Right (IPR) Reservation of important researches
- eg -

(1) National Knowledge Network (NKN)

- It is a multi-gigabit interconnectivity program of the important educational research Institutions of India
- The core network operates at 10 Gb/s connectivity and provides services at 1 Gb/s connectivity on end nodes
- It helps to share important educational content and research