B.Ed 4 Year

ICT IN SCHOOL MANAGEMENT

Course Code 8693



DEPARTMENT OF EPPSL

FACULTY OF EDUCATION

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

ICT IN SCHOOL MANAGEMENT
B. ED (4-Year)

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DEPARTMENT OF EDUCATIONAL PLANNING POLICY STUDIES AND LEADERSHIP
FACULTY OF EDUCATION
ALLAMA IQBAL OPEN UNIVERSITY
ISLAMABAD

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FOREWORD

Information Communication Technologies have revolutionized everything and have become an essential component of every field of life including education. Like other fields, in education Information and Communication Technology (ICT) has great usage and significance. For the management of schools, ICTs can be useful for numerous reasons. Due to ICTs, several administrative processes such as monitoring, tracking attendance, grading, scheduling, and reporting have been automated. ICTs are helpful in completing the tasks in less time and with little effort, allowing staff members to emphasize more on instructional activities and strategic planning. With the use of ICTs, school management can maintain a complete data base of student's information, academic progress and other essential data. It enables real-time updates and quick access to information that ultimately enhances the process of decision-making.

Another benefit of ICT tools is the improved communication between teachers, students, parents, and administrative staff. ICT provides collaborative environments through platforms such as emails, school portals, and messaging apps to ensure that significant information is shared promptly and effectively. Additionally, with the help of ICT, school management can manage school resources effectively such as libraries, laboratories, and inventories. Furthermore, digital cataloguing systems and resource booking software can be used for the effective utilization and tracking of resources, minimizing wastage and ensuring availability. Moreover, ICT facilitates the development of creation of interactive and engaging learning environments through the use of multimedia, digital classrooms and e-learning platforms. It not only improves the learning experience but also provides a variety of learning styles and needs. With the help of ICT, continuous monitoring of student performance through digital grade books, assessments, and analytics has become possible. It provides useful information in identifying student's learning gaps so that early and implementing targeted interventions can be made to improve student learning outcomes.

The data analytics capabilities of ICT offer useful insights into many aspects of school operations including financial management and academic performance. This data-driven strategy enables informed decision-making and strategic planning. Although the implementation of ICT in educational institutions provides a substantial investment in the infrastructure, however, it provides long-term benefits including reduced paperwork, improved resource allocation, and streamlined

processes that can lead to important cost savings.Additionally, ICT tools such as assistive technologies allow schools to offer a more inclusive education by supporting students with special needs. It ensures equitable access to educational opportunities for all students. ICT systems can help in improving the security of student and staff data by implementing secure databases and access controls. It ensures compliance with educational standards and regulations by keeping accurate and up-to-date records.

This course has been designed for school leaders to address some of the diverse topics such as the latest trends in education, ICT in assessment, and ICT for professional development. A wide range of readers will be able to use it as a reference. Readers who read this book will have a comprehensive understanding of the topic thanks to its broad information. The content of this course is designed to equip prospective educational leaders to understand the role of ICT in school management.

I wish you all the best in this course and throughout this program of study that you have chosen for the purpose of learning to teach, manage and lead.

Prof. Dr. Fazal-Ur-Rahman
Dean Faculty of Education

ACKNOWLEDGMENT

The Allama Iqbal Open University and the authors both are grateful to the scholars and publishers for using/adopting their books, web material, and reports as reference materials for the development of the course of ICT in School Management.

It may be pointed out for general information of all whose work has been quoted in the course that Allama Iqbal Open University is a non-commercial educational organization in Pakistan, which is providing educational facilities to underprivileged remote rural areas through distance education mode.

Great stress has been placed on making this course to facilitate prosperous, in-service and pre-service teachers for educational planning and management. There are many activities included in the course for the better understanding and engagement of the students. The university and the department would like to be grateful to acknowledge the expertise provided by various departments and various scholars and experts in developing and improving the outlines and course books.

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Dr. Afshan Huma
Incharge

INTRODUCTION

ICT is making dynamic changes in today's societies and culture. Nearly all aspects of life are being influenced by ICT. Schools are also affected by ICT because ICT provides more opportunities to students and teachers for adaptive teaching and learning for managing the individual needs of learners. With the use of ICT, educational leaders can effectively manage the schools. In this era of information communication technologies, there is a paradigm shift; now society has aspirations for educational institutions to serve as knowledge enhancement institutes instead of mere knowledge transfer institutes. Similarly, the learning environment also needs to be changed according to the needs of learners. Therefore, nowadays, school management not only uses ICT for teaching and learning, it is also being used for effective and efficient administration. ICT has the potential to play a significant role for the improvement of the functional effectiveness of the school system. In this course, learners will discuss how ICT can help the school management and administration in improving various administrative tasks of schools.

LEARNING OUTCOMES

After studying this course, learners will be able to:

1. describe applications of ICT for school administration and management
2. explain the role of ICT for the maintenance and record-keeping
3. apply various ICT tools for scheduling and solving administrative problems
4. use ICT effectively for communication with parents
5. explain ways for planning, managing and implementing suitable ICT infrastructure

Dr. Farkhunda Rasheed Choudhary
Course Development Coordinator

Unit: 1

INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGY

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Introduction

Information communication technologies (ICT) have become the backbone of modern society, permeating every aspect of human existence. From the way we communicate and access information to the methods we employ for education, healthcare, and business operations, ICT has revolutionized the world in unprecedented ways. At its core, ICT refers to the convergence of computing and communication technologies, enabling the seamless transmission, processing, and storage of data across vast distances and diverse platforms. In essence, ICT encompasses a diverse array of hardware, software, networks, and digital content that collectively facilitate the creation, exchange, and utilization of information on a global scale. In today's interconnected world, the significance of ICT cannot be overstated, as it underpins the functioning of modern economies, empowers individuals, and shapes the dynamics of social interaction and cultural exchange.

Indeed, information communication technologies (ICT) represent the cornerstone of the digital era, serving as the driving force behind innovation and progress. With the rapid advancement of technology, ICT has evolved from mere tools of communication to multifaceted systems that revolutionize how we live, work, and interact. Through the seamless integration of hardware, software, and networks, ICT empowers individuals and organizations to transcend geographical boundaries, access vast repositories of knowledge, and collaborate in real-time. Moreover, ICT fosters a culture of digital literacy and lifelong learning, empowering individuals to adapt to the ever-changing technological landscape and participate actively in the digital economy. In essence, ICT embodies the transformative power of technology, offering endless possibilities for creativity, connectivity, and societal advancement.

Learning Outcomes

After completing this unit, you will be able to:

1. define ICT and articulate its significance in contemporary society.
2. identify the scope of ICT by recognizing its various components, including hardware, software, networks, and digital content.
3. trace the historical evolution of ICT from its inception to its current state, highlighting key milestones and technological advancements.
4. analyze the pervasive influence of ICT in everyday life, including its impact on communication, entertainment, healthcare, and business operations.
5. evaluate the role of ICT in education, including its applications in teaching and learning processes, curriculum development, and student engagement.

1.1 What is ICT?

ICT, or information and communications technology (or technologies), refers to the infrastructure and components that power modern computers. One of the purposes of information and communication technologies, tools, and systems is to improve how humans create, process, and share data or information with one another.

Another goal is to assist individuals improve their skills in a variety of fields, including business, education, medicine, real-world problem-solving, and even leisure pursuits such as sports, music, and movies.

There is no single, uniform definition of ICT because technologies, gadgets, and even thoughts about ICT are continually altering. However, the phrase is widely understood to encompass all devices, networking components, and applications. When integrated, these enable people and organizations to engage in the digital realm.

Information and Communications Technology (ICT) refers to the use of computing and telecommunications technologies, systems, and tools to facilitate the creation, collection, processing, transmission, and storage of information. It encompasses computing technologies such as servers, laptop computers, and software applications, as well as wired and wireless communication technologies that enable telephony, the Internet, the Internet of Things (IoT), and the metaverse.

1.1.1 Difference Between ICT and IT

The acronym ICT is occasionally used interchangeably with IT. However, ICT is commonly used to refer to a more comprehensive list of all components associated with computer and digital technologies.

I.T is concerned with the management of information technologies and its numerous technical components, such as software, hardware, and networking. ICT includes considerations for telecommunications devices and technology, but IT management does not. IT may be considered a subcategory of ICT.

1.1.2 Components of ICT

The list of ICT components is extensive and continues to expand. Some components, such as computers and telephones, have been around for decades. Others, such as cell phones, are digital. TVs, and robotics, are newer inclusions.

ICT components include the following:

a. Devices (hardware).
b. Software.
c. Middleware.
d. Data.

e. Wired networks.
f. Wireless networks.
g. Communication technologies.
h. The cloud.
i. Communications protocols and interfaces.
j. Information security and governance policies.

1.1.3 Technologies Included in ICT

ICT is more than just a collection of components. It includes the use of all of these different components. It is here that ICT's true potential, power, and danger emerge: in economic, societal, and interpersonal transactions and interactions. ICT refers to both the internet-enabled realm and the mobile one powered by wireless networks. It contains outdated technology like landline phones, and radio and television broadcasts, which are still widely utilized with cutting-edge ICT elements like artificial intelligence and robotics.

Activity

Explore the internet and write down some new websites for Social networking.

1.1.4 ICT and Digital Transformation

Businesses were compelled to adjust quickly to ensure company continuity and productivity during COVID-19 lockdowns, making digital transformation a necessity rather than an option.

Businesses of all sizes were suddenly forced to rely on digital collaboration tools and services to keep their operations functioning. Teleconference calls, screen sharing apps, and virtual meeting platforms such as Zoom and Google Hangouts quickly became necessary tools for professionals forced to work from home during the pandemic.

During the pandemic, every area of the economy required communication and cooperation technologies, including education, healthcare, and e-commerce.

Self Assessment Questions 1.1

Q1. What is ICT and what are its primary goals?
Q2. How does ICT differ from IT, and why is it considered a broader term?
Q3. List some components included in ICT and explain their significance.
Q4. What technologies are encompassed under ICT, and how do they contribute to modern communication and data sharing?
Q5. Explain the role of ICT in digital transformation and give examples of its applications during the pandemic.

Q6. Discuss the significance of governance policies in ICT. What aspects do these policies cover?

1.2 Scope of ICT

Information and Communications Technology (ICT) encompasses all technologies used to handle and transmit information. This includes computers, the internet, broadcasting technologies, and telephones. ICT also includes the management and storage of information, as well as all associated services and applications. The scope of ICT is broad and constantly evolving, as new technologies and innovations continue to emerge.

1. Communication: ICT enables communication through various platforms such as emails, video conferencing, instant messaging, and social media connecting individuals and communities globally.
2. Data Processing and Management: ICT tools like databases, spreadsheets, and data visualization software help in processing and managing large amounts of data.
3. Education and Training: ICT is widely used in education and training to create interactive e-learning modules, virtual classrooms, and online tutorials.
4. E-commerce: ICT enables businesses to sell products and services online through e-commerce platforms and digital marketplaces.
5. Entertainment: ICT provides access to various forms of entertainment such as online games, streaming services, and virtual reality experiences.
6. Health Care: ICT is used in the healthcare sector for telemedicine, electronic health records, and remote monitoring of patients.
7. Information and News: ICT platforms like news websites, blogs, and social media provide access to information and news from around the world.
8. Banking and Finance: ICT is used in the banking and finance sector for online transactions, digital payments, and financial management.
9. Robotics and Automation: ICT is used to control and automate various industrial processes through robots and other automation systems.
10. Transportation and Logistics: ICT is used in transportation and logistics to track and manage the movement of goods, vehicles, and people.
11. Business and Industry: ICT drives innovation, productivity, and competitiveness in the business sector, enabling e-commerce, digital marketing, enterprise resource planning (ERP), and automation of manufacturing processes.

12. Governance and Public Services: ICT facilitates e-government initiatives, digital identity management, smart city technologies, and citizen engagement platforms, improving the efficiency and transparency of public services.

Here is a description of some of the scopes of ICT.

Self Assessment Questions 1.2

Q1. What technologies are encompassed by ICT, and how do they contribute to the handling and transmission of information?
Q2. How has ICT transformed communication and facilitated global connectivity? Provide examples.
Q3.In what ways do e-government initiatives leverage ICT to enhance service delivery and promote transparency?
Q4. Explain the significance of digital identity management systems in the context of ICT.
Q5. What are some challenges associated with the broad and evolving scope of ICT?

1.3 Evolution of ICT

The concept of ICT dates back to the nineteenth century, with the invention of the telegraph and telephone. These two technologies transformed the way people worked and interacted socially by allowing one person to connect with another in real or near-real time, regardless of location.

As ICT becomes an increasingly important aspect of education, it would be interesting to observe how it has evolved over the last few decades. Radio and television introduced the concept of mass communication in the middle of the twentieth century, and by the end of the century, the Internet had established itself as a mainstream instrument for communication, commerce, and entertainment. Its use grew fast in the years that followed, altering the way people worked and digitally transforming how they communicated.

This section intends to provide teachers with an overview of the history of ICT, beginning with the invention of the first computer and continuing to the present day. We'll also try to peer into the future to see what ICT will look like in the coming decades.

1.3.1 A Brief History of ICT

The telegraph (1837) and telephone (1876) enabled wire-based communication across huge distances virtually instantly, vastly improving on prior systems of rail, ship, and pony express. Wireless telegraph (1895), shortwave radio (1926), and more dependable high-frequency microwave radio (1946) all circumvented the physical limitation of connecting every location with wire or cable. Microwave

technology enabled higher-capacity communication channels for broadcasting television signals, paving the way for the development of satellites and space communication (1957). The core technology underpinning the Internet and the World Wide Web, as well as mobile communication phones, were established in the 1970s. Mobile and Internet communication have expanded fast since their introduction in the 1980s, to the point where mobile access to the Internet (e.g., smartphones)

The fundamental goal of information and communications technology (ICT) development in the twenty-first century is to increase the capabilities and capacity of the equipment and facilities used to communicate over telecommunications networks. The term technological convergence became popular in the 1990s and 2000s to describe how new ICT is being used to combine previously separate communication media — such as voice telephone, radio, TV, newspapers, and computer data — into a single medium, the Internet, delivered over enhanced, high capacity broadband telecommunications networks.

As ICT has advanced and the Internet has reached near-universal coverage in most developed countries, software-based network applications are being developed and applied in industries other than information and communication: banking, retail, and services; industrial production, agriculture, education, and medical services; and government services ranging from license issuance to taxation. Increased capabilities for gathering massive amounts of detailed information (metadata) and the establishment of networks of communicating devices (e.g., the Internet) have created new opportunities for beneficial applications in fields such as science, health, and environmental monitoring, but they have also facilitated serious breaches of privacy by allowing governments, corporations, and sophisticated hackers to spy on individuals and organisations.

1.3.2 History Of Information and Communication Technology

1. The prehistoric period

a. Period (…. S / d 3000 BC)

At initially, people built information technology as a mechanism for introducing the forms that they are familiar with. They narrate what they learn on the cave walls about hunting and prey animals. Because of their ability to communicate solely through voice grunts and hand gestures at the time, they began to identify objects in their environment and represent them with forms, which they then painted on cave walls. Further development is created and uses equipment that make noises and cues, such as drums, trumpets made of animal horn, or smoke signals as a means of offering warning of danger.

b. Period of 3000 BC

For the first time, the Sumerians used pictograf symbols as letters. Symbols or letters can also take on multiple sound forms (mention), resulting in words, sentences, and language.

c. Historical Period (3000 BC s / d in 1400-an M)

1) 2900 BC

Ancient Egyptians used hieroglyphic letters. Hierogliph is a symbol-based language that represents each phrase with a different symbol. When mixed, the words will have a different pronunciation and meaning. The Heirogliph writing system and language are more advanced than Sumerian.

2) 500 BC

Papyrus fibers are used to make paper. Paper derived from papyrus tree fiber grown near the Nile is a more strong and flexible medium for writing or mediating information than clay tablets, which were previously utilized.

3) 105 M

The Chinese found kertas.Kertas, which the Chinese discovered at the time, is now known as paper. Paper is manufactured by crushing, filtering, washing, flattening, and drying bamboo fibers. The invention also allows for the printing procedure to be conducted utilizing a carving on a block of wood and coated by ink, or as we know it now, with a cap.

2. MODERN PERIOD (1400-S AN M / D NOW)

a. Year 1455

Johann Gutenberg invented the printing press, which employs iron plates that can be changed in a wooden frame.

b. Of 1830

Augusta Lady Byron created the world's first computer software that employs Charles Babbage's Analytical engine. The tool is intended to be able to enter data, process data, and provide output in the form of cards. This machine is said to as a prototype for the first digital computer, despite the fact that it operates more mechanically than digitally. It was created 94 years before the first digital computer, ENIAC 1.

c. In 1837

Samuel Morse created the telegraph and Morse code language alongside Sir Wiliam Cook and Sir Charles Wheatstone, who delivered electronic messages between two distant parties via a cable linking the two locations. This information

may be delivered and received nearly simultaneously, allowing it to be widely accepted and used by people without regard for location or time constraints.

d. In 1861
Moving images are projected onto a screen, which was originally used as a precursor film and is now in ancient times as the projector grows and steps onto the screen. e. The year 1876 was characterized by people who devised the Melvyl Dewey decimal writing system.

f. In 1877
1) Alexander Graham Bell created and built the first phone for general use.
2) Edward Muybridge invented high-speed photography.
g. In 1899
Tape storage systems (tape) were the earliest magnetic storage devices, however, they were still analog rather than digital as nowadays. h. In 1923, Zvorkyn invented the first television tubes.

i. In 1940
During World War II, science in the field of information began to grow, and it is now utilized to send and receive military data stored on magnetic tape.

j. In 1945
Vannevar Bush designed a hypertext-based coding system. During this time, hypertext was developed, and website design is still changing.

k. 1948
During the 1946 time of this technology, the world's first digital computer, ENIAC, was constructed. Although I don't have many users, computer technology is used by specific agencies.

l. Year 1948
Researchers at Bell Telephone developed the transistor.

m. Year 1957
1) Jean Hoerni pioneered the planar transistor. This method enables the creation of millions, if not billions, of transistors within a small piece of silicon crystal.

2) The USSR (Russia at the time) launched the first artificial earth satellite, Sputnik, which operated as a spy. In exchange, the United States will establish the Advanced Research Projects Agency (ARPA) under the Department of Defense's power to develop science and information technology for military applications.

N. Year 1972

Ray Tomlinson developed the first e-mail application, which is used to communicate over large distances. E-mail can be defined as electronic mail.

O. Year 1973-1990

The name "Internet" was first used in a paper on TCP/IP, and a group of DARPA researchers devised a network protocol known as TCP/IP. In 1981, the National Science Foundation established a backbone known as CSNET, with 56 Kbps capacity for each government institution. In 1986, the IETF created a server that functions as a coordination tool for DARPA, ARPANET, DDN, and the Internet Gateway.

P. Year 1991 –

Now, commercial systems in the IT area begin when the CERN collects a charge from its members to cover operational costs. The Internet community was established in 1992, and CERN coined the name World Wide Web (WWW). The National Science Foundation founded the InterNIC in 1993 to provide Internet-related services, data storage directories and databases (by AT&T), registration services (by Network Solutions Inc.), and information services (by General Atomics / CERFNET). The Internet's rapid growth began in 1994 when it began to pervade all facets of human life and became inextricably linked to humanity. In 1995, public enterprises were able to join the provider by purchasing a network in this Backbone.

Langkah started developing information technology, particularly the internet, and conducting research to create systems and more advanced tools.

COMPUTERS

The word "computer" is derived from the Latin words "computus" and "computare". Both Latin phrases indicate to determine using mathematical or numerical methods. The English verb "compute" has the same idea. A computer is a programmable electrical device that conducts mathematical calculations and logical operations, particularly one capable of processing, storing, and retrieving vast amounts of data quickly. Personal computers are also used to manipulate text or pictures, browse the Internet, and play games or videos.

The main components of a computer are:

1. a Central Processing Unit (CPU),
2. a monitor,
3. a Keyboard,

4. and a mouse.

Originally, the first computers were the size of a big room and used as much power as several hundred modern desktop computers. Later, computers became smaller and more powerful.

THE INTERNET

The Internet was created as a result of pioneering research undertaken in the early 1960s by visionary individuals such as J.C.R. Licklider of MIT. The latter recognized the value of allowing computers to share research and development data in scientific and military domains. That's why, in 1962, he proposed a global computer network and joined the Defense Advanced Research Projects Agency (DARPA) in late 1962 to lead the development effort.

THE WEB

The terms Internet and the Web are not synonymous, despite the fact that many people use them interchangeably. Millions of computers across the world are connected by the vast network known as the Internet. As long as they are both online, computers within this network can speak with one another. On the other hand, the Web, often known as the World Wide Web (WWW), is a method of obtaining information via the Internet. It's a model or information space created on top of the Internet where web addresses, also known as URLs (Uniform Resource Locators), are used to identify documents and other web resources. This area can be accessed through the Internet and is connected by hypertext links.

Tim Berners-Lee, an English scientist, created the World Wide Web in 1989. While working at CERN in Switzerland in 1990, he built the first web browser.

WEB 1.0, WEB 2.0, AND WEB 3.0

What distinguishes Web 3.0 from Web 2.0 and Web 1.0?

They show how the Web has changed over the past 20 years. This is a synopsis of their attributes.

WEB 1.0

The World Wide Web's initial phase of development was known as Web 1.0. For the great majority of people, who were merely consumers or readers of that content, content creators essentially produced content.

The most important features of Web 1.0 were as follows:

- It was a read-only web
- It was based on HTML which is a basic computer language.
- It was characterized by static pages (there is no interactivity between users and websites).
- It was also characterized by slow connection speed.

- The software was very expensive, generally on CDs or DVDs to be installed.

WEB 2.0

The Web's next phase was known as Web 2.0. It has a social component that makes it more sophisticated. Web 2.0 is a many-to-many relationship in contrast to Web 1.0.

Here are the features of Web 2.0:

- It is a read-and-write web.
- It is based on more sophisticated computer languages (PHP, Mysql, Java Script…)
- The pages are dynamic pages, which means that there is the possibility of interactivity between users and the web.
- It is characterized by speed.
- The software is more accessible. It is online or downloadable.

WEB 3.0

The Web has evolved into Web 3.0, an expansion of Web 2.0. Another name for it is the Semantic Web. Connective intelligence, which links ideas, data, applications, and eventually people, is what defines it.

Here are its features:

- Read, write and execute web.
- Users are served more intelligently.
- Personalized information.
- Machine comprehension.
- Cloud Technology.
- Everything is connected.
- Immersion.

WHAT'S NEXT?

The field of ICT has a bright future. There will be even more opportunities on the web.

WEB 4.0

Humans and machines will engage in symbiotic interaction as a result of Web 4, also known as the symbiotic web. Automated systems has the intelligence to quickly scan the contents of the internet and respond with high-caliber information.

WEB 5.0:

A version known as Web 5.0, or the emotional web, is presently being worked on covertly. Users will be able to communicate with the web and have their emotions

recognized. In terms of emotions, the web is neutral as of now. It's likely that this will alter in the future.
For your ease, the evolution is presented in the following table:

Year	Technological Advancement
1837	Morse code and telegraph
1876	Telephone
1895	Wireless telegraphy
1927	Television
1947	Transistor
1951	UNIVAC I (First commercial computer)
1969	ARPANET (Foundation of the Internet)
1971	First email
1990	World Wide Web
1991	GSM (Global System for Mobile communication)
1994	Netscape Navigator (Widely-used web browser)
1998	Google
2001	Commercial 3G networks
2004	Facebook
2007	IPhone
2008	Bitcoin (First blockchain-based cryptocurrency)
2010	4G networks
2016	AlphaGo (AI system defeating world champion Go player)
2020	5G networks
2023	Zoom (350 million daily meeting attendees)

People can now generate, access, share, and consume information more easily than ever thanks to cell phones and broadband internet, and ICT promises even more interesting advances in the future. Faster and more dependable communication will be made possible by 6G networks; the creation and acquisition of information will be transformed by ChatGPT and other generative AI systems; and a plethora of new ICT tools and applications will be inspired by cutting-edge technologies like Web3 and quantum computing.

Self Assessment Questions 1.3

Q1. How did the invention of the telegraph and telephone in the 19th century revolutionize communication?

Q2. How have modern applications of ICT expanded beyond traditional information and communication industries? Provide examples.

Q3. What are the significant differences between Web 1.0, Web 2.0, and Web 3.0, and what are the anticipated features of Web 4.0 and Web 5.0?

1.4 ICT in Everyday Life

In the modern era, the integration of Information and Communication Technology (ICT) has transformed every area of human life. From communication to education, healthcare to entertainment, and business to personal finance, ICT has become an essential element of daily life. This unit will look at the ubiquitous influence of ICT in various aspects of our lives and how it has changed the way we live, work, and interact with the world around us.

1.4.1 Communication Revolution

The emergence of ICT drastically altered the way humans communicated. Letters and landline phones are no longer the only ways to communicate with people. Today, instant messaging, email, social networking platforms, and video conferencing are common ways to communicate with friends, family, and coworkers all around the world. Whether it's sharing social media updates, collaborating on projects remotely, or holding virtual meetings, ICT has made communication faster, easier, and more interactive than ever before.

1.4.1.1 The Rise of Social Media

Social media sites like Facebook, Twitter, Instagram, and LinkedIn have transformed how people exchange information, connect with others, and form communities online. The immediacy and pervasiveness of communication enabled by ICT have transformed social interactions, cultural norms, and societal dynamics, creating both benefits and challenges in the digital age.

1.4.1.2 Mobile Communication

The proliferation of smartphones and mobile internet has further transformed communication, allowing people to stay connected while on the go. Mobile messaging apps such as WhatsApp, WeChat, and Telegram have replaced traditional SMS and phone calls as key forms of communication.

1.42 Education and Learning

ICT has also transformed education, making it more accessible and engaging. With the advent of online courses, educational websites, and digital textbooks, people can now access a variety of information from any location with an internet connection. Furthermore, interactive learning tools, multimedia materials, and virtual simulations improve the learning experience while accommodating varied learning styles and preferences. ICT has democratized education by removing barriers to learning and encouraging people to pursue lifelong learning opportunities.

1.4.2.1 Online Learning Platforms

Online learning platforms such as Coursera, Khan Academy, and Udemy provide a wide choice of courses on a variety of topics, allowing students to master new skills and knowledge at their own speed. Virtual classrooms and remote learning technologies have become indispensable tools in academic institutions, allowing students to attend classes, participate in discussions, and complete assignments online.

1.4.2.2 Digital Assessment and Analytics

Furthermore, digital assessment tools, learning management systems (LMS), and educational apps let educators gain vital insights into student development and performance, allowing for more personalized instruction and support.

1.4.3 Healthcare Transformation

In the field of healthcare, ICT has been essential in enhancing patient care, easing administrative operations, and promoting medical research. Electronic health records (EHRs) allow healthcare providers to swiftly and securely access patient information, resulting in more informed decisions and coordinated care. Telemedicine systems enable patients to consult with healthcare professionals remotely, thereby increasing access to medical treatments, particularly in rural or underserved areas.

1.4.3.1 Remote Patient Monitoring

People may take charge of their health and well-being by tracking vital signs, keeping an eye on chronic illnesses, and adopting healthier lifestyles thanks to mobile health applications, wearable health trackers, and remote patient monitoring equipment.

1.4.3.2 Telehealth Services

Furthermore, telehealth services remove obstacles like geographic distance, mobility limitations, and the stigma attached to asking for help by providing easy access to mental health counseling, expert consultations, and preventive care.

1.4.4 Entertainment and Leisure

With the abundance of digital content and immersive experiences that ICT offers, it has completely changed the way we entertain ourselves. With the help of streaming services, customers may access movies, TV series, music, and games on demand and enjoy their preferred entertainment at any time or location. Through social media and online networks, people can meet others who share their interests, exchange stories, and find new ones.

1.4.4.1 Digital Entertainment Platforms

As digital entertainment platforms like YouTube, Netflix, and Spotify have grown in popularity, they have upended established media businesses and changed how people consume information and how it is distributed.

1.4.4.2 User-generated Content and Influencers

Influencers on social media and user-generated content have become important players in determining consumer trends and popular culture. In addition, live streaming services like Twitch and TikTok have given content producers new chances to interact with viewers in real time and make money off of their original works.

1.4.5 Business and Commerce

ICT has completely transformed how businesses function, interact, and conduct business with clients and partners in the field of business and commerce. E-commerce platforms have completely changed the retail industry by giving companies access to international markets and allowing consumers to easily purchase from the comfort of their homes. Businesses can leverage digital marketing technologies, social media advertising, and data analytics to get insights into consumer behavior, tailor marketing campaigns, and increase sales.

Self Assessment Questions 1.4

Q1. How has ICT transformed the way people communicate in the contemporary era, and what are some examples of tools that have become ubiquitous for communication?

Q2. In what ways has ICT revolutionized education and learning, and how have online learning platforms contributed to this transformation?

Q3. What role has ICT played in improving healthcare, particularly through the use of electronic health records (EHRs) and telemedicine platforms?

Q4. How have digital entertainment platforms and user-generated content reshaped the entertainment industry and consumption habits?

Q5. What are the significant societal impacts of ICT, and how can individuals, organizations, and governments address both the benefits and challenges of digital transformation?

1.5 ICT in Education

Information and Communication Technology, or ICT, classrooms use digital tools to improve learning and teaching processes. Its development has substantially impacted education by offering access to massive resources, interactive learning

platforms, and personalised learning experiences. For example, online courses, virtual classrooms, and educational apps have transformed traditional teaching approaches.

1.5.1 Meaning of ICT in Education

ICT in education refers to the use of a variety of tools and resources such as computers, laptops, tablets, interactive whiteboards, educational software, online platforms, internet connectivity, and multimedia content. It attempts to assist and optimize students' learning experiences while also improving the efficacy and efficiency of instructors' teaching methods.

1.5.2 Examples of ICT in Education

This section will highlight the importance of ICT in education through four different areas.

1.5.2.1 Integration of ICT in Classroom Instruction:

1. Interactive Whiteboards

Teachers utilize interactive whiteboards to make content more interesting and dynamic. These whiteboards can show multimedia content, annotate, and interact with it, increasing student interaction.

2. Multimedia Presentations

Educators produce and use multimedia presentations that combine text, graphics, videos, and audio to effectively convey complicated subjects.

3. Digital Simulations

1.5.2.2 Online Learning Platforms and Virtual Classrooms:

Simulations provide pupils with virtual environments in which they can experiment and learn without risk. Physics simulations, for example, can assist students grasp the concepts of motion and gravity.

1. Learning Management Systems (LMS)

LMS platforms such as Moodle, Canvas, and Google Classroom provide online course management, material sharing, assessments, and communication between teachers and students.

2. Virtual Classrooms

Live virtual classrooms allow teachers and students to communicate in real time, using capabilities such as video conferencing, chat rooms, and collaborative group discussions.

3. Massive Open Online Courses (MOOCs)
These platforms provide free or low-cost online courses, allowing students to access high-quality education from institutions around the world.

1.5.3 Advantages of ICT in Education

Information and Communication Technology (ICT) has become a permanent part of our life, with apps, multimedia tools, and smart devices dominating the digital landscape. For students embarking on their educational path, ICT can be an essential component of the learning process. With the effective use of technology in classrooms, combined with more traditional teaching processes, there is no limit to the positive development of a young mind—whether in the form of academic achievement and improved learning outcomes, enhanced creative thinking, or the development of skills that will be useful later in life.

1. Enhances interaction and increases student engagement
When properly integrated into a classroom environment, technology has the potential to boost student engagement and interaction. Simply said, teachers can deliver long-established topics in fresh and unique ways. Students are considerably more likely to engage with Ancient Egyptian history if they may go on a virtual field trip to Luxor or access interactive online resources about Xerxes the Great.
This is a generation that is completely at ease with smart technology, having used it on a daily basis—so why not take advantage of that familiarity and use it to learning?

2. Learning is accessible any time, any place
The ubiquity of smart devices and the rise of cloud technology mean that students can use their educational ICT resources wherever and whenever they want. Academic progress does not have to stop in the classroom, as collaborative projects can be worked on in real time via applications and virtual student dashboards.
There are also numerous educational apps available to help students make better use of their free time. By achieving the ideal mix between pleasure and learning, kids can enjoy using a tablet or mobile device while also developing and mastering new abilities. With ICT and a solid internet connection, a child's learning potential is limitless.

3. Offers new learning techniques as classroom tools are constantly evolving
Technology is never static; it is constantly evolving and progressing, just like the teaching and learning process. Developers are always releasing new apps and customizing software to improve the digital learning experience in schools, which can only benefit students and teachers. Meanwhile, international technology

companies such as Google, Microsoft, and Apple are producing complete learning environments rather than just apps.
Classrooms from the 1990s would seem totally different to a time-traveling student from today, and future learning spaces will be nearly unrecognizable—such is the speed with which technology changes. Educators must stay up with these ever-changing trends and seek innovative ways to enhance the classroom experience with ICT.

4. Decreases teacher paperwork improving work-life balance
With the variety of internet tools available to instructors, class plans are no longer limited to reams of paperwork and printed handouts. Using trusted apps and technology, educators can abandon traditional approaches in favor of digital media. Teachers can save precious time by utilizing virtual lesson plans, grading tools, and online assessments. Time can be spent focusing on one-on-one interactions with students, particularly those who may require further assistance.

5. Improves parent-teacher interaction
The incorporation of technology into the school system benefits more than just instructors and pupils. A variety of smart parent-teacher engagement applications allow parents to maintain good communication with their children's teachers. This software allows parents to watch their child's progress through open channels of communication with educators.
Parents can contact teachers, schedule appointments using virtual calendars, and even hold video conferences. Teachers realize the importance of a parent's role in their child's educational development, and technology can help facilitate this dynamic in the current day.

1.5.4 Applications of ICT in Education
ICT offers a wide range of educational applications, including classroom instruction, curriculum creation, administrative functions, and professional development. Some of the main applications of ICT in education are:

1.5.4.1 Classroom Instruction
ICT tools and resources can improve classroom instruction by delivering interactive multimedia content, enabling virtual experiments and simulations, and encouraging active student participation. Interactive whiteboards, educational software, and internet resources enable teachers to design dynamic and engaging learning experiences that appeal to a variety of learning styles and preferences. ICT can also enhance collaborative learning activities, group projects, and peer-to-peer contacts, resulting in a collaborative and participatory learning environment.

1.5.4.2 Curriculum Development

ICT can help with curriculum development by offering access to a variety of educational resources, such as digital textbooks, online courses, multimedia presentations, and open educational resources (OER). Digital content repositories and learning management systems (LMS) allow instructors to curate and organize educational materials, personalize learning experiences, and connect instructional resources with curriculum objectives and standards. Furthermore, ICT tools like content authoring software, simulation platforms, and virtual labs enable educators to design interactive and immersive learning experiences that foster conceptual understanding and critical thinking skills.

1.5.4.3 Assessment and Evaluation

ICT can help with assessment and evaluation procedures by offering tools for administering, scoring, and evaluating assessments, as well as generating real-time feedback and performance metrics. Online assessment platforms, digital quizzes, and computer-based testing systems enable educators to assess student learning outcomes in an efficient and effective manner, while also allowing for adaptive learning and personalized feedback. Furthermore, ICT technologies can facilitate formative assessment methods like as peer evaluation, self-assessment, and collaborative feedback, all of which enhance student involvement, reflection, and metacognitive skill development.

1.5.4.4 Professional Development

ICT can help educators with their professional development endeavors by offering access to online courses, webinars, virtual conferences, and professional learning networks. Online platforms such as MOOCs (Massive Open Online Courses), learning management systems, and social media networks allow educators to engage in self-directed learning, communicate with peers, and share best practices and resources. Furthermore, ICT can support personalized professional development plans, competency-based assessments, and micro-credentialing efforts, allowing educators to improve their knowledge, skills, and pedagogical practices in line with their professional goals and needs.

Self Assessment Questions 1.5

Q1. What is ICT in education and how does it aim to enhance learning experiences for students?

Q2. How do interactive whiteboards and multimedia presentations contribute to classroom instruction?

Q3. What are some examples of online learning platforms and virtual classrooms used in education, and how do they facilitate learning?

Q4. How do educational software and applications, such as educational games and language learning apps, enhance student engagement and knowledge retention?
Q5. What collaborative tools are available for communication and project-based learning, and how do they promote group work and creativity among students?
Q6. What are the key benefits of integrating ICT in education, particularly in terms of enhancing learning experiences and providing access to vast information?
Q7. What challenges and limitations are associated with the integration of ICT in education, such as the digital divide and technological barriers?

Key Points

1. ICT refers to the infrastructure and components that enable modern computing, aiming to improve how humans create, process, and share data, enhancing capabilities in business, education, medicine, problem-solving, and leisure activities.
2. ICT encompasses a broad range of devices, networking components, and applications that facilitate digital interaction, with its definition constantly evolving.
3. ICT includes computing technologies like servers and laptops, telecommunication technologies, the Internet, IoT, the metaverse, and various communication protocols, ensuring efficient human-to-human, human-to-machine, and machine-to-machine communication.
4. ICT infrastructure comprises hardware, software, communication infrastructures, protocols, interfaces, and governance policies that facilitate the creation, dissemination, acquisition, storage, and protection of information.
5. ICT revolutionizes education with tools like interactive whiteboards, educational software, online courses, and virtual classrooms, enhancing access to resources and personalized learning.
6. In healthcare, ICT improves patient outcomes through electronic health records, telemedicine, wearable devices, and health monitoring systems, facilitating seamless information sharing and remote consultations.
7. ICT drives innovation in business and industry, enhancing efficiency through ERP systems, enabling global e-commerce, supporting digital marketing, and optimizing manufacturing with automation technologies like robotics and AI.

8. ICT originated in the 19th century with the telegraph and telephone, revolutionizing communication by enabling near-instantaneous communication over long distances.
9. The 20th century saw the rise of mass communication with radio and television, followed by the internet, which transformed communication, commerce, and entertainment.
10. The 21st century focuses on expanding the capabilities and capacity of ICT equipment, with technological convergence combining previously separate communication media into one medium, the Internet.
11. The evolution of ICT includes key milestones: telegraph (1837), telephone (1876), wireless telegraphy (1895), television (1927), transistor (1947), first commercial computer (1951), ARPANET (1969), email (1971), World Wide Web (1990), GSM (1991), popular web browser Netscape Navigator (1994), Google (1998), 3G (2001), Facebook (2004), iPhone (2007), Bitcoin (2008), 4G (2010), AI advancements (2016), and 5G (2020).
12. The digital economy has introduced new jobs, improved productivity, and enabled remote collaboration.
13. Environmental impacts of ICT include significant power consumption and e-waste, necessitating responsible practices and regulations.
14. To build a more connected and inclusive world, it is important to support ESG initiatives, develop affordable technologies, invest in connectivity solutions, and promote digital literacy.
15. Challenges include the digital divide, technological barriers, pedagogical challenges, privacy and security concerns, and equity and inclusion issues.

Answers to Self Assessment Questions

Self Assessment Questions 1.1

Consult the relevant section

Self Assessment Questions 1.2

Consult the relevant section

Self Assessment Questions 1.3

Consult the relevant section

Self Assessment Questions 1.4

Consult the relevant section

Self Assessment Questions 1.5

Consult the relevant section

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Unit: 2

ICT FOR EDUCATIONAL MANAGEMENT

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Introduction

The advancement of ICT has changed the world completely. Now the world has become a global village. Therefore, globalization and technological advancement have created a new global economy. The global economy is powered by information and communication technology. Technological advancement has brought serious concerns for educational institutions. New educational reforms are due to technological changes in the world. Information and communication technology have become essential in teaching and learning processes. All aspects of the education system are dependent on ICT. Classroom and school management are beneficiaries of ICT. Different kinds of ICT tools provide support for better learning, especially in the form of audio-visual aids. ICT is also helpful for teachers and students as well. The literature reveals that the use of ICT across different subjects has a useful motivational impact on students' learning. At the start of the 21st century, ICT has played a vital role in the development and prosperity of individuals, society and countries. Information and communications technology transforms the conventional educational system into a more modern and a better-quality system. It helps transform the educational system in several ways. The acquisition of basic skills in ICT is relatively easier and leads to a more creative human being.

Learning and teaching processes have become more effective with the use of ICT. ICT helps learners to become creative, problem solvers, and critical thinkers. ICT has helped the teacher's training institute during the pandemic of COVID-19. Today, learners have thousands of resources by using ICT in condition while sitting in their home not by searching for knowledge in libraries. Presentations became visual and auditory for students in addition to using software programs like powerpoint. However, all these factors need effective teachers and management or administrators to apply and achieve these effective benefits for students.

Learning Outcomes

After studying the unit, the learners will be able to:

- describe an overview of the application of ICT in school management
- use technology effectively
- explain different types of ICT tools
- appreciate the role of ICT in inclusion and the management system
- describe the initiatives of Pakistani government for the application of ICT in education; and
- use information and communication technology effectively in daily life communication

2.1 Use of ICT in School Management

Information and communication technology is used in the education sector to enhance the quality of education all over the world. The integration of ICT in education is inevitable and unavoidable, as it has become an essential part of daily life activities. ICT is considered an effective way for the betterment of all aspects of school education. The integration of ICT in school education is not associated with only teaching and learning processes. ICT also plays a key role in effective management in schools. Effective school management is essential to creating an effective learning environment. Therefore, the inclusion of ICT in school management ultimately results in the creative and productive learning environment.

ICT for Communication in School Management

A good communication system is a key to effective school management. Communication in any educational institution is used for internal and external information attainment and broadcasting. In a school, communication can occur among different people. It may occur among staff members, students, students' parents other institutions or offices, and officers.

In the past, communication among students, teachers, school staff members, parents and other stakeholders has occurred in a manual way.

Internet-based communication involves electronic mail (E-mails), forums and social networks. Virtual Learning Environment (VLE) is a new trend of ICT applied in schools. VLE is the internet-based software; it can be used for communication through discussion boards. It has its own built-in communication modules to interact with students. These students can be monitored by their parents with the help of VLE. With the help of VLE, paper marking, students' assessment, administration of different students' groups, uploading of content, and arrangements of students' grades can be done in an effective way.

ICT for Record Maintenance

School records are official transcripts or copies related to certain processes of actions, events and other matters which are kept by school administrators and preserved for future use and reference as authentic documents. These records include the admission and withdrawal register, attendance register, log book, visitors' book, staff and students' personal files, cumulative record folder, student progress reports, lesson plans/ notes, record book, staff attendance register, staff transfer and leaving records, library records and inventories, stock register, cash register including financial matters, pay sheets, etc.

ICT FOR SCHOOL MANAGEMENT

Having a dynamic system with a bird's view of data and reports can give the next level of power and quickness in decision-making for principals or management staff members. The benefits of ICT for school management are highlighted below.

1) Analysis of fee and other financial data
2) Data Analysis
3) Preparation of Reports
4) Tracking of Class wise performance
5) Tracking of Inquiries
6) Tracking of Lesson Progress
7) Tracking of Records of School Staff
8) Tracking of Students' Admissions
9) Tracking of Students' Profiles

ICT for Teachers and Staff

Having access to School Management System dashboard and Mobile App multiplies the productivity of academic and non-academic staff. Having the power to report important activities on the system reduces the burden and improves the speed of communication. Keeping data records and access to data when required makes their life super easy. The benefits are summarized below.

1) Access to domain-specific modules
2) Data Analysis and Reporting
3) Easy access to information
4) Lesson Progress Management
5) Management of Students' attendance and leave
6) Rapid communication
7) Remote Teaching

ICT for Students and Parents

The use of Advanced technology in education has made the lives of students and parents very easy. Different types of education-related mobile applications and websites provide countless opportunities for students and their parents. The benefits of ICT for students and their parents are summarized as under.

1) Access to Homework and Classwork
2) Access to Lesson Plans progress
3) Live Classes
4) Meeting with students' parents at a large distance
5) Online Testing Services
6) Record of Students' Attendance
7) Record of Students' Performance
8) Records of fees and online payments

9) Schedules of Examinations

Activity

Describe the name and functions of ICT tools used in your educational institution

Self-Assessment Questions 2.1

1. The phrase Information and communication technology has been used by academic researchers since
   a. 1960 b.1970 c.1980 d.2000
2. The Royal Society recommended that the use of term ICT should be discontinued in British school in
   a. 2012 b. 2008 c. 2014 d. 2010
3. School management refers to running the school according to
   a. Education Minister b. Principal c. Teachers d. Educational policies
4. VLE is a new trend of ICT applied in schools. Its full form is
   a. Variety of Legal education b. Versatile learning and education
   c. Virtual learning environment d. Virtual Education and learning
5. EMIS, the abbreviation stands for

a. Education Management Information Systems
b. Evaluation and Measurement Information System
c. Education Ministry Information System
d. Education Measurement and Inclusive System

2.2 School Management Tools

Schools are expected to play a vital role as the source of knowledge generation and learning atmosphere in the present age of information, communication, and technology (ICT). For this purpose, ICT has become an essential tool. ICT has changed the world dynamically. It has become a successful source of adapting learning, teaching and management of students' individual needs.

School Management Tool

A school management tool is a tool that helps a school administration in managing all educational and administrative tasks. A software school management tool helps schools to manage their all educational and administrative tasks digitally on a single platform. Sharing of ideas and communication with teachers, students, students' parents, alumni, and all other stakeholders has become an important part of school management. Students' admissions, assignment of subjects and classes to the class teachers and subject teachers, maintaining school records, communication with all stakeholders of the school, preparation of different certificates, and collection and analysis of different forms of data are included in school management.

It is the duty of a school manager to manage all the things in school. Therefore, a school manager should be aware of the school matters and trends of school and

educational developments. But, it is a difficult task for a school manager to perform all the duties alone. He/ She is always in need of some assistive things i.e. assistive devices to manage all aspects of school in a better way. School management tools are helpful for school managers to manage schools effectively. There are different types of school management tools in the world. Some of them are listed below.

1) Alma
2) Ascend SMS
3) Class365
4) Fedena
5) FeKara
6) Grade Link
7) Open Admin for School
8) Power School SIS
9) School Time
10) School Tool
11) Synergy
12) Thinkwave
13) TS School
14) Vera Cross

PowerSchool SIS

1) PowerSchool SIS is software that helps teachers to communicate easily with students and their parents.
2) It is used to keep data safe with cloud compliance experts.
3) It helps to manage daily school operations.
4) It helps to provide students' reports online with accuracy.
5) It helps to compare the analysis of academic data.

Gradelink

1) The Gradelink software is used by school management to save time and improve students' enrollment process.
2) It also helps the teachers to manage classes and other school schedules.
3) It helps in preparing administrative reports.

Fedena

1) It is one of the best school management tools.
2) It is also called Project Fedena.
3) It can be integrated with other software for video conference i.e. Zoom software and Google Meet Software.
4) It is also helpful in conducting inline examinations in an effective way.
5) It is also helpful in calculating taxes on transactions.
6)

Alma

1) It is school management software.
2) It helps school administration to simplify the processes of students' enrollments, registrations, and other tasks.
3) It is helpful in making data-driven decisions with the help of easy analytics and graphics.

Synergy

1) It is school management software.
2) It is helpful for school teachers to simplify their school tasks.
3) It helps school administration to organize students' data in an easy way.

Board Docs

1) It is school management software.
2) It is also known as a remote school management application (RSMA).
3) It also helps in managing students' attendance easily.

Orah

1) Orah is the software that is helpful in the completion of different managerial tasks.
2) It helps school managers to keep track of students.
3) It helps in managing leave, check-in, check-out, and event planning.
4) It can be used in integration with other software i.e. ISams, TASS, Synergetic, and Veracross.

Anthology

1) Anthology software helps in managing the academic schedules of schools without any disturbance.
2) It also helps in regulating students/ financial matters.
3) It helps in simplifying students' enrollment.

Classe 365

1) Classe365 is school management software.
2) It helps students to apply online for admission to the schools. It facilitates students to pay their fees etc. online. It helps in tracking admission and library fees.
3) It also helps teachers and students to manage classes and courses.

Think waves

1) It is software, used for cloud-based school management.
2) It provides custom report cards and delivers them in printed form or in electronic form.

3) It is used to send a large number of electronic mails(E-Mails) to students and their parents.

Guardian

1) It is school management software.

2) It simplifies the process of school management.

3) It is useful software, especially for students.

4) It helps students to focus their attention on their studies.

Activity
Enlist the name and functions of the Software.
Self-Assessment Questions 2.2

1. What do you know about School Management?
2. What do you know about school management tools?
3. How School management tools are helpful for teachers?
4. Describe the role of school management tools in effective management
5. Enlist the five names of School management tools

2.3 Assistive Technology in Inclusion
Assistive technology is a general term used for adaptive, assistive, and rehabilitative tools or devices for people with disabilities (Maor et al., 2011).
Huang et al. (2009) asserted that assistive devices are tools designed to improve the functioning of individuals with disabilities and reduce the effects of environmental barriers. These devices range from simple or low-tech devices to high-tech devices. Assistive technology is also helpful for special students' social and emotional betterment at school. It has been found that students with communication disabilities have more negative self-concepts as compared to students with no or less communication difficulty. Moreover, the students facing communication difficulties are perceived more negatively by their peer students. Therefore these students tend to have less social interactions.

Inclusion
Inclusion is a general term used for the placement of special students with normal students in general classrooms. According to law, inclusive education is the participation of special needs students in the general education curriculum. Another

aspect of inclusive education is the shared ownership of faculty members for the education of all students regardless of teachers' specialization (Voltz et al., 2010). World Health Organization (WHO) recommends the term relevant to special students. The Internal Classification of Functioning, Disability and Health (ICF) is the -sub-organization of W.H.O. ICF uses the term " Participation" instead of inclusion (Gal et al., 2010; ICF, 2001). The literature reveals mixed effects of inclusion on special students' academic, social, and emotional aspects. Some studies support the positive impact of inclusion on academic, social and emotional aspects of special and normal students. Some studies report the negative impact of inclusion on normal students

Need of Assistive Technology in Inclusion

The educational world is undergoing a massive change as a result of digital progress. The digital revolution gives insight into the availability and accessibility of technology for educational training. The application of assistive technology in all levels of education is important. Most of the students spend their time outside school using different types of technology. Therefore the students should also be provided the chances of using technologies in the classroom. Opportunities for using technology in the classroom will attract students to come to school regularly.

Types of Assistive Technology

According to the literature, there are three major types of assistive technology. These types are briefly discussed here.

1) Web Sites
2) Software
3) Telephones

Websites: Accessible web pages such as those that allow students with low reading skills to access information and communicate with others.

Software: Accessible instructional software, such as programs that allow students to work side-by-side and collaborate with their peers to complete assignments in the classroom. **Telephones**: Accessible telephones that make communication accessible to everyone, whatever their disabilities.

Assistive Technology for Academic Skills

Technology could play an important and significant role, in many cases, in helping students with disabilities overcome the academic difficulties that they face and helping them to develop their academic skills as well. Cullen, Richards, and Frank (2008) conducted a study to determine whether computer software would help students with disabilities improve their performance in writing. A multiple baseline design was used to study seven fifth-grade students with mild disabilities in three

phases: baseline, intervention using a talking word processor, and intervention using word prediction software in conjunction with a talking word processor. In the first week (Baseline) students handwrote all writing samples with no accommodations; in the next three weeks (Intervention one) Students used Write: Outloud, a talking word processor for all writing samples; in the last three weeks and performed better after getting the training of using talking word processor.

Types of Assistive Technological Tools for Inclusion

The experts in technology and inclusion have recommended some assistive technological tools for inclusion. Some of them have been enlisted below.

1) Calculator
2) Talking Calculator
3) Outlining
4) Abbreviation expanders,
5) Speech recognition,
6) Word Processor
7) Spell checking program
8) Proofreading program
9) Speech synthesis,
10) Optical character recognition System
11) Free-Form Databases

Activity

Visit an inclusive classroom and describe the role of ICT in the classroom

Self-Assessment Questions 2.3

1. Define Assistive Technology in your own words.
2. What do you mean by Inclusion?
3. What are the three major types of assistive technology?

2.4 Management of ICT Infrastructure in Schools

Management of ICT in school is of key importance. It needs diligence from all members of the school. The headmaster or the principal of a school should have sufficient knowledge of ICT. The school's heads that are aware of ICT are more aware of their staff members' needs and the school's needs. The school heads should have the basics of word processing, presentation software, and the internet to enhance their computer skills. To stay ahead and become competitive administrators and managers school heads and education officers must keep them up-to-date with the latest technology.

ICT Infrastructure

Information communication technology infrastructure is comprised of different components in coordination with each other. To run a company or a system seamlessly, the components of ICT infrastructure work together in a coherent way. With the breakdown of a single component, the other components are likely to be affected. The breakdown of any component results in a data breach, downtime, and even massive losses. Therefore a robust management of ICT infrastructure is necessary to observe that all working of ICT infrastructure is optimal and give quick solutions to any problem. I

Hardware Infrastructure

Any ICT component that you can touch is called hardware. Hardware infrastructure includes but is not limited to the following list:

1) Data centers
2) Devices
3) Hard drive
4) Laptop
5) Mobile devices
6) Network cables
7) Personal computers
8) Printer
9) Routers
10) Servers
11) Storage devices
12) Switches

Networking

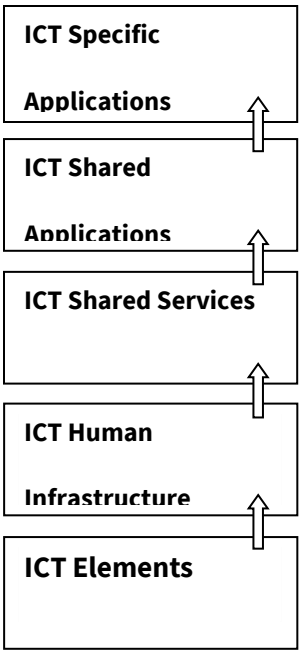
It involves but is not limited to

1) Cables
2) Desktop
3) Firewalls and security,
4) Internet connectivity
5) Routers
6) Switches
7) Virtualization
8) VPN

Software

It involves

1) Operating Systems
2) Software Applications
3) Virtual Machines



Types of ICT Infrastructure

There are different types of ICT infrastructure. Some of them are explained below.

1) **Traditional Infrastructure**
2) **Cloud Infrastructure**
3) **Hyper Converged Infrastructure**

These types are explained below.

Traditional ICT Infrastructure

Traditional ICT infrastructure involves software infrastructure, hardware structure, and networking infrastructure. This type of infrastructure is owned, managed, and maintained on-premise. Traditional infrastructure includes desktop computers and software installed locally on-premise servers and on individual machines.

Cloud Infrastructure

Cloud infrastructure is comprised of private internal clouds and infrastructure as a service system. Cloud systems delivered through a managed hosting provider and software as a service may also be included in cloud infrastructure.

Hyper Convergent Infrastructure

Hyper convergent infrastructure is a software-based infrastructure that virtualizes the elements of conventional hardware-based infrastructure. It is also known as virtualization IT infrastructure. The computers and server machines are used to

share information and necessary files in any institution. Machine hardware is made up of systems with the best performance and different processors. Different processors work in a different way. Some processors work for limited programmability and some processors allow for full programmability. There are a lot of companies to prepare computer hardware and servers. Apple, DELL, IBM, and HP are some famous manufacturers of quality computer hardware and servers.

Storage and Management of Data

Data is stored in storage devices and its management is done by software. Data storage has become the essential need of every ICT infrastructure to access, store and analyze in an easy way. There are two major ways for data storage: traditional storage and cloud storage

Traditional Storage

In traditional storage of data, data are stored in computers or servers and can be accessed via local area network (LAN) and Wide area network (WAN). LAN is a private computer network that connects computers and peripheral devices in small physical area. For example, a small office and a single building, etc. WAN is a computer network that is spread across a vast geographical area. It consists of multiple local area networks. For example internet, a network of bank cash dispensers. Given information is stored on disks that are flexible for reformatting when required. As information is increased more disks can be added its storage. To avoid complete loss as a result of a breakdown or disaster, data are stored in different locations.

Cloud Storage

Cloud storage is a cloud computing model that stores data on the internet through a cloud computing provider. The cloud computing provider manages and operates data storage as a service. In cloud storage, data are stored in 3rd party servers on the cloud. It can be accessed by multiple users at the same time from anywhere and anytime. There is only a single case in which it cannot be accessed. The case is when the system is down and the backup provided is also failed. As compared to traditional storage, cold storage is insecure.

There are three types of cloud storage: Object storage, file storage, and block storage.

Object Storage: Applications developed in the cloud often take advantage of an object's storage scalability and metadata characteristics.

File Storage: Some applications need to access shared files and require a file system. This type of storage is supported by network-attached storage (NAS) servers**.**

Block Storage: Block storage is analogous to direct-attached storage (DAS) or a storage area network (SAN).

Self-Assessment Questions 2.4

1. Describe the types of ICT infrastructure.
2. Define cloud storage
3. Write down three names of Enterprise applications.
4. Define ICT infrastructure.
5. What do you know about VPNs?

2.5 Management Information System

A management information system is the combination of three words; management, information and system. In order to make the concept of management information system clear to everyone, we define these three terms separately

Management

Management is the process of doing things through and with people in an organized way.

Information

Information is the data that is processed in an organized way for decision-making.

System

An orderly collection of interdependent elements linked together in a planned way for the achievement of a specific goal.

The concept of a management information system is elaborated through the following diagram.

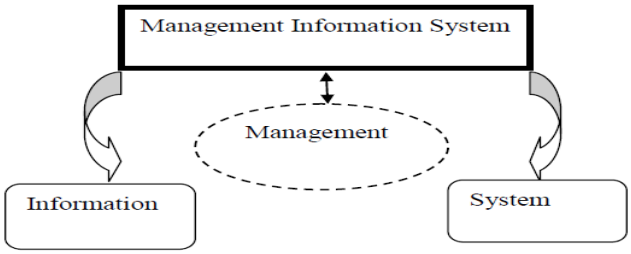


Fig. 1 Management Information System

Management information systems is the study of people, technology and organization and their relations with each other. A management information system can also be defined as a computer system management system comprising

software and hardware that serves as the backbone of operations of an organization. A combination of systems and procedures that collect information from different sources, compile the information and present it in a readable format.
The collection of people, procedures, data and information technology assists managers to make informed decisions.

Components of Management Information System
Four components constitute a management information system. These components are: People, Hardware, Software and Organizational procedure

People or Executive
People or executives are the individuals working in an organization. The people may be in the form of professionals of information technology to operate management information systems.

Hardware
Several input and output devices are included in the hardware of the management information system. These devices are used for data entry and demonstration of required information. The input devices may be in the form of keyboard, mouse, recorder, scanner etc. The output devices may be in the form of a monitor, speaker, printer, etc.

Software
Software of management information systems involves computer programs to perform specific tasks. The examples of software are Microsoft Word, Microsoft Excel, and PowerPoint etc.

Organizational Procedure
Procedure refers to the rules or guidelines of an organization to operate a management information system. The organizational procedures are of many types. These may vary from organization to organization as well as from department to department.

Functions of Management Information System
The major objective of MIS in an organization is to collect the information by managers of the organization for decision-making. However, there are four basic functions of a Management Information System: Data collection, data processing, Information Storage and dissemination of management information.

1. Data Collection

Management information system executes data through computer systems utilizing the sources of organization.

2. Data Processing

Data processing involves the conversion of collected data into the required information for decision-making. In data processing, mathematical and logical operations are used in the processing of data. These mathematical and logical operations may be in the form of calculation, storing, classifying and summarization of data. We can summarize that data processing involves the following activities:

I. Organize Data.
II. Analysis of data.
III. Application of mathematical and logical operations collection.
IV. Create predictive modeling;
V. Research and forecasting.

3. Information Storage and Retrieval

As discussed earlier management information system stores data as an organizational record for their further uses. Information retrieval consists of approaching the stored data according to the needs of the organization.

4. Disseminating Management Information

In the process of disseminating management information, the required information is dispersed to the individuals working in the organization. The dispersing of information is made according to the needs of individuals in an organization. The functions of a management information system are explored through the following diagram.

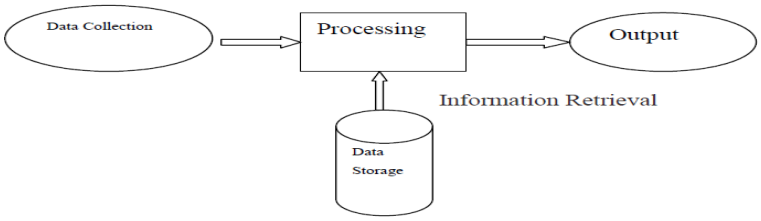


Fig. 2 Information Retrieval

Types of Management Information Systems in Education

There are many types of management information systems according to the nature and demand of educational organizations or institutions. Learning management

systems, School management information systems, knowledge management information systems, and education management information systems are some of famous management information systems applied in the field of education. These information systems are discussed below.

Learning Management System

There are two famous types of learning management systems in Pakistan

a) **School Management Information Systems**
b) **Education Management Information Systems**

These systems are explained below.

School Information Management System

School information system facilitates school management regarding teaching and learning material.

Knowledge Management System

Knowledge management system (KMS) facilitates an organization for the collection, recording, retrieval, and dissemination of knowledge. All types of documents, accounts records, uncoordinated procedures, practices and skills are included in the knowledge management system. Knowledge management information system deals with the process of knowledge creation and acquisition from the internal process and external world. After incorporating the organizational policies and procedures the collected knowledge is disseminated to the entire stakeholder.

Education Management Information System

The Education management information system (EMIS) is widely used in the school education departments of Pakistan. There is a unique code for each school. The EMIS is a data collection, storage, retrieval, and process and dissemination system. It is prepared to be used by school administrators and decision makers to administer the school education system in an effective and efficient way. The system is helpful in managing the large number of information on educational institutions. The system provides accurate and timely data to education authorities for decision making, planning, and the development of different programs. The system is also helpful for all the stakeholders of the school education system.

Activity

Describe the benefits of the Learning Management System of Allama Iqbal Open University Islamabad.

Self-Assessment Questions 2.5

1. Describe the levels of management information systems given by Davis and Olson.
2. Describe the major steps of data processing.
3. Enlist the components of the Management Information System.
4. Describe briefly the importance of EMIS in schools.
5. Enlist the functions of a management information system.

Answers to Self-Assessment Questions

Self-Assessment Questions 2.1

1. C 2.a 3. d 4.d 5. a

Self-Assessment Questions 2.2

Read the relevant material for answers

Self-Assessment Questions 2.3

Read the relevant material for answers

Self-Assessment Questions 2.4

Read the relevant material for the answer

Self-Assessment Questions 2.5

Read the relevant material for the answers

Key points

1. A school management tool is a tool that helps a school administration in managing all educational and administrative tasks.
2. The phrase Information and communication technology has been used by academic researchers since 1980.
3. In 2012, the Royal Society recommended that the use of the term ICT should be discontinued in British schools as it has attracted too many negative connotations.
4. The United Nations has created a "United Nations Information and Communication Technology Task Force" and an internal "Office of Information and Communication Technology".
5. Information and communication technology (ICT) is an extended form of information technology (IT).

6. ICT means all communication technologies including internet wireless networks, cellphones, computer software, middleware, social networking, video conferencing and other media applications and services enabling users to access, retrieve, store, transmit and manipulate information in digital form.
7. ICT is also used to refer to the convergence of audiovisual and telephone networks with computer networks through a single cabling or link system.
8. ICT means all types of technologies that combine; and allow people and organizations to interact in the digital world.
9. There are three major types of assistive technology: Websites, Software and Telephones
10. There are three common types of ICT infrastructure: Traditional Infrastructure, Cloud Infrastructure, and Hyper Converged Infrastructure
11. There are three types of cloud storage: Object storage, file storage, and block storage.
12. Four components constitute a management information system: People, Hardware, Software and Organizational procedure
13. There are three levels of management information systems: Organizational level, application level, and user level
14. There are two famous types of learning management systems in Pakistan: School Management Information systems and Education Management Information Systems
15. Knowledge management system (KMS) facilitates an organization for the collection, recording, retrieval, and dissemination of knowledge.
16. All types of documents, accounts records, uncoordinated procedures, practices and skills are included in the knowledge management system.
17. The Education management information system (EMIS) is widely used in the school education departments of Pakistan.
18. The EMIS is a data collection, storage, retrieval, and process and dissemination system.

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Unit: 3

USE OF MULTIMEDIA IN MANAGEMENT

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Introduction

There is a variety of media available in the teaching learning process which can be used to enhance teaching learning process efficiency and effectiveness. This is usually regarded as "multimedia". Bob Goldstein coined this term who was an artist and a singer. So, this term attached combination of different audio, video, print, broadcast, and non-broadcast technologies. This is used to enhance the interactivity and involvement of learners with content and educational experiences. The concept of multimedia started when German scientist Paul Nipkow developed the first video disc and combined it with Marconi's radio and made a Nipkow system in the 1920's which was lately used as a standard for research in audio video projection. With the passage of time, different systems were produced for communication. However a major work was done by Tim Burner Lee in 1991. He developed the World Wide Web and revolutionized the use of multimedia. Now in every education system, teachers and learners are using it as part of their education. (Abdullah, 2022).

The term multimedia is defined as a set of different audio-visual technologies that are used for effective communication in a new way in the education system to make it easier for learners to learn with conceptual clarity. It includes texts, pictures, slides, and audio-videos. In the early 20's multimedia was used in different schools, colleges, and universities for delivering education in different countries. Multimedia is also defined as the use of two or more two different media to enhance teaching and learning and to convey the message in a different way such as text, graphics, sounds/ audio, animations, etc. (Qaiser Suleman, 2012).

With the advancement in technology, educators have been using the latest media while not relying on a single media. By combining one or two media, powerful communication can be done with students. So "multimedia is an interactive media and provides multiple ways to represent information to the user in a powerful manner. It provides interaction between users and digital information. It is a medium of communication". Generally, multimedia combines text, videos, audio, animations, hardware, software, graphics, etc. to communicate information by using computerized methods combining textual data, audio, visuals (video), graphics and animations (Guan, Song & Li, 2018).

Objectives

Dear students, after reading this unit you will be able to:

1. understand the elements of multimedia.
2. inculcate different types of multimedia.
3. comprehend the process of developing multimedia content.
4. use the process of developing multimedia content.
5. apply different tools to create and use multimedia.
6. use multimedia in the educational management process.

3.1 Elements of Multimedia

Elements of Multimedia are Text, Images and graphics, Audio, Video, and Animation. Texts, images, and graphics are three elements static (do not move) whereas the other three elements: audio, video and animations are moving objects or dynamic objects within multimedia applications. (Vaganova et al., 2020). Following is the description of its elements:

Information in audio, video, sound, graphics, video, etc. can be displayed and conveyed to many students simultaneously which puts an appealing and soothing impact on their senses. The current education system demands the use of different elements of multimedia to enhance and accelerate the education of the new generation. Among different elements of multimedia, its components can be categorized into two main groups, software, and hardware. So, these two groups are combined to convey information in teaching learning process:

Here is the description of each component:

1. **Text:** This is an important component of multimedia which has prime importance. This can be created and written in different fonts, styles, sizes and colors. There are many effects that can enhance its appeal to the students. Many formats of texts are also available among this animated text produces soothing effects on students' memory and retention rate.

2. **Graphics:** A picture is better than a thousand words. Pictures are important elements in multimedia. These offer attractive and durable learning to students. There are many students who do not like to read text. They are auditory learners. They learn better when they are shown some pictures. They can grasp background information easily through pictures, understand difficult concepts quickly and use the acquired knowledge in future learning. There are two types of graphics:

a. **Bitmap Images:** these are acquired through digital cameras or scanners. Usually, these images cannot be edited, and they require large memory as their size is big.

b. **Vector Graphics:** these images can be edited as they are drawn on computers. Their size is also low as compared with bitmap images.

3. **Audio:** This is an application in which sound, music and speech effects are used. Audio is also called the' audio element of multimedia' or 'sound element of multimedia'. Students can be offered different sounds to listen i.e. for nursery class students, audios of different animals' voices (lion, cheetah, cat, dog etc.)

or birds' voices (sparrow, crow, dove, etc.) can be played in classrooms which will help students to remember the voices. These are of analog and digital types.

a. **Analog audios or analog sounds:** original sound signals are referred to as analog audios. These are stored in computers in digital form.

b. **Digital audio.** The sound used in multimedia applications is digital audio.

4. **Video:** This is the strongest and most powerful element of multimedia. It combines all the elements i.e. audio, graphics text and animation. This is also called moving pictures accompanied by graphics. In a small amount of time, students can be offered amazing information over text and voice. Videos offer the use of maximum senses of students.

5. **Animation:** This is a moving image and a very popular multimedia component. Animations are used to make static images in moving forms. A series of still images is placed in a sequence and then animation is created. Animations enhance the attention and motivation of students. These are attractive and appeal to students. Students can enjoy animations and retain these in their long-term memory. These can be stored, transferred, and copied easily. Their use requires no specific expertise of teachers.

Activity 1.
Read the above material on elements of multimedia and write one paragraph in your own words on the different elements discussed here.

Self-Assessment Question 3.1

Q1. Define multimedia. Also critically analyze its elements.

3.2 Types of Multimedia

There are two types of multimedia used in the education system worldwide.
Linear and nonlinear multimedia.

Linear media is also called passive media as there is less interaction with the audience. It may include a PowerPoint presentation, any video, picture, or story-based images etc. whereas nonlinear media is a bit different. A person himself gets involved with the interface or any web or any other media while using a nonlinear type of multimedia.

Nonlinear media includes any social media channel, any website page, or a search engine home page etc. Its examples are games, courseware, and interactive CD (Belajar, 2013). Nonlinear means the following:

– Interactive
– Users have control over the contents
– Users are given navigation control

As the world is changing rapidly the way of teaching and learning process is also changing according to the needs of the digital world. The needs of teachers and learners are changing day by day to meet educational goals at the global level. In past years only pictures, charts, CDs, DVDs, Radio, and TV were used as multimedia technologies in education but now there are several other types of multimedia, we are using to enhance our education system e.g. video, websites, web pages, channels, and movies. series etc. multimedia is not only important for traditional education systems but more important for vocational and virtual education systems (Mukherjee, 2018).

Activity 2.
Make a chart and write down the two types of multimedia discussed here. Then display in your class and decide on the type you like the most. Also, note down the opinions of your classmates.

3.2.1 Why Use Different Types of Multimedia

- Multimedia is used because it is easy to use.
- Multimedia enhances motivation to learn.
- It allows teachers to plan their teaching creatively.
- Multimedia provides self-paced, independent study to learners.
- It involves more senses of students which promotes long-lasting retention.
- It encourages better understanding.
- This is cost-effective and can be used more and more times.

3.2.2 Examples of Multimedia Applications

- ✓ Interactive TV
- ✓ Multimedia
- ✓ courseware
- ✓ Video conferencing
- ✓ Video-on-Demand
- ✓ (VoD)
- ✓ Virtual reality

Virtual reality is an extension of multimedia. It uses the basic multimedia elements of imagery, sound, and animation. It requires terrific computing horsepower to be realistic.

Activity 3.
Given the above different examples of multimedia, which examples you have experienced? Make a chart and draw/paste the best example of multimedia you have experienced. Also, write a note on its salient features and your own reflection upon your experience.

3.2.3 Advantages of Multimedia in Educational Management

Multimedia inhibits characteristics of motivation, interactivity, integration of different types of media and attention. This makes it very helpful and fruitful in education for all students to cater to their individual differences. The provision of catering to individual differences is the big advantage of multimedia which covers all students in a classroom to support their learning and increase their motivation. This permits students to control the speed of applications and the amount of repetition to meet their individual needs. In comparison with other media, multimedia offers interactivity by allowing learners to control to a certain extent on the content being presented to them to change learning parameters, observe their study results, or respond to choose options towards mastery learning.

Moreover, feedback that is tailored to the individual needs of students distinguishes multimedia from other media without the presence of teachers. Teachers can use computers while using multimedia which extends different computer applications combined in a meaningful manner to be used in classrooms effectively and efficiently. So, the presentation of ideas in different ways can be used by employing:

- Images, including scanned photographs, drawings, maps, and slides.
- Sounds, e.g. recordings of voice, noise, and music.
- Video, including complex procedures and 'talking heads'.
- Animation and simulations.

Activity 4.

1. Go to google and search on the merits of multimedia in education. Make short points and discuss them with your friends in a group of 4 to 5 students.

Activity 5.

Discuss with your teacher and write your reflection on the challenges of multimedia use in teaching teaching-learning process. Also, ask your teacher about specific challenges he/she faces while using multimedia.

Self-Assessment Questions 3.2

Q1. Compare and contrast linear and non-linear multimedia.
Q2. What are the merits and demerits of using multimedia in the teaching learning process?
Q3. If you have to use multimedia in teaching learning, why you will use it? Justify.

3.3 Developing Multimedia Content

Multimedia content not only improves learning but also helps to gain more admissions. It also improves retention in any institute. It also provides ease in the process of assessment and evaluation. It helps to save time in the classroom and to utilize the allocated time effectively.
For effective use, the multimedia content should be aligned with the curriculum and student learning outcomes. While developing multimedia content, an educationist or teacher must consider the core of the learning outcomes. It is very important to understand the process of development of multimedia content for the effective process of teaching and learning.

3.3.1 Criteria for Developing and Using Multimedia

Bent, Andersen and Brink (2013, p.69-70) "Using educational multimedia in the classroom effectively and meaningfully demands a careful selection of materials. Multimedia products and online services should be selected according to the overall objectives of learning activities, learners' prior knowledge and experiences, curriculum, etc. The following selection criteria refer to multimedia-based learning materials from the end user's/learner's perspective, i.e.

1. **Appropriateness of the target group:** Is there a clear definition of the target group? Is the presentation of the content to be learned appropriate with respect to graphics, sounds, identification figures, etc.?

2. **Gender issues:** How to observe and overcome gender differences when learners receive and produce multimodal content?

3. **Pedagogical content:** Are the learning objectives defined? Are the knowledge content and its organization appropriate for achieving the specified objectives? Are they pitched at the right complexity level for the users that the system attempts to reach? Do the tasks that are designed to convey this knowledge stimulate and enhance users' capacity for learning? How much content does the application contain? Is there a guide through the application? Does it give useful and correct information on the content to be learned? Does it ask questions or allow learners to interact actively with the application for more than just navigation purposes? Does it fit the (national) curriculum? Which learning

approach does the application use? Does it support a deep approach to learning? Does the material provide selective feedback? How can it be used collaboratively?

4. **Flexibility and Navigation:** How easily can users obtain knowledge or perform tasks by following the links provided by the system? Does the information content provided in each node and its associated nodes facilitate a relational understanding of concepts? How do such links and navigation methods provide more effective ways to disseminate knowledge than traditional media? Do they stimulate creative ideas and collaboration? How is the content structured? Is it possible for learners to choose their own path through the material or to return to previously viewed work without returning to the start? Is it possible to modify the content of the application? Is it possible to use the application for different attainment levels? Is there an interactive assessment with selective feedback?

5. **User-friendliness:** Is the application easy to use and install from the web or a CD-ROM and to remove? Does the application provide guidance for its use? Is it easy to survey? How easy is it for users to learn the ways of operating the system and remembering them? How well can users manage the application through its interface?

6. **Technical quality:** Slow, badly designed, or unreliable systems will quickly lose the support of their users. Technical evaluation covers interaction, speed, capacity, reliability, and extensibility. How responsive is the system? Is it fast enough to provide a real-time response, and if not, is there any message to inform users of what is going on? How reliable is the system when used continuously by different types of users? Does it provide new functionalities or innovative ways to perform a specific task? Are these capabilities implemented in such a way that they can be easily scaled? How good is the quality of such multimedia elements as graphics, animations, videos, sounds, etc.? Are the symbols used easy to see and understand? Is the presented format (Web, CD-ROM, etc.) easy to use? Is the target platform used in the classroom (e.g. a Windows version)? How is the hardware configured?

7. **Value for money:** The value for money criterion can be considered through the evaluation of all the listed criteria".

3.3.2 Ethical Issues Developing Multimedia Content

While developing multimedia content following ethical points may be kept in mind:

1. ***Copyright.*** Teachers who are developing multimedia content should keep in mind that no copyright should be violated. Content, that is free to access, and which can be used freely should only be used. Images, text and animations which are protected should be used only after seeking permission from the developer or the writer.

2. ***Plagiarism.*** This is one of the biggest challenges technologies have introduced. ChatGPT has been added to it. Artificial intelligence tools are being exploited and malpractice. This comes under plagiarism. Plagiarized work is a crime and this needs to be inculcated to teachers and students. Plagiarism is a serious problem that should be avoided while developing multimedia content and using it in the classrooms.

Activity 6.

Read the heading 3.3.1 and reflect upon the specific challenges you have faced when using multimedia in classrooms.

Self-Assessment Question 3.3

Q1. Being a teacher, what criteria you will follow while developing content for multimedia?

Q2. What are ethical issues in using multimedia that should not be neglected? What will be the probable effects of their violation?

3.4 Tools for Creating Using Multimedia.

In an interactive classroom, teachers use several techniques and teaching aids that improve the process of teaching and learning. These tools not only help teachers to enhance their teaching practices but also bring improvement in the cognitive abilities of the students. The term multimedia refers to the usage of different content such as texts, audio, videos, symbols, numbers, and pictures with the help of technological tools (Abdulrahman et al., 2020; Guan et al., 2018).

"Multimedia tools in general may be defined as digital learning resources that aid users in becoming familiar with the representations offered via the use of numerous media components. Multimedia tools are formulated of information and learning activities that are delivered via the use of multiple components such as video, picture, audio, graphic and text using digital learning resources" (Fu'ad & Sam, 2021).).

Teachers utilized text-based aids in the past but today multimedia is widely used all across the globe. Multimedia is used to support the teaching and learning process in the classroom with the help of advanced technologies. Both software and

hardware are used to run multimedia content effectively (Abdulrahman et al., 2020; Alemdag and Cagiltay, 2018; Kapi et al., 2017).

3.4.1 Multimedia Tools

Following are popular multimedia tools:

Zoom Classroom

According to Singh, et al (2020), "Zoom is one of the top popular video conferencing applications today. The participant does not need to go through the hassle of registering into Zoom in order to join an online meeting room. Technically, Zoom has numerous functions that enable educators to engage students in virtual meetings such as allowing multiple participants, recording, presenting, working on whiteboard and so many more. Zoom, a video conferencing tool, has recently become extremely popular due to its great features that allow hundreds of video participants and up to 49 videos on screen".

Google Meet

"Google Meet is a free virtual meeting accessed by Gmail. To use this tool, users must have a Gmail account first. It is an easy tool to navigate as most students and educators have personal email thus, making it the top multimedia tool in Malaysia. In fact, all around the globe, businesses, schools and other users find Google Meet is an easy app that allows them to stay connected and get work done" (Singh, et al, 2020).

TED-Ed

This is also an important tool. "For many decades, video content has been used to support the motivation and learning of students in higher education. Students entering university are viewed as digital natives who benefit from the incorporation of digital technology in the learning environment, with younger students reporting greater enjoyment when video is used as a teaching tool in class. This website tool allows democratizing access to information, both for educators and students, especially in higher education" (Russell, 2016).

Canva for Education

Canva for education is a powerful design tool that allows teachers and students to create visually stunning designs for any subject or age level. According to (Yundayani et al., 2019), "Visuals in the classroom, including Canva, can serve a variety of purposes, including:

1) making abstract ideas concrete.
2) motivating students.
3) giving direct attention; and
4) repeating information.
It enables its users to create their own designs from scratch or choose from ready-made templates with high resolutions and the finest quality educational templates. Interesting and colorful visuals do attract students' attention more than just words".

Quizizz
"This multimedia is designed to engage a learning platform where users can customize their own quizzes, lessons, presentations and even flashcards not only for students but everyone including employees, families and many more.

Prezi
"Prezi is a presentation app known mostly for its style of zoom-in navigation and a slide-less design, with the core concept of creating presentations that stay connected to every section and the presenter can choose to zoom in and navigate between every slide seamlessly.

Kahoot!
This one almost has the same functions as Quizizz but with a bit of a twist, which it is based on a game and questions. Through this tool, educators can create their own questionnaires, discussions or even surveys that match academic lessons' desires. The materials projected in the classroom and questions are answered by students while playing games designated and learning at the same time. According to Göksün and Gürsoy (2019), "the impact of using the Kahoot application as a formative assessment tool on the academic achievements of pre-service teachers was reported,

Powtoon
"In the current era, the learning process that uses digital-based media is indeed very necessary, especially to accommodate the development of learners who are very familiar with the advancement of technology and information. Powtoon is designed to capture audiences' attention by using creative presentation templates which help teachers and educators to ensure maximum information delivery to students.

Google Classroom

Google Classroom is a Learning Management System (LMS) for teachers provided by Google. “This application serves as a hub for students to communicate, ask questions, and make assignments.

SelfCAD

According to Gouri (2020), “to promote learning, students are provided with curriculum. There are various types of tech-based tools available for use in the classroom that are specifically designed to encourage, enhance, and manage learning. SelfCAD is a cloud-based software package for students as it is easy to use, yet it provides an authentic, ‘real-world’ 3D design experience. It provides a database of complete 3D printable designs, making thousands of 3D objects available for immediate 3D printing. It is a powerful and effective tool for the education sector. Due to our higher sensory stimulation as we watch, listen, explore, and learn by doing simultaneously during the teaching-learning process through digitalization, our learning is sustained for a longer period”.

3.4.2 Multimedia applications

According to Elmagzoub, (2015), there are four educational multimedia applications:

1. **Text-Based Applications**:

   These are important multimedia creating and using tools/applications. “Many multimedia applications provide efficient navigation through a large resource of primarily text-based information. These applications need to be searchable so that relevant information can be found easily and quickly

2. **Interactive Applications**

   Most educational multimedia applications fall into the category of interactive, graphical applications. These applications are fully capable multimedia tools that can handle all media formats, as well as provide interactivity with the user. Although most applications provide these capabilities, some are better suited to complicated, interactive applications than others. Authoring tools, which cater to this type of application generally, include programming future, commands and functions provided in the scripting language. IconAuthor from AimTech Corporation, Macromedia Director, Macromedia Flash from Macromedia, the Apple Media Tool Programming Environment from Apple, and Course Builder from Discovery Systems are professional-quality, sophisticated multimedia packages, but are also quite expensive. Development

packages like SumTotal Systems Multimedia ToolBook, and Claris Corp's Hypercard are very capable development tools that cost significantly less.

3. **Web Mobile (Smart) phones Applications**
   A mobile phone is an electronic telecommunications device that can make and receive telephone calls. It connects to a wireless communications network through radio waves or satellite transmissions. Nowadays, in addition to telephony, mobile phones support a wide variety of other services, such as text messaging, MMS, email, Internet access, short-range wireless communications (infrared, Bluetooth), multimedia applications, gaming, and photography.
4. Mobile phones are also used to play all types of multimedia, e.g. play sounds, view images, and watch videos. Mobile phones that offer these and more general computing capabilities are called smartphones. Mobile Applications are the software that runs on a mobile device and performs certain tasks for the user of the mobile phone. Applications may include Games, Web browsers, cameras, Media players, Social Networks, calendars, calculators, Image Viewer, etc.

Activity 7.
Open your smartphone, go to the www and play nursery rhymes for a kid in your family. Notice the involvement and curiosity multimedia "Mobile (Smart) phones Applications" have created for the kid.

Self-Assessment Questions 3.4

Q1. There are many multimedia tools available on the internet. Which tool you prefer and why?
Q2. Write a comprehensive note on multimedia applications.

3.5 Use of Multimedia for Educational Management

Multimedia is popular in most educational institutions. It has created its own space, and value and is used as a tool of educational technology. It offered many educational management solutions to administrators, teachers, and managers. Now, educational institutions can use multimedia as an "anytime and anywhere tool" for educating multi-disciplinary students. It has enabled increased interaction and communication between teachers and students. The process of knowledge acquisition becomes more efficient when the learners experience an event through a multimedia simulation. It also offered administrative solutions to maintain many

educational records. Its powerful pedagogical strength has offered endless possibilities to improve teaching and learning which can also be used in its full potency to enhance administrative efficiency and as a new tool of educational technology (Malik & Agarwal, 2012).

3.5.1 Reasons for Using Multimedia in Educational Management

There are several reasons for using multimedia in educational management. According to Cadmium (2022), these are as follows:

1. **Manual management is expensive.**
   Manual management of educational resources and maintaining manual databases is not only a big challenge as it demands hundreds of hours of laborious paperwork, but also contains chances of errors and incurs huge costs. Multimedia software has offered educational administrators the chance to solve this issue. Now different record maintaining software made the work of administrators easy and data can be stored in a single file which can be stored, retrieved, transferred, and copied easily.

2. **Better optimization.**
   There are various multimedia management platforms that help educational organizations to take advantage of cutting-edge features and optimization techniques. This permits the assets of educational organizations to be efficiently used in an optimized fashion.

3. **Cloud supported.**
   Multimedia packages and platforms are could-supported. This is the trend of today and in the future. This enables digital asset management professionals as well as easier asset management, collaboration, and production among involved parties.

4. **Institutional growth.**
   With the development, progress, and growth of institutions, need to strengthen their ‘multimedia management capabilities’. Usually, this is done through the procurement of the latest software or by developing some ‘self-hosted platform’. The efficiency of multimedia rests in its effective management.

5. Students' management.

With every passing day, the online enrollment of students in different online courses is increasing significantly. As enrollment increases, the management of students demands multimedia packages in educational administration.

6. Better learning outcomes.

Educational organizations, that use multimedia, often experience better results with learners. Multimedia has offered students benefits with greater retention, improved memory recall and improved/high scores on tests.

7. Efficient teaching.

Educational administrators, encourage teachers to use multimedia, and who provide ample opportunities teachers to use latest multimedia experience better results in teaching. Teachers can achieve desired learning outcomes easily by using different multimedia packages.

8. Innovative educational technology tool.

In this technological era, almost every school, college, and educational organization whether face-to-face or online is expected to have multimedia. Multimedia has emerged as an innovative educational technology tool. Educational records need to be maintained electronically. Students' classes need multimedia. This is because ubiquitous technologies on mobile devices have emerged need for multimedia and these also provide flexible learning schedules to students and educational planning platforms to teachers as well. The trend is being driven by the ubiquity of mobile devices and the need for more flexible learning schedules.

9. Well-integrated Platforms.

Different multimedia management platforms can integrate with learning management systems. Different types of media can also be shown or played on learning management systems. This helps increase access, improve efficiency, and deliver quality teaching and learning.

10. New forms of multimedia.

New forms of multimedia i.e. virtual reality, augmented reality, and 360-degree video have helped educational managers to manage teaching effectively with increased retention of students. These also motivated learners to learn in a technology-driven driven better learning environment.

11. Affordable.

Multimedia is cost-efficient and cost-effective. It has allowed colleges and universities to reduce costs with "one-stop-shop technology" by automating and streamlining the multimedia management process.

Activity 8.

Go to the nearest library and read more about ways to use multimedia. Keeping in view the use of multimedia in educational management, also reflect upon the possible ways you would use it in any organization.

Self-Assessment Questions 3.5

Q1. What are the probable uses of multimedia in educational management? Justify with reasons.

Q2. Define multimedia. What is its educational value?

Q3. If you are working in school/college/university, how you will combine these elements of multimedia in your classes?

Q4. Why multimedia is significant in education? Justify with reasons?

Q5. Discuss different elements of multimedia in detail.

Q6. What is the significance of each component of multimedia?

Q7. Write short notes on the following:

a. Text
b. Graphics
c. Audio
d. Video
e. Animation

Q8. Differentiate between analog audio/analog sounds and digital audio.

Q9. Compare and contrast bitmap images and vector graphics.

Q10. Make a comparison between linear and non-linear multimedia.

Q11. What are the specific advantages and challenges of the use of multimedia in education? Also, offer solutions for the challenges.

Q12. Critically examine the following multimedia applications:

f. Text-Based applications
g. Interactive applications
h. Web applications
i. Mobile (Smart) phone applications

Q13. Why multimedia use is important in educational management? As a manager how would you use multimedia in your job role?

Answers to Self-Assessment Questions

Self-Assessment Questions 3.1 (Headings 3.1 and 3.5.1)
Self-Assessment Questions 3.2 (Headings 3.2, 3.2.1, 3.2.2 and 3.2.3)
Self-Assessment Questions 3.3 (Headings 3.3.1 and 3.3.2)
Self-Assessment Questions 3.4 (Headings 3.4.1 and 3.4.2)
Self-Assessment Questions 3.5 (Headings 3.5 and 3.5.1)

Key Points

1. Multimedia is a set of different audio-visual technologies that are used for effective communication in a new way in the education system to make it easier for learners to learn with conceptual clarity. It includes texts, pictures, slides, and audio-videos. In the early 20's multimedia was used in different schools, colleges, and universities for delivering education in different countries.
2. Elements of Multimedia are Text, Images and graphics, Audio, Video, and Animation. Texts, images, and graphics are three elements static (do not move) whereas the other three elements: audio, video and animations are moving objects or dynamic objects within multimedia applications.
3. There are two types of multimedia used in the education system worldwide. Linear and nonlinear multimedia. *Linear media* is also called passive media as there is less interaction with the audience. *Nonlinear media* includes any social media channel, any website page, or a search engine home page etc. Its examples are games, courseware, and interactive CD.
1. Multimedia content is very important in education. It not only improves learning but also helps to gain more admissions. For effective use, the multimedia content should be aligned with the curriculum and student learning outcomes. While developing multimedia content, an educationist or teacher must consider the core of the learning outcomes.
2. Ethical points of multimedia may be kept in mind which include plagiarism and copyright.
3. There are many multimedia tools which include Zoom Classroom, Google Meet, TED-Ed Canva for education, Quizizz, Prezi, etc.
4. There are four educational multimedia applications, Text-Based applications, Interactive applications, Web applications and Mobile (Smart) phone applications.

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Unit: 4

LATEST TRENDS IN EDUCATION

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Introduction

In the previous unit, you learned about the use of multimedia in school management. In this unit, you will learn about different emerging trends that are being used in the education sector worldwide. There are many different trends and developments in the field of education, and it is difficult to identify the latest trends without access to current information. However, some of the trends that have been observed in recent years include the following:

- The increasing use of technology in education, such as online learning platforms and educational apps, provides learners with greater flexibility and access to learning opportunities.
- The growth of personalized learning, in which educational content and instruction are tailored to the individual needs and preferences of each learner.
- The rise of alternative education models, such as competency-based education and micro-credentials, provides learners with more flexible and customizable pathways to learning and career success.
- The growing recognition of the importance of social and emotional learning, and the development of new strategies and approaches for teaching these skills.

Overall, the field of education is constantly evolving, and new trends and developments are emerging all the time. It is important for educators to stay informed about the latest trends and to be open to new ideas and approaches to provide the best possible education for their students. In this unit, we will focus on the use of e-learning technologies, learning management systems (LMS), different e-learning standards, advantages, and limitations of E-learning.

Learning Outcomes

Dear students, after reading this unit, you will be able to

1. define the concept and characteristics of e-learning
2. explain different approaches to e-learning
3. define and explain different e-learning tools and technologies
4. explain learning management systems (LMS)
5. define e-learning standards
6. explain advantages and potential limitations of e-learning

4.1 Concept and Characteristics of E-Learning

E-learning, or electronic learning, is a form of education that is delivered using digital technology and media, such as the Internet, mobile devices, and computer-based learning systems. It is a type of distance education, in which students and teachers are typically separated by physical distance, and the learning process is facilitated using technology and digital media.

E-learning has several key characteristics that differentiate it from other forms of education. Some of these characteristics include the following:

1. **Flexibility:** E-learning provides learners with the flexibility to study from anywhere, at any time, and at their own pace. E-learning is flexible because it allows learners to set their own pace and schedule for learning.

2. **Convenience:** E-learning allows learners to access educational content and resources easily and quickly, using a variety of digital devices and platforms. E-learning is convenient because it allows learners to access course materials and participate in learning activities from anywhere with an internet connection

3. **Interactivity:** E-learning often incorporates interactive elements, such as multimedia, simulations, and games, which can enhance the learning experience and improve engagement. E-learning often includes interactive elements, such as videos and discussions, which can help engage learners and make the learning experience more interactive and dynamic.

4. **Personalization:** E-learning can be personalized to the individual needs and preferences of each learner, providing a more tailored and effective learning experience.

   Overall, e-learning is a flexible, convenient, and engaging way to access education and learning opportunities, and it is an increasingly popular choice for learners around the world. Some other characteristics of e-learning include:

5. **Customization:** E-learning can be customized to meet the needs and preferences of individual learners. For example, course materials can be tailored to different learning styles and learners can progress at their own pace.

6. **Collaboration:** E-learning can facilitate collaboration among learners through online discussion forums and other interactive tools.

7. **Cost-effective:** E-learning can be a cost-effective solution for organizations and individuals, as it often requires fewer resources than traditional, in-person learning.

8. **Accessibility:** E-learning can be made accessible to learners with disabilities using assistive technologies and alternative formats for course materials.

4.1.1 Flexibility

Flexibility is one of the main advantages of e-learning. It allows learners to set their own pace and schedule for learning, which can be especially beneficial for individuals who have busy schedules or who live in remote locations. E-learning courses often include a variety of learning materials, such as videos, readings, and interactive activities, which can be accessed at any time. This allows learners to choose the learning materials that best suit their needs and preferences, and to learn at their own pace.

4.1.2 Convenience

Convenience is another key characteristic of e-learning. It allows learners to access course materials and participate in learning activities from anywhere with an internet connection. This can be especially beneficial for individuals who live in remote locations or who have busy schedules that make it difficult to attend in-person classes. E-learning courses often include a range of learning materials, such as videos, readings, and interactive activities, which can be accessed at any time. This allows learners to choose the learning materials that best suit their needs and preferences, and to learn at their own pace.

4.1.3 Interactivity

Interactivity is an important aspect of online education, as it helps engage learners and make the learning experience more dynamic and interactive. There are several ways in which interactivity can be incorporated into online education:

a) **Discussions:** Online discussion forums and chat rooms allow learners to interact with their peers and instructors in real-time, sharing ideas and discussing course materials.
b) **Collaborative projects:** Collaborative projects and group work can encourage learners to work together to solve problems, complete assignments, and share ideas.
c) **Quizzes and assessments:** Quizzes, polls, and assessments can help learners test their knowledge and understanding of course material and provide feedback on their progress.
d) **Simulations:** Simulations and interactive games can help learners apply their knowledge and skills in a virtual setting, allowing them to practice and learn through experience.
e) **Video conferencing:** Video conferencing tools, such as Skype or Zoom, allow learners to participate in live, interactive lectures and discussions with their instructors and peers.

Overall, incorporating interactive elements into online education can help engage learners, promote collaboration, and make the learning experience more dynamic and engaging.

4.1.4 Personalization

Personalization, also known as customization, refers to the ability to tailor the learning experience to meet the needs and preferences of individual learners. This can be especially beneficial in online education, where learners may have diverse learning styles and preferences.

There are several ways in which personalization can be incorporated into online education:

a) **Adaptive learning:** Adaptive learning systems use algorithms to adjust the content and difficulty level of course materials based on the learner's progress and performance. This allows learners to progress at their own pace and receive targeted support as needed.

b) **Customized learning plans:** Online education platforms may allow learners to create customized learning plans based on their goals, interests, and learning style. This can help learners focus on the most relevant and engaging materials for their needs.

c) **Alternative formats:** Online education platforms may offer course materials in a variety of formats, such as videos, readings, and interactive activities, to accommodate different learning styles.

d) **Personalized feedback:** Online education platforms may offer personalized feedback on learners' progress and performance, such as grades and comments, to help learners understand their strengths and areas for improvement.

Overall, personalization in online education can help improve the learning experience by tailoring it to the needs and preferences of individual learners. This can help learners stay motivated and engaged, and ultimately lead to better learning outcomes.

Self-Assessment Questions 4.1

Q.1 Define the term E-Learning.

Q.2 What are the key characteristics of E-Learning?

Q.3 How interactivity can be added in online classrooms?

4.2 Approaches to E-Learning

There are several different approaches to e-learning, which refer to the ways in which digital technology and media are used to deliver educational content and support the learning process. Some of the most common approaches to e-learning include the following:

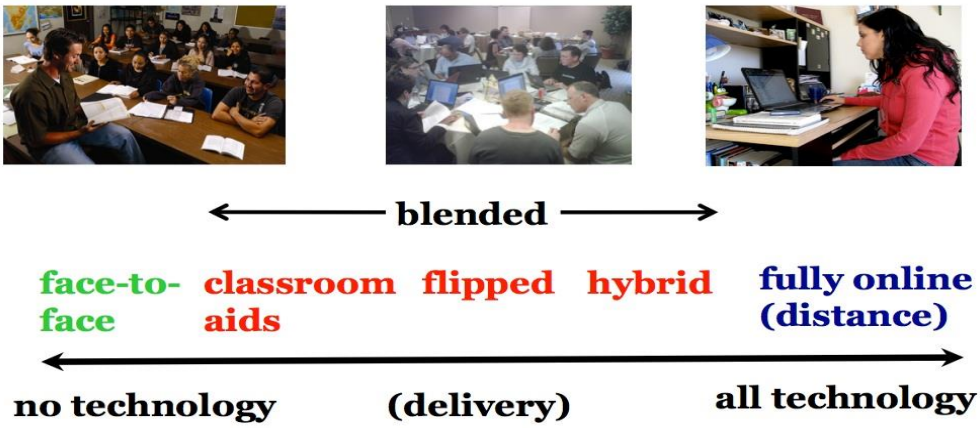


Figure 1: Approaches to E-Learning

1. **Synchronous e-learning:** In synchronous e-learning, learners and teachers interact with each other in real-time, using tools such as video conferencing such as Zoom, Skype, Microsoft Teams, BBB, Google Meet, and online discussion forums. This approach allows for direct communication and collaboration, and it can be a useful way to replicate the face-to-face learning experience in an online setting

2. **Asynchronous e-learning:** In asynchronous e-learning, learners and teachers do not interact with each other in real-time. Instead, learners access educational content and resources independently, at their own pace, and they may submit assignments and participate in discussions using a learning management system or other online platform. This approach allows for greater flexibility and convenience, but it may lack the personal interaction and support of synchronous e-learning.

3. **Self-paced e-learning:** In self-paced e-learning, learners have complete control over their learning experience, and they can progress through the course material at their own pace. This approach is particularly suitable for learners who have busy schedules or who need to balance their studies with other commitments.

Overall, the best approach to e-learning will depend on the specific goals and needs of the learners and the educators involved. Different approaches may be more

suitable for different subjects, learners, and learning environments, and educators may need to use a combination of approaches to provide the most effective e-learning experience.

4.2.1 Face to Face Approach

Face-to-face education, also known as in-person education, refers to educational programs and activities that are delivered in person, rather than online or through other remote means. Face-to-face education is typically delivered in a traditional classroom setting, where learners physically attend classes and interact with their instructors and peers in person.

Some characteristics of face-to-face education include:

a) **Direct interaction:** Face-to-face education allows for direct interaction between learners and instructors, as well as between learners themselves. This can facilitate a more engaging and interactive learning experience.

b) **Immediate feedback:** Face-to-face education allows for immediate feedback on learners' progress and performance, as instructors can observe and assess learners' participation and understanding of course material in real-time.

c) **Personalized support:** Face-to-face education allows for personalized support and individualized attention, as instructors can work one-on-one with learners to address their specific needs and challenges.

d) **Sense of community:** Face-to-face education can foster a sense of community and social connections among learners, as they are physically present in the same location and can interact with each other on a regular basis.

Overall, face-to-face education can be a valuable learning experience for many learners, as it allows for direct interaction, immediate feedback, personalized support, and a sense of community.

4.2.2 Fully Online Approach

Fully online education, also known as distance learning or virtual education, refers to educational programs and activities that are delivered entirely through electronic means, such as the Internet. Fully online education is typically delivered through a learning management system (LMS), which provides access to course materials, assignments, and other learning resources.

Some characteristics of fully online education include:

a) **Flexibility:** Fully online education allows learners to access course materials and participate in learning activities from anywhere with an internet connection, at their own pace and schedule.

b) **Convenience:** Fully online education is convenient for learners who live in remote locations or who have busy schedules that make it difficult to attend in-person classes.

c) **Interactive:** Fully online education often includes interactive elements, such as videos, simulations, and discussions, which can help engage learners and make the learning experience more interactive and dynamic.

d) **Customization:** Fully online education can be customized to meet the needs and preferences of individual learners. For example, course materials can be tailored to different learning styles and learners can progress at their own pace.

e) **Collaboration:** Fully online education can facilitate collaboration among learners through online discussion forums and other interactive tools.

f) **Accessibility:** Fully online education can be made accessible to learners with disabilities using assistive technologies and alternative formats for course materials.

Overall, fully online education is a convenient and flexible learning option that allows learners to access high-quality education from anywhere with an internet connection.

4.2.3 Hybrid Approach

Hybrid education, also known as blended learning, refers to educational programs and activities that combine face-to-face and online delivery. In a hybrid education model, some course materials and activities are delivered in person, while others are delivered online.

Some characteristics of hybrid education include:

a) **Flexibility:** Hybrid education allows learners to access course materials and participate in learning activities from anywhere with an internet connection, at their own pace and schedule.

b) **Personalized learning:** Hybrid education can offer a personalized learning experience, as it allows learners to choose the learning materials and activities that best suit their needs and preferences.

c) **Face-to-face interaction:** Hybrid education allows for face-to-face interaction between learners and instructors, as well as between learners themselves. This can facilitate a more engaging and interactive learning experience.

d) **Immediate feedback:** Hybrid education allows for immediate feedback on learners' progress and performance, as instructors can observe and assess learners' participation and understanding of course material in real-time.

e) **Collaboration:** Hybrid education can facilitate collaboration among learners through online discussion forums and other interactive tools, as well as face-to-face interactions.

Overall, hybrid education is a flexible and personalized learning option that combines the benefits of face-to-face and online education. It allows learners to access high-quality education from anywhere with an internet connection, while also providing opportunities for face-to-face interaction and immediate feedback.

Self-Assessment Questions 4.2

Q.1 Define the term synchronous e-learning.

Q.2 What are the key benefits of Blended Learning?

Q.3 What is self-paced e-learning?

4.3 E-Learning Tools and Technologies

Education is a very vast field. There are many emerging systems evolving in this sector. The emergent systems have been divided into the following types based on different techniques and technology:

1. Cloud Computing
2. Mobile Technology
3. Game-Based Learning Systems
4. MOOCs
5. Learning Analytics
6. Virtual Reality
7. Augmented Reality
8. Mixed Reality

4.3.1 Cloud Computing in Education

Many educational systems are using cloud computing techniques. All kinds of virtual learning environments are covered under this category. Web-based learning management systems like MOODLE are using cloud computing services. -based sharing systems like Google Docs and Drop Box are very popular amongst students and teachers. These systems are used to share educational materials and much other

helpful information. These systems are multi-device compatible. Some students use their personal laptops, PC and some use their smart handheld devices to access information available on the cloud.

A few benefits of Cloud computing are given as under:

- No more expensive textbooks
- No more outdated learning materials
- No expensive hardware required
- No expensive software required
- Accessible to everyone

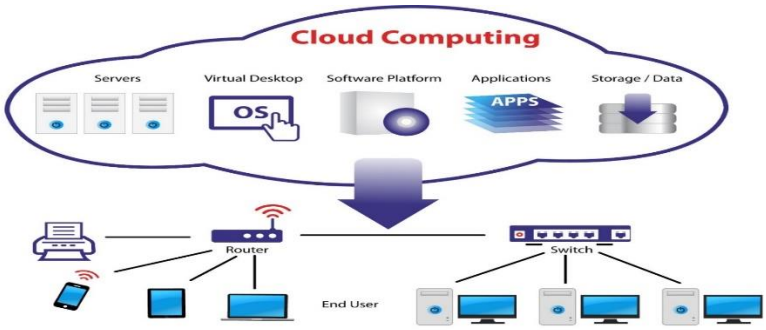


Figure 2: Cloud Computing in Education

4.3.2 Mobile Technology in Education

Mobile technology is one of the emerging technology in education. It is being used by students of elementary to K-12 college and university students. These devices are more affordable than laptops due to which they have gained rapid popularity. They require less infrastructure environment. According to iTunes, educational applications are 2nd most downloaded content. Students of all ages generally find learning on a tablet more personal and accessible than being chained to a desktop. They also respond well to animation-driven apps, which make lessons more interactive and entertaining than linear modules delivered on a desktop. Learning used to be more about concepts being conveyed in an abstract manner using textbooks. Mobile technology makes the learning process more interactive and engaging.

4.3.3 Game-based Learning Systems

Game-based learning techniques has become popular among young students and even pre-school learners use game-based learning systems to acquire knowledge. It has become a very effective tool for educational curricula. It can give real world simulation experience to young learners.

The game-based learning is a combination of educational content and information technology. From the e-learning carried on, game-based learning is getting more attention. In game-based learning, the course content is mapped into the game to

provide a scenario environment of learning, the repeated self-learning, and the ongoing interaction and feedback can increase the learning interest and motivation. Hence, game-based learning could reach the goal of learning effectively.

4.3.4 Massive Open Online Courses (MOOCs)

MOOC is a very popular technique/method/system in online learning. It is based on the philosophy of education access to everyone, everywhere, free of cost. Education has been declared one of the basic needs of all humans. Systems based on MOOC provide massive online learning for everyone all over the world. Lecturers of different universities are delivered online using the internet as a medium of instruction. A few examples of systems based on MOOC have been illustrated in the below figure. MOOC is a concept that can be backed by any type of Learning Management System (LMS). It basically provides an affordable and flexible way to learn new skills and deliver quality educational experiences at large scale.

4.3.5 Learning Analytics

Learning analytics is the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs. A related field is educational data mining. Systems based on analytics are used for top-level to low level managerial decision making. In education, learning analytics are based on statistics and student interaction with online learning systems.

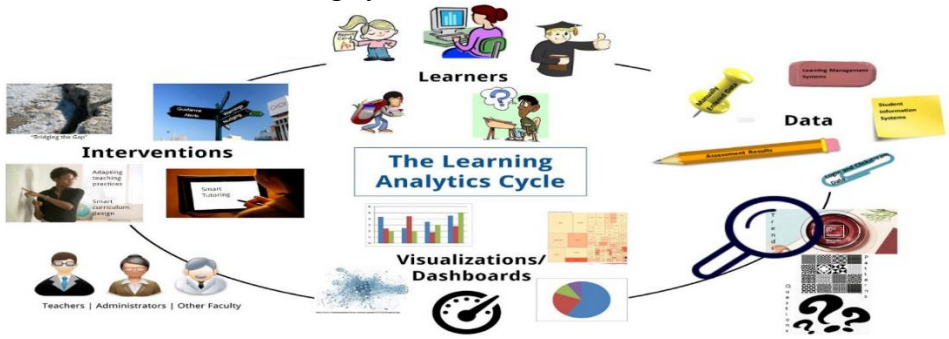


Figure 3: Learning Analytics Cycle

4.3.6 Virtual Reality

Virtual reality (VR) is a computer-generated simulation of a three-dimensional environment that can be interacted with in a seemingly real or physical way by a person using specialized equipment, such as a headset and gloves. VR allows users to experience a virtual environment as if they were physically present in it and can be used for a variety of applications, including gaming, entertainment, and education.



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Figure 4: Virtual Reality

Some advantages of using VR in education include:

a) **Engagement:** VR can help engage learners by providing a more immersive and interactive learning experience.

b) **Accessibility:** VR can provide learners with access to experiences and environments that may be difficult or impossible to visit in person, such as historical sites or hazardous environments.

c) **Personalized learning:** VR can be tailored to meet the needs and preferences of individual learners, allowing them to learn at their own pace and in a way that best suits their learning style.

d) **Safety:** VR can provide a safe learning environment, as learners can experience and explore scenarios in a virtual setting without the risks associated with real-world experiences.

Overall, VR has the potential to revolutionize education by providing learners with immersive and interactive learning experiences that can engage and motivate them

4.3.7 Augmented Reality

Augmented reality (AR) is a technology that superimposes computer-generated images, sounds, or other sensory inputs onto the real world, in real-time. AR can be experienced through a variety of devices, such as smartphones, tablets, and headsets.



Figure 5: Augmented Reality

In education, AR can be used to enhance the learning experience by providing learners with real-time, context-specific information and interactive elements. For example, AR can be used to overlay information or graphics onto physical objects or environments, allowing learners to learn about and interact with these objects in a more engaging way.
Some advantages of using AR in education include:

a) Engagement: AR can help engage learners by providing a more interactive and immersive learning experience.

b) Contextual learning: AR can provide learners with real-time, context-specific information, allowing them to learn about and interact with their environment in a more meaningful way.

c) Personalized learning: AR can be tailored to meet the needs and preferences of individual learners, allowing them to learn at their own pace and in a way that best suits their learning style.

d) Accessibility: AR can provide learners with access to information and experiences that may not be available in their physical environment, such as virtual field trips or simulations.

Overall, AR has the potential to enhance the learning experience by providing learners with interactive and immersive learning opportunities that can engage and motivate them.

4.3.8 Mixed Reality

Mixed reality (MR) is a technology that combines elements of both virtual reality (VR) and augmented reality (AR). MR allows users to interact with virtual objects and environments in a way that is seamlessly integrated with the real world.
In education, MR can be used to create immersive learning experiences that blend real and virtual elements in a way that feels natural and seamless. For example, MR can be used to overlay virtual objects or information onto real-world environments,

allowing learners to interact with and learn about these virtual elements in a more engaging way.



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Figure 6: Mixed Reality

Some advantages of using MR in education include:

a) **Engagement:** MR can help engage learners by providing a more immersive and interactive learning experience.

b) **Contextual learning:** MR can provide learners with real-time, context-specific information, allowing them to learn about and interact with their environment in a more meaningful way.

c) **Personalized learning:** MR can be tailored to meet the needs and preferences of individual learners, allowing them to learn at their own pace and in a way that best suits their learning style.

d) **Accessibility:** MR can provide learners with access to information and experiences that may not be available in their physical environment, such as virtual field trips or simulations.

Overall, MR has the potential to enhance the learning experience by providing learners with immersive and interactive learning opportunities that can engage and motivate them.

Self-Assessment Questions 4.3

Q.1 Define the term MOOCs.

Q.2 What are the key benefits of AR, VR and MR?

Q.3 Write three main benefits of Learning Analytic

4.4 Learning Management Systems (LMS)

In this section, you will learn about the basic concept of a Learning Management System (LMS). In the recent past, there has been massive progress in the use of LMS in Open and Distance Learning (ODL) institutes. LMS is one of the core and integral part of the ICT infrastructure for any educational institute (Bullen, 2014). This section will give you an overview of LMS and its importance in the learning process. The LMS is a kind of web-based application that is essentially a suite of tools for organizing and managing course contents and related resources. It provides a facility for communication and interaction between learners and teachers and interaction between learners. It also provides a platform where teachers or administrators can perform and manage different educational assessment activities of the learners (Weaver, Spratt, & Nair, 2008).

4.4.1 LMS – An Introduction

A Learning Management System (LMS) is a type of software or web application that is essentially a set of tools for organizing and managing the overall learning process. It provides a platform where you can do the administration, documentation, tracking, monitoring, reporting and delivery of educational content using Information and Communication Technology (ICT). The core concept of LMS has emerged from online or electronic learning (e- learning).

An LMS is a kind of web-based application that provides a facility for communication and interaction between learners and teachers and an interaction between different learners. It also provides a platform where teachers or educational administrators can perform and manage different types of assessment activities of the learners.



Learning – because you use it to deliver learning contents
Management – because it helps you to manage these contents
System – because an LMS is a computer system

In simple words, it is a software program that helps you create, manage, and deliver different types of learning content. (TalentLMS, 2015)

4.4.2 LMS Users

A Learning Management System (LMS) may be used by the following entities:

a) Students
b) Teachers

c) Businesses of all sizes
d) Various International Organizations (e.g., USAID, UN etc.)
e) Government agencies and local governments
f) Schools, Colleges, and Universities
g) Online Learning Platforms (e.g., Khan Academy, Coursera, edX etc.)

4.4.3 LMS Platforms

In the market, there are the number of Learning Management Systems available but few of the most popular names are:

a. MOODLE
b. Blackboard
c. Desire2Learn
d. Google Classroom
e. eCollege
f. Sakai
g. Canvas LMS
h. Litmos
i. Docebo
j. TalentLMS

Some of the above-mentioned LMS are free to use and some involves cost to use.

4.4.4 LMS Types

Just like any other software platform, LMS may fall into one of the following categories

a) Open Source
b) Freeware
c) Commercial

Open Source LMS are very popular because of their financial and programmatic philosophy. In an open-source environment, the source code of the product is made available to the user without charge. It may free the user from a contractual agreement with any specific vendor. A program or software based on open source may be customized and branded according to the institution's requirements. Open-source software is technically supported by its programming community. In the context of open-source LMS, there is an active and vibrant community of developers for MOODLE and Sakai, the two most popular open-source LMSs.

Freeware LMS are those types of systems that are freely available to use but their source code (programming) is not available for the user to modify or change. A popular example of such type is Google Classroom.

Commercial LMS are the classical nature software systems that are developed by commercial organizations for which they charge their users based on user requirements or software modules.
From a technical point of view, a Learning Management System (LMS) is a server-based software program that interfaces with a database containing information about learners, teachers, and contents. In this context, this system is not very different from other computer-based systems like e-commerce, HR and Payroll. The uniqueness of an LMS is its instructional behavior. An LMS provides a platform for learning activities that is not dependent upon time and location. Such systems allow any organization to manage a large number of full or blended learning programs. E-Learning has become institutionalized within higher education which is clear evidence of the popularity of these systems among both faculty and education administrators. (Kats, 2010)

Self-Assessment Questions 4.4

Q.1 Define the term LMS.

Q.2 What are the key benefits of open-source LMS?

Q.3 Write down the names of three popular LMS platforms.

4.5 E-Learning Standards

E-learning standards are guidelines and specifications for the design and development of e-learning courses and materials. These standards help ensure that e-learning courses are effective, accessible, and interoperable across different learning management systems and devices. Some common e-learning standards include Learning Tools Interoperability (LTI), the Sharable Content Object Reference Model (SCORM), the Experience API (xAPI), and the Accessible Portable Item Protocol (APIP). These standards help ensure that e-learning courses can be easily shared and reused and that they are accessible to learners with disabilities.



Figure 7: E-Learning Models

Source: (Bakhouyi et al., 2017)

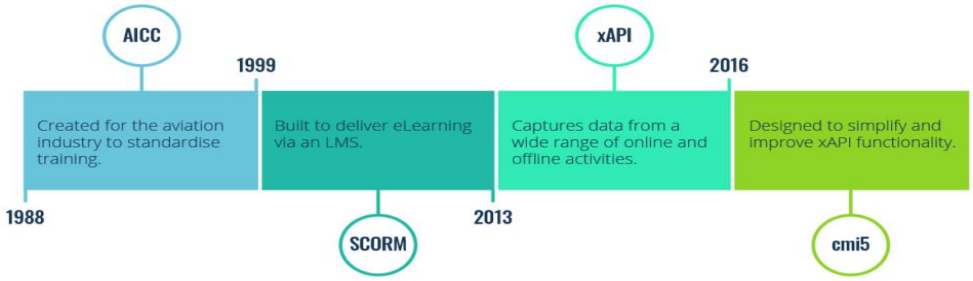


Figure 8: E-Learning Standards Timeline

4.5.1 LTI

LTI (Learning Tools Interoperability) is a set of technical standards and specifications that allow educational software applications and learning management systems (LMS) to communicate and exchange data with each other. LTI is designed to enable seamless integration between different educational software applications, allowing learners to access and use these applications within the context of their LMS.

LTI is often used in online education to enable learners to access a variety of learning tools and resources, such as videos, simulations, and assessments, from within their LMS. This can help streamline the learning experience for learners and make it more convenient to access and use these resources. LTI is supported by several educational software applications and LMSs, including Blackboard, Canvas, Moodle, and Sakai. To use LTI, educators must first set up an LTI integration within their LMS, which allows learners to access and use the desired educational software applications from within the LMS.

Overall, LTI is a useful tool for online educators who want to provide learners with access to a variety of learning resources and tools within a single, integrated platform.

4.5.2 SCOREM

SCORM (Sharable Content Object Reference Model) is a set of technical standards and specifications for creating and delivering educational content in a format that is interoperable across different learning management systems (LMS). SCORM allows educational content, such as videos, simulations, and assessments, to be created and packaged in a way that can be easily integrated into an LMS and accessed by learners. SCORM is often used in online education to enable learners to access and interact with educational content within their LMS. It allows educators to create and deliver interactive and engaging learning experiences and provides learners with a consistent and seamless learning experience across different LMSs.

To use SCORM, educators must first create or purchase educational content that is SCORM-compliant, and then upload this content into their LMS. The LMS can then track and record learners' interactions with the content, allowing educators to monitor and assess learners' progress and performance.Overall, SCORM is a useful tool for online educators who want to create and deliver interactive and engaging learning experiences within an LMS.

4.5.3 xAPI

xAPI (Experience API, also known as Tin Can API) is a set of technical standards and specifications for tracking and recording learning experiences and activities. xAPI allows learning experiences to be tracked and recorded in a way that is interoperable across different systems and devices and can be used to track a wide range of learning activities, including online courses, simulations, games, and real-world experiences. xAPI is often used in online education to enable learners to track and record their learning experiences and activities across different systems and devices. It allows educators to capture and analyze data on learners' engagement and performance and can provide insights into how learners are using and interacting with learning resources. To use xAPI, educators must first create or purchase learning resources that are xAPI-compliant, and then integrate these resources into their learning management system (LMS) or other learning platform. The LMS or platform can then track and record learners' interactions with the resources and send this data to a central repository or learning record store (LRS). Overall, xAPI is a useful tool for online educators who want to track and record learners' learning experiences and activities in a way that is interoperable and flexible.

Self-Assessment Questions 4.5

Q.1 Define the term xAPI.

Q.2 What is SCORM?

Q.3 What is LTI in online education?

4.6 Advantages and Potential Limitations of E-Learning

Some of the advantages and potential limitations of E-Learning are as follows:

4.6.1 Advantages of E-Learning

There are several advantages to e-learning, including the following:

- **Flexibility:** E-learning allows learners to access course materials and complete assignments on their own schedule, rather than having to attend classes at a specific time and place.
- **Convenience:** E-learning allows learners to access course materials and complete assignments from any location with an internet connection, making it possible to learn from anywhere.
- **Cost-effectiveness:** E-learning can be more cost-effective than traditional classroom instruction, as it typically requires fewer resources and can be delivered to a larger number of learners at once.
- **Personalized learning:** E-learning allows learners to move at their own pace and focus on the topics that are most relevant to them, which can improve learning outcomes and retention.
- **Accessibility:** E-learning can be made accessible to learners with disabilities using assistive technologies and alternative formats for course materials.
- **Collaboration:** E-learning can facilitate collaboration among learners through online discussions, group projects, and other interactive activities.
- **Up-to-date content:** E-learning course materials can be easily updated to reflect the latest developments and best practices in each field, ensuring that learners have access to accurate and current information.

4.6.2 Limitations of E-Learning

While e-learning has many advantages, there are also some limitations to consider. These include the following:

- **Limited personal interaction:** E-learning can be a solitary experience, with little or no direct interaction between learners and instructors. This can make it difficult for learners to ask questions or get feedback on their work and can also make it harder for instructors to assess learners' progress and provide support.
- **Access to technology:** E-learning requires access to a computer and an internet connection, which not all learners may have. In addition, e-learning courses and materials may require specific hardware or software, which can create barriers to access for some learners.
- **Difficulty engaging learners:** E-learning can be less engaging than traditional classroom instruction, which can make it difficult to maintain learners' attention and motivate them to complete coursework.

- **Limited support for learners with disabilities:** While e-learning can be made accessible to learners with disabilities, it is not always easy to provide the same level of support and accommodations that are available in a traditional classroom setting.
- **Limited opportunities for hands-on learning:** Some types of learning, such as hands-on experience with equipment or materials, may be difficult to replicate in an e-learning environment.
- **Security and privacy concerns:** E-learning courses and materials may be vulnerable to security breaches or unauthorized access, which can pose risks to the privacy and confidentiality of learners and their personal information.

Overall, while e-learning can be a valuable and effective way to deliver education and training, it is important to carefully consider the limitations and potential challenges of this approach before implementing it.

Self-Assessment Questions 4.6

Q.1 What are the key advantages of E-Learning?
Q.2 What are the key drawbacks of E-Learning?

Key Points

- E-learning is a flexible, convenient, and engaging way to access education and learning opportunities, and it is an increasingly popular choice for learners around the world.

- The flexibility of e-learning makes it an attractive option for learners who need to balance their studies with other commitments, such as work or family responsibilities

- Incorporating interactive elements into online education can help engage learners, promote collaboration, and make the learning experience more dynamic and engaging

- AR, VR and MR have the potential to enhance the learning experience by providing learners with interactive and immersive learning opportunities that can engage and motivate them

- A Learning Management System (LMS) is a type of software or web application that is essentially a set of tools for organizing and managing the overall learning process.

- LTI, SCORM and xAPI are the set of technical standards and specifications in online education which useful tools for online educators who want to track and

record learners' learning experiences and activities in a way that is interoperable and flexible

- E-learning can be a valuable and effective way to deliver education and training, it is important to carefully consider the limitations and potential challenges of this approach before implementing it

Answers to Self-Assessment Questions

Q.1 Define the term E-Learning.
E-learning, or electronic learning, is a form of education that is delivered using digital technology and media, such as the Internet, mobile devices, and computer-based learning systems

Q.2 What are the key characteristics of E-Learning?
The key characteristics of E-Learning are i) Flexibility ii) Convenience iii) Interactivity and iv) Personalization

Q.3 How interactivity can be added in online classrooms?
In online classrooms, interactivity can be added using multimedia, simulations, and gamification of learning content.

Q.4 Define the term synchronous e-learning.
Synchronous e-learning refers to educational programs and activities that are delivered in real-time, with learners and instructors participating at the same time. Synchronous e-learning is typically delivered through live, interactive sessions, such as webinars, video conferencing, or virtual classrooms

Q.5 What are the key benefits of Blended Learning?
The key benefits of blended or hybrid learning are i) Flexibility ii) Personalization iii) Face to Face interaction or Human factor iv) Immediate Feedback and v) Collaboration

Q.6 What is self-paced e-learning?
In self-paced e-learning, learners have complete control over their learning experience, and they can progress through the course material at their own pace.

Q.7 Define the term MOOCs.
MOOCs are Massive Open Online Courses that are taught online to the massive learners usually free of cost.

Q.8 What are the key benefits of AR, VR and MR?
AR, VR and MR have the potential to enhance the learning experience by providing learners with interactive and immersive learning opportunities that can engage and motivate them

Q.9 Write three main benefits of Learning Analytics.
Learning Analytics can improve the student and instructor education experience. Learning analytics can lead to prediction of students learning which can be used for personalization of contents and interventions.

Q.10 Define the term LMS.
LMS is a Learning Management System which is a type of software or web application that is essentially a set of tools for organizing and managing the overall learning process.

Q.11 What are the key benefits of open-source LMS?
Open-source LMSs are usually free of cost, easy to use, have large community support and customizable according to the needs of the learner, teacher, or institution.

Q.12 Write down the names of three popular LMS platforms.
There are many LMSs, but the most popular LMS platforms are Moodle, Canvas and BlackBoard.

Q.13 Define the term xAPI.
xAPI (Experience API, also known as Tin Can API) is a set of technical standards and specifications for tracking and recording learning experiences and activities.

Q.14 What is SCORM?
SCORM (Sharable Content Object Reference Model) is a set of technical standards and specifications for creating and delivering educational content in a format that is interoperable across different learning management systems (LMS).

Q.15 What is LTI in online education?
LTI (Learning Tools Interoperability) is a set of technical standards and specifications that allow educational software applications and learning management systems (LMS) to communicate and exchange data with each other.

Q.16 What are the key advantages of E-Learning?

E-Learning has several advantages, key advantages are i) Flexibility ii) Convenience iii) Cost-Effective iv) Personalization v) Accessible vi) Collaboration and vi) up-to-date content

Q.17 What are the key drawbacks of E-Learning?

E-Learning has several disadvantages as well, key disadvantages are i) Limited personal interaction ii) Access to Technology iii) Difficulty in engagement iv) Limited support for learners with disabilities v) Limited support for hands-on learning vi) Security and vi) Privacy concerns

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Unit: 5

ICT IN ASSESSMENT

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Introduction

Information and Communication Technology (ICT) has revolutionized the field of educational assessment. With the rapid advancement of digital tools and platforms, ICT has introduced new possibilities and efficiencies in assessing student learning and performance. ICT in assessment encompasses various technologies and methodologies that enhance the evaluation process, providing educators with innovative ways to gauge students' knowledge, skills, and competencies. From online assessments and automated grading to the use of multimedia, simulations, and virtual environments, ICT offers a range of options to make assessment more accessible, personalized, and authentic. By leveraging digital tools, educators can streamline assessment processes, provide timely and targeted feedback, and gain valuable insights through data analysis. The integration of ICT in assessment not only enhances efficiency but also promotes engagement, critical thinking, and collaboration among students. Overall, ICT in assessment has transformed traditional approaches, empowering educators to design and implement assessments that align with 21st-century learning needs and promote meaningful Educational Outcomes.

Learning Outcomes

After reading this unit students will be able to;

1. explain the current trends in educational assessment.
2. discuss the role of ICT in student assessment.
3. articulate available digital tools and options for student assessment.
4. understand and maintain e-portfolios.
5. elaborate the structure and purpose of digital rubrics.
6. shed light on the digital assessment alternatives.

5.1 Current Trends in Assessment

ICT has revolutionized assessment by offering more flexible, interactive, and personalized approaches. It has expanded the possibilities for assessing student learning outcomes and has the potential to improve the accuracy, efficiency, and effectiveness of the assessment process. Here is the detail of some current trends in educational assessment:

Competency-Based Assessment: Competency-based assessment focuses on evaluating specific skills and competencies rather than just content knowledge. It emphasizes real-world application and performance-based tasks to assess a student's ability to apply their knowledge in practical scenarios.

Authentic Assessment: Authentic assessment aims to evaluate students' understanding and skills in real-world contexts. It involves tasks that mirror or simulate actual situations, such as problem-solving activities, case studies, and project-based assessments. Authentic assessments provide a more holistic view of a student's capabilities beyond traditional exams.

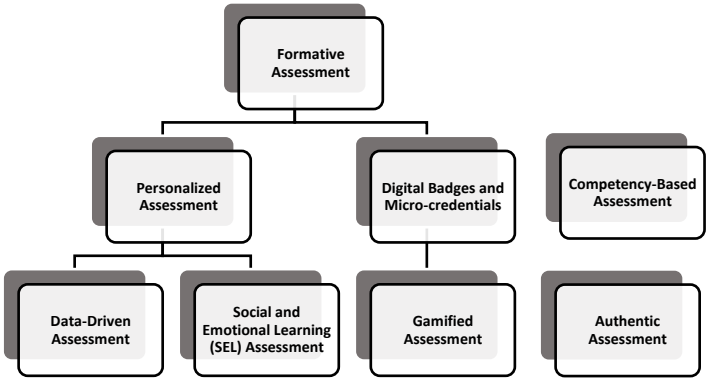


Fig 5.1: Current Trends in Assessment

Formative Assessment: Formative assessment is an ongoing and continuous process that monitors students' learning progress throughout the instructional cycle. It involves timely feedback, self-assessment, and peer assessment to guide students and inform instructional decisions. Technology-enabled formative assessment tools facilitate quick feedback and data analysis to inform teaching practices.

For interactive formative assessment strategies, you may visit;
https://www.weareteachers.com/25-formative-assessment-options/

Personalized Assessment: Personalized assessment tailors the assessment approach to the individual needs and preferences of students. It considers their learning styles, interests, and readiness levels. Adaptive assessment tools that adjust

the difficulty level and content based on students' responses are gaining popularity in providing personalized assessment experiences.

Activity No.1

For more details, you may visit; https://resources.hrsg.ca/blog/everything-to-know-about-competency-based-assessments#:~:text=A%20competency%2Dbased%20assessment%20refers,skills%20an%20employee%20may%20possess. https://www.turnitin.com/blog/what-is-authentic-assessment-bringing-authentic-assessment-to-life

Digital Badges and Micro-credentials: Digital badges and micro-credentials are gaining recognition as alternative forms of assessment. They represent specific skills or achievements and can be displayed digitally on resumes, portfolios, or social media profiles. They provide a more granular and detailed representation of a learner's accomplishments beyond traditional grades or certificates.

Data-Driven Assessment: The use of data analytics and learning analytics in assessment is becoming increasingly prevalent. Educators are leveraging data to identify learning gaps, track student progress, and inform instructional decisions. Learning management systems and assessment platforms with built-in analytics are utilized to collect, analyze, and visualize assessment data.

Social and Emotional Learning (SEL) Assessment: As the focus on social and emotional learning grows, there is an increased emphasis on assessing and evaluating students' social and emotional skills. Assessments are designed to measure competencies such as self-awareness, social awareness, self-management, relationship skills, and responsible decision-making.

The following link will help you understand the concept; https://casel.org/state-resource-center/assessment-tools/ https://dpi.wi.gov/sspw/mental-health/social-emotional-learning/assessment/evidence-based

Gamified Assessment: Gamification elements are being incorporated into assessments to enhance student engagement and motivation. Game-like features, such as points, levels, and leaderboards, are integrated into assessment tasks to make them more interactive and enjoyable.

Self-Assessment Questions 5.1

1. Competency-based assessment focuses on evaluating specific _____rather than just content knowledge.
2. Authentic assessments provide a more _____of a student's capabilities beyond traditional exams.
3. Formative assessment is an ongoing and _____that monitors students' learning progress throughout the instructional cycle.
4. Technology-enabled formative assessment tools facilitate quick _____and data analysis to inform teaching practices.
5. Personalized assessment tailors the assessment approach to the _____and preferences of students.

5.2 Role of ICT in Assessment

ICT (Information and Communication Technology) plays a crucial role in assessment in several ways:

Enhancing Accessibility: ICT tools and platforms make assessments more accessible to a wider range of learners. Online assessments can be accessed remotely, allowing students to take assessments from anywhere with an internet connection. Additionally, ICT accommodates students with disabilities by providing assistive technologies, such as screen readers or speech-to-text software, to support their participation in assessments.

Automation and Efficiency: ICT enables automated grading and feedback, saving time for educators and providing immediate results to students. Objective assessments, such as multiple-choice or matching questions, can be automatically scored, reducing the need for manual grading. This automation allows teachers to focus more on analyzing results, providing personalized feedback, and designing targeted interventions.

Personalization and Differentiation: ICT tools facilitate personalized assessment approaches tailored to individual students' needs and preferences. Adaptive assessment systems adjust the difficulty level and content based on students' responses, ensuring that they are appropriately challenged and supported. This personalization helps identify students' strengths and weaknesses, enabling targeted instruction and intervention.

Documentation and Portfolios: ICT facilitates the creation and management of electronic portfolios or digital documentation of students' work and achievements. E-portfolios allow students to showcase their learning progress, reflect on their growth, and demonstrate their competencies. ICT tools provide platforms for

organizing, storing, and sharing these portfolios, making them easily accessible for assessment purposes.

Activity No. 2

You may visit:

1. https://www.tutorialspoint.com/ict-in-assessment-and-evaluation#:~:text=The%20ICT%2Dintegrated%20assessment%20gives,their%20mistakes%20and%20go%20forward.
2. https://blog.teachmint.com/role-of-ict-in-education/

Overall, ICT in assessment promotes efficiency, accessibility, personalization, collaboration, and data-driven decision-making, enhancing the assessment process and supporting effective teaching and learning.

Self-Assessment Questions 5.2

Q1. How has ICT helped in making assessment an interactive activity for students?
Q2. What role ICT play in formative assessment and feedback?
Q3. Explain the role of ICT in organizing and analyzing assessment data.

5.3 Assessment: Digital Tools and Options

There are numerous digital tools and options available for assessment. Here are some commonly used ones:

1. **Online Assessment Platforms:** These platforms provide a comprehensive range of assessment options, including multiple-choice questions, short answer questions, essay questions, and interactive assessments. Examples of popular online assessment platforms include Google Forms, Quizizz, Kahoot, Edmodo, and Moodle.

2. **Learning Management Systems (LMS):** LMS platforms, such as Canvas, Blackboard, Schoology, and Moodle, offer built-in assessment features. They allow educators to create, deliver, and manage assessments within their learning environment. LMSs often provide grading functionalities, data analysis, and integration with other educational tools.

3. **Digital Quizzing Tools:** Tools like Quizlet, Socrative, and Mentimeter enable educators to create interactive quizzes and engage students in real-time assessment. These tools often offer features like gamification elements, instant feedback, and data tracking.

4. **Formative Assessment Apps:** There are various apps designed specifically for formative assessment, such as Nearpod, Plickers, and Pear Deck. These apps allow teachers to pose questions, collect responses from students, and provide

immediate feedback. They often support interactive features like polls, surveys, and collaborative activities.

5. **Video-Based Assessments:** Video assessment tools, like Flipgrid and Recap, enable students to record and submit video responses to assessment prompts. This approach allows for more expressive responses compared to traditional text-based assessments.

6. **Online Portfolios:** Digital portfolio platforms, such as Seesaw, Google Sites, and Pathbrite, allow students to showcase their work, progress, and reflections. These portfolios provide a comprehensive view of students' achievements and growth over time.

7. **Virtual Labs and Simulations:** Virtual lab platforms, such as Labster and PhET Interactive Simulations, provide interactive simulations and virtual experiments for assessing scientific knowledge and skills. These tools offer realistic and safe environments for students to practice and demonstrate their understanding.

8. **Plagiarism Detection Tools:** Plagiarism detection tools, like Turnitin and Grammarly, help educators assess the originality of student work by comparing it against a vast database of sources. These tools aid in ensuring academic integrity during assessment.

Activity No.3

For details you may visit;

1. https://www.hurix.com/best-digital-assessment-tools-that-are-useful-for-both-students-as-well-as-teachers/
2. https://www.commonsense.org/education/lists/top-tech-tools-for-formative-assessment

It's important to consider the specific needs, objectives, and technical requirements of your assessment when selecting digital tools. Additionally, it's advisable to explore the features, pricing, and user reviews of the tools before implementing them in your assessment practices.

Self-Assessment Questions 5.3

1. How online assessment platforms facilitate educators?
2. Explain the features of LMS.
3. Enlist any two video-based assessment tools.
4. What is the main function of plagiarism detection tools?

5.4 E-Portfolio

E-portfolios, also known as electronic portfolios, are digital collections of student work and achievements that demonstrate their learning, growth, and skills. E-portfolios provide a comprehensive and organized representation of a student's educational journey and can include a wide range of artifacts, such as documents, presentations, videos, images, and reflections. Here are some key points about e-portfolios:

1. **Purpose:** E-portfolios serve multiple purposes, including assessment, reflection, and showcasing student achievements. They offer a holistic view of a student's progress, showcasing their skills, knowledge, and growth over time. E-portfolios can be used for formative assessment, self-assessment, and summative assessment, allowing students to reflect on their learning experiences and showcase their accomplishments to educators, peers, and potential employers.
   Benefits: E-portfolios have several advantages over traditional paper-based portfolios. They are easily accessible and shareable, allowing students to showcase their work to a wider audience. E-portfolios can be continually updated and revised, providing a dynamic representation of a student's learning journey. They also support multimedia integration, enabling students to include videos, audio recordings, and interactive elements in their portfolios.

2. **Content:** E-portfolios can contain a variety of artifacts that demonstrate a student's learning, including assignments, projects, essays, artwork, videos, presentations, and more. In addition to showcasing finished products, e-portfolios often include reflections, self-assessments, and learning goals that demonstrate a student's metacognitive skills and critical thinking.

3. **Reflection:** E-portfolios encourage students to reflect on their learning experiences and the growth they have achieved. Reflections can include insights, challenges, achievements, and goals. This process helps students develop a deeper understanding of their learning and promotes metacognition.

4. **Organization and Navigation:** E-portfolios should be well-organized and easy to navigate. Students typically organize their portfolios based on themes, courses, or competencies, with clear labels and categories. Navigation features like menus, hyperlinks, and search functions enhance the usability of the portfolio.

5. **Technology Tools:** There are various technology tools available for creating and managing e-portfolios. Popular options include Google Sites, Mahara,

Pathbrite, and Seesaw. These tools provide templates, customization options, and sharing capabilities to simplify the process of creating and maintaining e-portfolios.

6. **Assessment and Evaluation:** E-portfolios offer opportunities for formative and summative assessment. Educators can assess e-portfolios by providing feedback on student artifacts, reflections, and evidence of learning. Rubrics and criteria can be used to evaluate the quality of work and growth demonstrated in the portfolio.

7. **Authenticity and Ownership:** E-portfolios emphasize student agency and ownership of their learning. Students are actively involved in selecting, curating, and reflecting on their work, promoting a sense of pride and responsibility. E-portfolios provide a platform for students to showcase their unique strengths, interests, and accomplishments.

8. **Lifelong Learning:** E-portfolios can extend beyond educational contexts and be used for professional development and lifelong learning. Individuals can maintain e-portfolios throughout their careers, continually updating them with new achievements, certifications, and reflections.
   E-portfolios offer a dynamic and multimedia-rich way for students to demonstrate their learning, growth, and skills. They encourage self-reflection, goal-setting, and metacognitive development while providing an authentic and comprehensive representation of a student's educational journey.

5.4.1 Components of E-portfolio:

E-portfolios, or electronic portfolios, consist of various components that collectively showcase a student's work, achievements, and reflections. These components typically include:

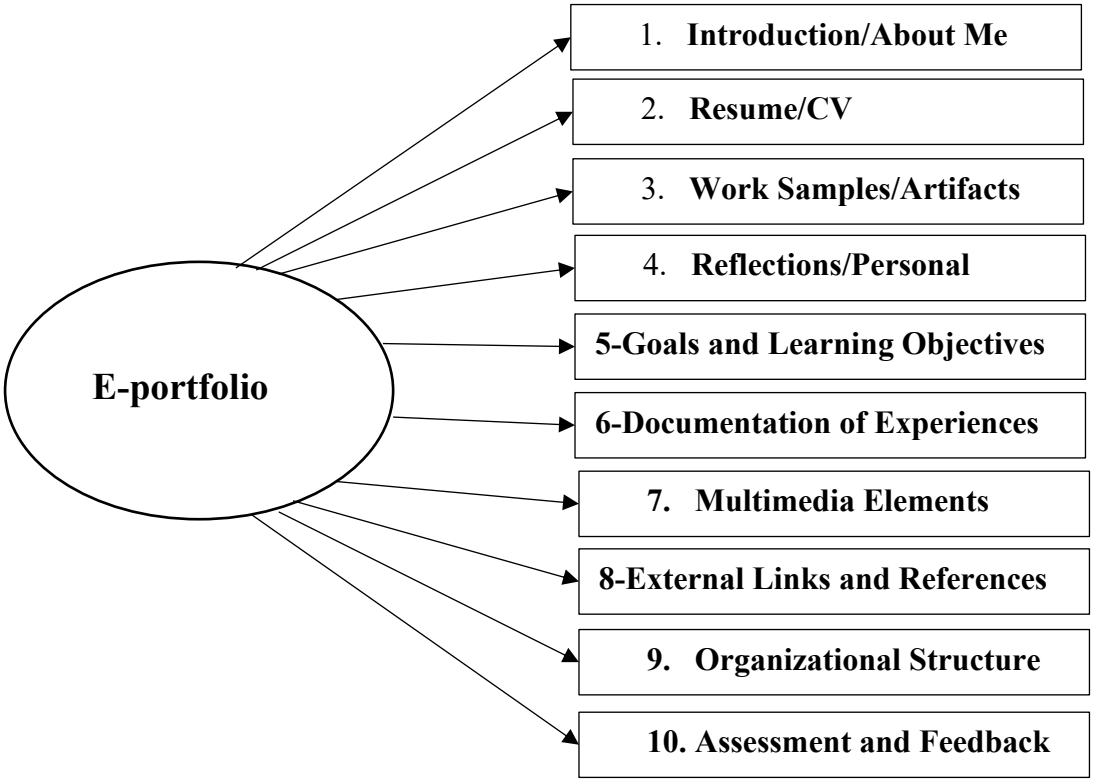


Fig 5.4 Components of E-portfolio

1. **Introduction/About Me**: This section provides an overview of the student, including their background, interests, goals, and aspirations. It helps establish a personal connection and sets the context for the portfolio.

2. **Resume/CV:** The resume or curriculum vitae section highlights the student's educational background, experiences, skills, certifications, and achievements. It provides a comprehensive overview of their academic and professional journey.

3. **Work Samples/Artifacts:** This component includes samples of the student's work, such as essays, research papers, projects, artwork, multimedia creations, coding projects, or any other relevant materials. These artifacts demonstrate the student's knowledge, skills, and accomplishments in various subject areas or disciplines.

4. **Reflections/Personal Statements:** Reflections are essential components of e-portfolios. They provide the student with insights, self-assessment, and critical analysis of their work and learning experiences. Reflections may include

thoughts on the learning process, challenges faced, growth achieved, and future goals.

5. **Goals and Learning Objectives:** This section outlines the student's goals, learning objectives, or competencies they aim to achieve. It helps provide a clear focus and direction for their learning journey and demonstrates their ability to set and pursue meaningful goals.

6. **Documentation of Experiences:** E-portfolios may include documentation of extracurricular activities, community service, internships, or other experiential learning opportunities. This documentation highlights the student's involvement outside the classroom, demonstrating their broader skill set and personal development.

7. **Multimedia Elements:** E-portfolios can incorporate multimedia elements to enhance the visual appeal and interactivity. This may include images, videos, audio recordings, interactive presentations, or any other media that complements the student's work and achievements.

8. **External Links and References:** E-portfolios often include external links or references to additional resources, publications, websites, or projects that further support and validate the student's work. These links provide further context and depth to the portfolio.

9. **Organizational Structure:** E-portfolios are typically organized using a logical structure or navigation system. This ensures that the portfolio is easy to navigate, with clear sections, menus, and links that help viewers explore different aspects of the student's work and achievements.

10. **Assessment and Feedback:** E-portfolios may include a section dedicated to assessment and feedback received from teachers, peers, or external evaluators. This section showcases the student's ability to incorporate feedback, refine their work, and demonstrate growth and improvement.
    By integrating these components effectively, e-portfolios provide a comprehensive and dynamic representation of a student's academic journey, skills, achievements, and reflective thinking.

Self-Assessment Questions 5.4

1. What is meant by E-portfolio?
2. What is the purpose of an e-portfolio?
3. What are the benefits of an e-portfolio?

4. Which technological tools can be used for the creation of e-portfolios?
5. What are the components of an e-portfolio?

5.5 Digital Rubrics

Digital rubrics refer to rubrics that are created and utilized in a digital format. Rubrics are assessment tools that provide clear criteria and performance levels to evaluate and score student work. When used in a digital format, rubrics can offer several advantages, including easier creation, accessibility, and streamlined assessment processes. Here are some key points about digital rubrics:

1. **Creation and Customization:** Digital rubrics can be created using various software or online tools designed specifically for rubric development. These tools often offer templates, drag-and-drop functionality, and customizable options, making it easier for educators to create and modify rubrics according to their specific assessment needs.

2. **Accessibility and Distribution:** Digital rubrics can be easily shared and accessed by both educators and students. They can be shared through learning management systems, online platforms, or even via email. Digital rubrics eliminate the need for physical copies, ensuring that everyone involved in the assessment process can access the rubric conveniently.

3. **Consistency and Standardization:** Digital rubrics provide a standardized evaluation framework, ensuring consistency in the assessment process. Educators can establish clear criteria and performance levels, eliminating ambiguity and subjectivity. Digital rubrics make it easier to maintain consistency across multiple assessors, resulting in fair and reliable assessments.

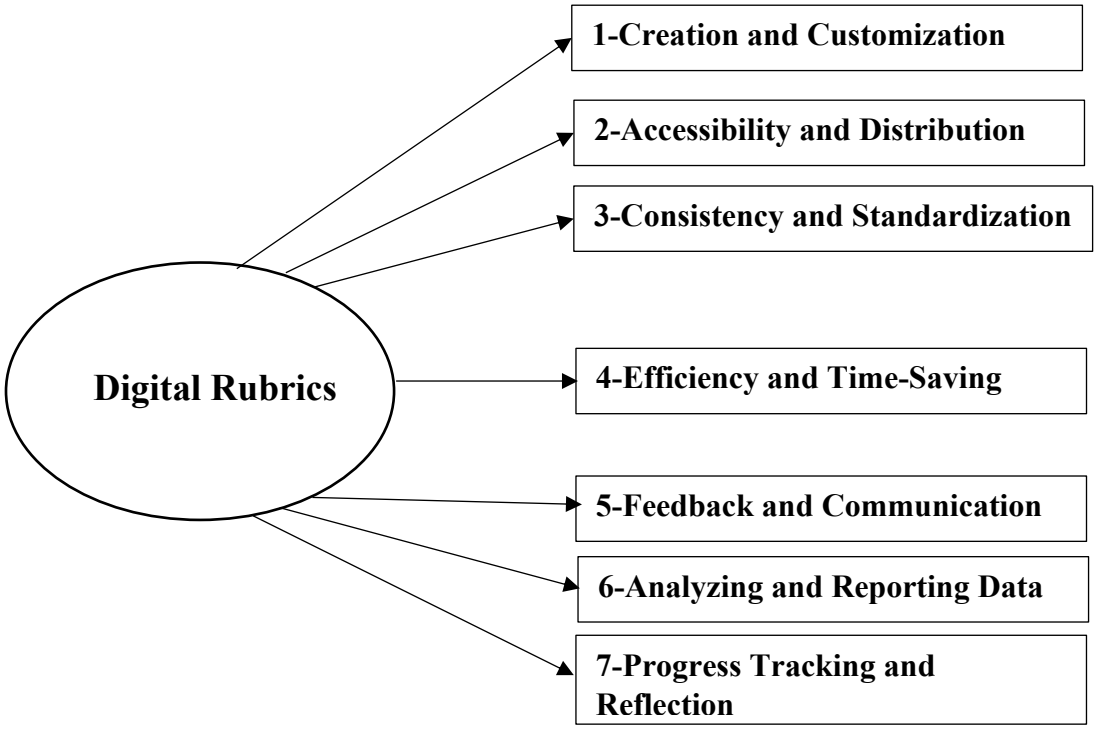


Fig. 5.5 Features of Digital Rubrics

4. **Efficiency and Time-Saving:** Digital rubrics streamline the assessment process, especially when combined with technology tools that automate grading and feedback. Rubric-based assessment tools, such as those integrated within learning management systems, allow for efficient scoring and automated calculations, saving time for educators.

5. **Feedback and Communication:** Digital rubrics often provide space for educators to provide specific feedback for each criterion or performance level. This feedback can be more detailed and meaningful compared to traditional handwritten comments. Additionally, digital rubrics can facilitate communication between educators and students, as students can receive feedback electronically and engage in ongoing dialogue about their work.

6. **Analyzing and Reporting Data:** Digital rubrics can generate data and reports that offer insights into student performance and learning trends. Digital assessment platforms and learning management systems often provide analytics features, allowing educators to analyze and visualize assessment data at individual, class, or school levels. This data-driven approach helps inform instruction and identify areas for improvement.

7. **Progress Tracking and Reflection:** Digital rubrics can support ongoing progress tracking and student reflection. Educators and students can use digital rubrics to monitor progress over time, track improvement, and identify areas for growth. Digital rubrics can also be integrated into e-portfolios, enabling students to reflect on their work and use rubric criteria as a guide for self-assessment.

Overall, digital rubrics offer convenience, efficiency, and enhanced assessment practices. They provide a structured and standardized approach to evaluation while enabling feedback, data analysis, and ongoing reflection. By leveraging technology, digital rubrics support more streamlined and meaningful assessment processes.

Activity No.4

For details visit please;

1. https://www.uen.org/rubric/know.shtml#:~:text='%20%22%20For%20example%2C%20a%20rubric,for%20each%20of%20the%20criteria.
2. https://www.youtube.com/watch?v=PgrJRtUV0UY

Self-Assessment Questions 5.5

1. What is the purpose of developing digital rubrics?
2. How do digital rubrics enhance consistency and standardization of assessment?
3. What are common scoring scales of digital rubrics?
4. What are the components of digital rubrics?

5.6 Digital Assessment Alternatives

Digital assessment alternatives refer to alternative methods of assessing student learning and performance using digital tools and platforms. These alternatives provide options beyond traditional pen-and-paper exams and can enhance engagement, authenticity, and personalized assessment experiences. Here are some popular digital assessment alternatives:

1. **Online Quizzes and Tests:** Online quizzes and tests offer a flexible and efficient way to assess knowledge and comprehension. They can be administered through learning management systems or dedicated online quiz platforms, allowing for immediate grading and feedback. These assessments often include multiple-choice, fill-in-the-blank, or matching questions.
2. **Multimedia Projects and Presentations:** Assigning multimedia projects and presentations allows students to demonstrate their understanding through various formats like videos, podcasts, interactive presentations, or websites. These projects encourage creativity, critical thinking, and

communication skills. Assessment can be based on content, organization, presentation skills, and use of multimedia elements.

3. **Digital Writing and Blogging:** Instead of traditional written essays, students can engage in digital writing and blogging. They can write articles, blog posts, or opinion pieces on online platforms or content management systems. Digital writing assessments can assess writing skills, research, analysis, and the ability to communicate effectively in digital formats.
4. **Virtual Labs and Simulations:** Virtual labs and simulations provide interactive and immersive experiences for assessing practical skills and understanding of scientific concepts. Students can conduct virtual experiments, explore virtual environments, or simulate real-world scenarios. Assessment can focus on the ability to apply knowledge, critical thinking, and problem-solving skills.
5. **Online Discussion Forums and Debates:** Online discussion forums or platforms facilitate asynchronous or synchronous discussions among students. Assessments can be based on active participation, critical analysis, and the ability to construct well-reasoned arguments. Online debates, either text-based or through video conferencing, offer opportunities for assessing communication, persuasion, and public speaking skills.
6. **Peer Assessment and Feedback:** Digital tools can support peer assessment and feedback processes. Students can review and provide feedback on each other's work, using criteria and rubrics provided by the teacher. Online collaboration platforms and tools allow for shared document editing, commenting, and version tracking.
7. **Gamified Assessments:** Gamification elements can be incorporated into assessments to increase engagement and motivation. Digital tools like educational game platforms or quiz platforms with gamified features offer interactive and enjoyable assessment experiences. Points, levels, badges, or leaderboards can be used to incentivize participation and achievement.
8. **Online Portfolios and E-Portfolios:** Online portfolios or e-portfolios provide a comprehensive collection of student work and achievements. Students can curate and showcase their best work, reflections, and evidence of learning using digital platforms. Assessment can focus on the quality of artifacts, reflection, growth, and achievement of learning goals.

Activity No. 5

Visit the following links for more details; 1.https://www.igi-global.com/dictionary/alternative-digital-assessment/33542#:~:text=Is%20used%20as%20a%20strategy,must%20be%20mediated%20by%20technologies. 2. https://uwi.edu/remote/teaching/authentic-assessments

These digital assessment alternatives offer flexibility, interactivity, and opportunities for personalized and authentic assessment. Educators can select the methods that align with their learning objectives, leverage digital tools and platforms, and provide students with diverse and engaging assessment experiences.

Self-Assessment Questions 5.6

1. Write a detailed note on digital assessment alternatives.
2. Explain the benefits of digital assessment alternatives.

Key Points

1. Online assessments provide immediate feedback and reduce the need for manual grading.
2. Digital portfolios allow for a holistic assessment of student progress and achievements.
3. ICT enables the creation of simulated environments that mimic real-life scenarios.
4. Grading and scoring processes can be automated using ICT, however, it is important to ensure the accuracy and fairness of automated grading systems.
5. ICT tools and platforms make assessments more accessible to a wider range of learners.
6. ICT platforms enable collaborative assessment and peer feedback.
7. ICT allows for the integration of multimedia elements, such as images, videos, and audio, into assessments.
8. Data-driven assessment enables educators to tailor instruction to meet individual student needs and improve overall learning outcomes.
9. Tools like Quizlet, Socrative, and Mentimeter enable educators to create interactive quizzes.
10. There are various apps designed specifically for formative assessment, such as Nearpod, Plickers, and Pear Deck.
11. Video assessment tools, like Flipgrid and Recap, enable students to record and submit video responses to assessment prompts
12. Seesaw, Google Sites, and Pathbrite, allow students to showcase their work in portfolios.
13. Coding and Programming assessment tools allow students to demonstrate their coding abilities through interactive projects and tasks.
14. Data Analytics and Learning analytics tools support data-driven decision-making in assessment and instruction.
15. Virtual Labs and Simulations offer realistic and safe environments for students to practice and demonstrate their understanding.
16. Plagiarism detection tools, like Turnitin and Grammarly, help educators assess the originality of student work.
17. Electronic portfolios, are digital collections of student work and achievements that demonstrate their learning, growth, and skills.
18. E-portfolios encourage students to reflect on their learning experiences and the growth they have achieved.
19. Digital rubrics can support ongoing progress tracking and student reflection.
20. Digital assessment alternatives refer to alternative methods of assessing student learning and performance using digital tools and platforms.

21. Online quizzes and tests offer a flexible and efficient way to assess knowledge and comprehension.
22. Instead of traditional written essays, students can engage in digital writing and blogging.
23. Digital Assessment can focus on the ability to apply knowledge, critical thinking, and problem-solving skills.
24. Online debates, either text-based or through video conferencing, offer opportunities for assessing communication and public speaking skills.
25. These digital assessment alternatives offer flexibility, interactivity, and opportunities for personalized and authentic assessment.

Answers to Self-Assessment Questions

Self-Assessment Questions 5.1

1. Skills and competencies, 2. Holistic view, 3. Continuous process, 4. Feedback, 5. Individual needs

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Unit: 6

ICT FOR TEACHER PROFESSIONAL DEVELOPMENT

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Introduction

The operational roles and work of teachers are changing as a result of technological advancement and the rapidly changing demands of the learning communities. In order to fulfill the special educational needs of pupils, teachers are forced to integrate them into multicultural classes. Technology gadgets assist teachers in communicating with colleagues and experts for the adoption of updated and needed techniques for student learning and student-parent engagement. Information and communication technologies (ICTs) are means for educational institutions around the world, to impart knowledge and skills and cater to the needs of the 21st century. For better production in the economy and new inclusive societies, the integration of information and communication technologies in the education sector holds an important role.

Industries have been greatly transformed by the use of ICT, such as medicine, engineering, agriculture and many other fields. The ways people communicate and do business in the last decade have also undergone revolutionary modifications due to the rapid changes in ICT tools. In the education sector, ICT has the capacity to change the teaching-learning process of students as well as the role of student and teacher. Technology has the potential to change the nature of education and define where and how learning can take place. ICT has switched the student and teacher roles, and made it compulsory for teachers to remain updated and well-trained in technological integration in teaching teaching-learning process. As new technologies developed, the responsibilities of the teaching profession increased and switched, from teacher-led tutoring in lectures to shared student-centered learning environments. The management and implementation of effective teacher training programs with ICT is a strategic goal for ultimate and large-scale improvement in education.

Teacher education institutions can either take the lead in changing education or be left behind in the wave of rapid technological change. Teaching educational institutions can change their education and training system by using technologies, if they do not adopt this change they will fail to compete with the new challenges of the world. It is essential that in-service and pre-service teachers are able to use ICT tools in teaching-learning process to get more benefits from new technologies.it is the duty of teacher educational organizations to provide new pedagogical tools for learning in pre-service and in-service teacher training.

In order for education to benefit from the benefits of ICT in teaching, it is essential that pre-service and in-service teachers are able to successfully use these new teaching tools. Teacher education organizations and programs must provide guidance for pre-service and in-service teachers to integrate new pedagogies and tools for learning.

Learning Outcomes

After studying this unit you will be able to:

1. understand the concept of teachers' professional development
2. understand the concept of ICT in teachers' professional development
3. explain the role of ICT in teacher's professional development.
4. describe the implementation of ICT in professional development.
5. describe the importance of professional development for teachers to effectively use ICT during their teaching.

6.1 The Concept of Teacher Professional Development

Continuous efforts of teachers and educators for the betterment of their teaching are termed as teacher professional development. Teaching professional development is a way to improve student's achievements and skills. These types of development affect on learning of teachers in formal and informal settings. Conferences, seminars, workshops and courses are the types of formal professional development.

Professional training: These trainings focus on practice and skills through conferences, short courses, and workshops. Teachers use these types of tools in the classroom and update student's previous learning. Arrangements of such training are scheduled by the experts and provided to the teachers and professionals.

Professional education: Education for professional development includes longer courses, research and theory-based information. This type of professional education is for the teacher's benefit to use these rules, values and ideas for their own knowledge and for the better performance of the students in the classroom. The goal of these types of programs is for teachers to have the opportunity to grow their personal development.

Professional support: Refers to the support provided during actual classroom activity, such as reviewing video recordings of class notes.

6.1.1. Teacher Development Process

Definitions of teacher development courses ensure that the development of teachers helps to increase the learning of the students and these professional skills also helpful for enhancement in the quality of learning of students. The professional development of staff directly affects on school's whole development. A cyclic process shows how teacher professional development occurred in normal situations. This cyclic process was proposed by O'Sullivan, Jones and Reid (1988) which covers all the stages in a simple and easy way for better understanding.

This illustration helps trainers and students answer questions like: where are we? Where do we want to be How do we get there? How will we know when we are there? O'Sullivan et al. (1988). The idea of a cyclic number can be discarded to simply clarify the process according to this figure, but it is actually not an easy task. For example: "Evaluation must be considered at every stage and must not be absent until the final part of the program. The process of this cycle is compressively elaborated below.

a. Identification of needs and analysis:

The goals of any program are usually set to meet the needs of its participants. Before planning any professional development courses, it is necessary to identify the needs of the targeted group of teachers and draw out the sets of skills needed to be imparted, developed or enhanced in any specific teaching community. Intelligent

identification of teachers' needs for their professional development eventually leads to the success rate of the course. The needs can therefore be drawn into the objectives of the program areas for their listeners. The second phase of course development includes the analysis of the extracted or identified needs of the targeted teacher's community. The purpose of this analysis is to prioritize the teacher's developmental needs with respect to their importance and demand to plan training accordingly.

These two steps ensure different features development activity of a well-planned teacher. According to their opinion, such an activity aims to increase the professional qualification of teachers. These activities help to enhance the professional qualification of teachers. Such programs not only immerse teachers in development activities but are also essentially a new addition to their existing knowledge of what they did not know before.

b. Designing a program

Need identification and analysis provide information regarding the true idea of the developmental activities. When the context and culture of the teaching-learning activities are fully identified by the planners, the next phase is to design the development program. That should be consistent with the needs and demands of the particular teaching community.

c. Running the program

There are many ways to meet development needs/goals. O'Sullivan et al. (1988) outlined some possible ways of organizing training/sessions within staff development programs. These include,

1. 'External short courses': these courses include a short period of time for the teacher development. These curses are also offered to the head of the school/ institution. The perfectly organized management they need to achieve the desired results.
2. 'Long-term courses': long-term courses for teacher professional development include before teaching or pre-service courses.
3. 'Single session seminars': single session seminars include for a very short time to achieve the objectives of the program.

Watch this and answer the given questions; https://www.slideshare.net/FathiaSamet/teachers-self-directed-development-slideshare

1. What do you understand by professional development?
2. How many types of teacher development programs?
3. What is professional education?

d. Monitoring/Evaluation

Implementation of employee development activities for immediate checking or for short-term inspection is termed monitoring. Monitoring is conducted to check the progress and benefits of the program. Glover and Law (1996) said that monitoring deals with the ways which concerned how the plans are implemented.

Teacher professional development is necessary for many purposes:

1. Helpful to advance the updated subject knowledge of the individuals in their relevant fields.
2. To update the skills, attitudes and values of the teachers by using new techniques and approaches. These skills are learned according to the circumstances and new pedagogical research.
3. This is helpful in making changes in curriculum and teaching practices.
4. Professional development is also helpful for using new strategies in curriculum implementation.
5. This is helpful to transfer information between teachers and institutions.
6. This is helpful for the betterment of weak teachers.

After going through the (OECD, 1998) training purposes what did you feel;

1. These purposes can only be achieved through well-organized professional development programs.
2. These purposes can be achieved by collegial efforts.
3. These can be achieved by individual teacher's efforts even.

6.1.2 Types of Teacher Professional Development

There are main types of teacher professional development

1. Courses/workshops (e.g. on topic or methods and/or other topics related to education).
2. Educational conferences or seminars (where teachers and/or researchers present their research results and discuss educational issues).
3. Qualification program (e.g. study program).
4. School visits to other schools.
5. Involvement in a network of teachers created specifically for the professional development of teachers.
6. Individual or joint research on a topic of professional interest.
7. Mentoring and/or peer observation and coaching as part of a formal school setting.
8. Reading professional literature (e.g. journals, evidence-based works, and diploma theses).
9. Engaging in informal dialogue with colleagues about how to improve teaching.

Critically go through the types of professional development and assess what kind of program would help you enhance your teaching skills.

Self-Assessment Questions 6.1
Fill in the blanks:

1. Teacher's professional development is any type of …….. education effort for educators.
2. ……is a short-term, immediate check on the implementation of employee development activities.
3. Activities that develop the skills, knowledge, expertise, and other characteristics of an individual as a teacher are called……
4. …….. is a long-term evaluation that how to value an employee
5. The definition recognizes that development can be realized in many ways, from formal to ……...\

6.2 ICT In The Professional Development Of Teachers

Information and Communication Technologies (ICTs) have provided teachers with the opportunity to enhance their pedagogical and content knowledge. The knowledge or changes aligned with modernization and demands of the rapidly changing societies of the present era. Teachers can upbring neglected development areas of their personalities, according to their availability, ease and pace without limitations of time or geographic boundaries.

The UNESCO Report on World Education, teachers and Teaching in a Changing World (UNESCO, 1998) states that: the adoption of ICT in every field of the modern era is crucial. Its importance and utility cannot be denied. Technology, science, political, economic and cultural spheres influence the new generation that enters the world radical in all fields. The switch in training and learning modules is only because of the emerging trends of Knowledge and culture in the global economy, hence the status and focus of the education system have also undergone several changes in trends and policies.

Activity

Visit websites of different institutions offering online services and programs for teachers' professional development and scrutinize the need and benefits of introducing ICT in this field.

6.2.1 Principles of ICT in Teachers' Education

There are three basic principles of ICT in teacher education that need to be addressed in relation to the challenges facing regions, universities and countries (Society for Information Technology and Teacher Education, 2002):

1) The entire teacher education program should be equipped with ICT
2) Technology implementation should be in context

3) In the teacher education program, students should experience an advanced learning environment supported by ICT.

6.2.2. ICT Skills Development of Teachers

In teaching vocational education, the most critical element is the extent to which teachers have the skills and knowledge to model the use of ICT in their own practices for successful ICT integration. A well-designed and sustainable program is needed to develop these skills in their professional development. Professional development agencies are responsible for up gradation of teacher's content, context and pedagogical knowledge and skills. Development agencies should plan for teachers' professional development programs and processes with a specific focus on using ICT in;

i. pre-service education programs
ii. in-service teacher certificates and
iii. Continuous professional development (CPD) courses.

Advanced ICT tools have changed the ways of communication and learning even online enterprises have changed the focus of business communities as well. Such rapid advancements have lessened the importance of

i. Traditional textbooks
ii. Teacher-led lectures
iii. Development of hard skills and
iv. Rote memorization of huge concepts and content

Instead, the education sector demands dynamic, career-oriented teaching with a specific focus on the integration of technology in teaching and learning. Attainment of such purposes is only possible by making teachers adaptable to technological advancements and adoption.

Pre-service and in-service teachers must be ready for learning the handling of ICT tools for their professional development and students learning. Teachers can avail of various learning tools being offered for their professional and personal development like

i. **Feedly** (platform for educational articles in one place for teachers and students)
ii. **Edmodo** (Enables students and teachers to connect through virtual classrooms for learning and development)
iii. **Teaching Channel** (Provides a collection of videos for enhancement of teachers' professional development regardless of grade and subject)

Activity

For more details you may visit: https://elearningindustry.com/professional-development-tools-for-teachers

6.2.3. Practicability of Using ICT for Professional Development

ICT has the potential to provide opportunities to any individual teacher for his development. It has reduced the requirement of teacher's availability at any specific time, place and duration. It has allowed the learners to avail the tools in accordance with the nature, ease, availability and compatibility of the individual teacher by utilizing synchronous or asynchronous MOOCs. Utilization of ICT in professional development is practicable as it is

i. Practical
ii. Specific and
iii. Continuous in nature.

6.2.4 Groups of ICT Competences

Competences needed for integration of ICT into teacher's professional development are further subdivided into four groups. Details are under

1. Pedagogy

Pedagogy is the most important aspect of introducing technology into the curriculum. Pedagogy focuses on pedagogical practices and curriculum knowledge and requires teachers to develop applications within their disciplines that effectively use ICT to support and extend teaching and learning.

2. Collaboration and networking

Collaboration and networking recognize the communicative potential of ICT to extend learning beyond the classroom and the implications for teachers in developing new knowledge and skills.

3. Technology

Technology brings with it new rights and responsibilities, including fair access to technological resources, care for individual health and respect for intellectual property, which are part of the competence of ICT in the field of social issues.

4. Technical issues

Technical Issues is an aspect of the lifelong learning theme through which teachers update their skills with hardware and software as new generations of technology emerge.

A sensible approach to ICT has been shown to be important in acquiring competence with hardware and software, especially for teachers. For example, providing laptops is an important strategy for ICT teacher training.

Self-Assessment Questions 6.2

Short question answer

1. What is the UNESCO report about ICT on education?
2. What are the principles of ICT in teacher education?
3. How many themes of teacher education?
4. What are the group of ICT competencies?

6.3 TEACHER PROFESSIONAL DEVELOPMENT THROUGH ICT

"Change is the only constant in life" (Greek Philosopher **Heraclitus)**

The growth of global culture, economy, education, health, sports, agriculture, technology, international relations, and communication are growing through ICT. This unique and fast way of communication was directly linked with the invention of the Advanced Research Projects Agency Network (ARPANET) in the 1970s. This invention revolutionized the daily affairs of each and every field, and so is the case with teachers' professional development through ICT.

6.3.1. Innovation of ICT in Teacher's Professional Development

The innovation of communication increased with the passage of time. In the 21st century, the number of innovations increased in the form of Information and Communication Technologies (ICTs). The computer, laptop, mini laptop, radio, television, 3rd screen, phone, mobile, smart mobile, telegram, internet, sms, projector, multimedia, smart media, Linux, window, new version window, typing machine, printer, advance printer, old software, new software and advance software are counted from several research studies of communication and science education. The communication is the first step towards transferring knowledge from one person to another. The covid-19 increased the role of ICT in the education system of the world for learning and development purposes. Educational and professional development institutions adopted ICT-based innovation but the mechanism of its adoption into professional development still needed to be defined clearly.

6.3.2. Approaches to use ICT in teacher professional development

In order to grasp the role of ICT in a teacher's professional development, it is necessary to understand the approaches of professional development. Adopted approaches for the professional development of teachers must be cultural and contextualized. Professional development through ICT to integrate it into teaching & learning is a steady and continuous process. It should not be taken as a single 'injection' of training. In accordance with the rapid technological changes, teachers need to update their attitudes, behaviors, knowledge and skills to cope with the modern school curricula and technology change. At first stance, individual teachers must be willing for personal development in better interest of organizational development. Various approaches in practice globally for teacher's professional development are;

a. Pre-service Teacher Education

In many regions, teachers engage in preparation before they start teaching in schools, a stage that this paper refers to as pre-service teacher education.

a. Pre-service Teacher Education

i. Recruitment Phase

The **recruitment phase** requires a lot of effort and commitment, and research in developed countries shows that around 30% of teachers may leave during this time. Assessment of teachers' skills in handling ICT tools can help in selection of the most adaptable and competent teacher educators receptive to the adoption of ICT.

ii. Induction

When beginning teachers start teaching, they can be provided with the opportunity to use ICT tools for additional support to cope with the complexity of teaching in the first to third year of their career. This phase of professional development is called induction. Integration of ICT during induction will increase the probability of acceptance of using ICT during teaching.

iii. On-the-job training

There are chances that inducted teachers may not get the benefit of the preparatory course for integration of ICT during teaching. They need to learn while their teaching in schools, it is referred to as on-the-job training. This kind of training takes place in actual educational settings. Trainee teachers should be provided with ICT gadgets or at least make it compulsory for integration of ICT in teaching using any available ICT tool to make in interactive experience for students to learn.

iv. Continuing teacher education

It would not be wrong to say that teacher education is a continuous process of lifelong learning. Teachers should be provided with then opportunity to attend workshops and seminars organized at local, national and international levels by organizing synchronous sessions of teacher development. Such activities provide teachers with the opportunity to interact with teachers of different cultures and with a variety of expertise

v. Innovative educational project

Innovation of ICT in teacher's professional development demands the introduction of versatile teacher training experiences. A practicing teacher using ICT in his teaching can work with a pre-service teacher education student to adoption of effective use of ICT in his teaching. This can not only increase the teaching potential of practicing teachers, but the pre-service teacher also experiences role modeling and may have an easier transition into teaching as a result of such model experience.

It is important to note that some very strong teacher education models provide concurrent professional development for more than one group. For example, undergraduate education can be combined with continuing teacher education.

6.3.3. Use of ICT for Professional Development

It has already been discussed that Advanced ICT tools have changed the ways of communication and learning. Such rapid advancements have lessened the importance of

v. Traditional textbooks
vi. Teacher-led lectures
vii. Development of hard skills and
viii. Rote memorization of huge concepts and content

So is the case that, the education sector is demanding dynamic, career-oriented teaching with a specific focus on integration of technology in teaching and learning. Attainment of such purposes is only possible by making teachers adaptable to technological advancements and adoption.

Pre-service and in-service teachers must be ready to learn and handling ICT tools for their professional development and students' learning. Understanding the importance of ICT for the continuous Professional Development of teachers, the individual teacher can avail the services of various learning tools for developing teacher's professional and personal development like

iv. **Feedly** (platform for educational articles in one place for teachers and students)
v. **Edmodo** (Enables students and teachers to connect through virtual classrooms for learning and development)
vi. **Teaching Channel** (Provides a collection of videos for enhancement of teachers professional development regardless of grade and subject)

Activity

For details, you may go through this link https://www.slideshare.net/MuhammadAbdullahJave/teachers-professional-development-118464084

6.3.4. Role of ICT in professional learning communities

Collegiality: Learning communities have introduced the concept of collegiality for professional development. This is in favor of all the participants of the learning community and every member can avail equal opportunity of supporting and being supported.

Public or Private Partnerships: Public-private partnership supports the professional development of teachers as well. These are particularly suitable for ICT integrated development of employees provided by ICT companies, their

technical and financial support make the environment feasible for training, Like the Intel Teach to the Future program, or local communities.

Peer-tutoring or Peer Mentoring: ICT has altogether changed the roles of stakeholders of any organization. In education, students have become teachers and teachers are learning from students as well. Such exchange of roles has emerged in the concepts of peer tutoring and peer mentoring.

Exposure to an Expert

Information and communication technologies are providing opportunities to access teaching experts from various localities. ICT has also widened the scope of such learning opportunities and also provided access to related supporting materials helpful for teacher's professional development. By using such programs teachers can learn to use these materials within class and design better learning opportunities for their students.

Exposure to Development Opportunities

Teachers can gain professional development from any learned member. ICT has made it easy for all related personnel to join the same class and share their experiences for motivation or development purposes. In this way,

Self-Assessment Questions 6.3

Q1. Write a note on how teacher development is possible through ICT.
Q2. What are the approaches to using ICT in teacher professional development?
Q3. How pre-service and in-service use of ICT possible for teacher development?
Q4. What is the role of ICT in professional learning communities?
Q5. What is the role of ICT in promoting a vision of education?

6.4 Teacher Professional Development In Integrating Ict

Educationists have been focusing on the integration of Information Communication Technology (ICT) as an innovation in the education system. Novel pedagogical strategies by the implementation of ICT in education have been working for the previous two decades. Teachers Professional Development (TDP) plays an important role in the implementation of ICT in the field of education.

6.4.1 ICT as an Innovation in educational institutions

According to Fullen (1991), implementation of ICT in educational institutions is considered as a successful innovation for;

Building a vision; ICT plays an important role in building the vision of the teachers and learners in accordance with the 21st century.

Evolutionary planning; implementation of ICT in planning and management is an evolutionary step.

Taking initiative and empowerment; ICT is used as an initiative and to empower the education system.

Staff development; implementation of ICT in education is for the staff development is very useful that it is the way to arrange and update their knowledge.

Resource assistance; ICT is also used as assistance for the teacher's professional development in the teaching and learning process.

Monitoring and troubleshooting; monitoring is also a major function that can be performed by using ICT in TPD for the betterment of the learning process of teachers.

There is a need to maintain a balance between the vision of ICT and other aspects, leadership of educational institutions, teachers and an environment for collaboration among various professionals through ICT.

6.4.2 Integration of ICT in Teaching

Teacher plays a central role in the integration of ICT in teaching.

- The teacher selects the needed curriculum variables to be delivered in class.
- The teacher selects/defines the technology appliances for use in accordance with the context and content.
- The teacher is the agent to define the processes matching the belief of good system in any specific educational set up.

Suggested Reading;

For more details, you may visit; https://www.slideshare.net/TCPLibrary/ict-for-personal-and-professional-development

6.4.3 Modes of I*ntegrating* ICT

Teacher's professional developers should focus on teachers training for such modes for integration into the class which seem compatible for teachers and available for students and affordable for educational institutions and parents of the children. ICT can be integrated in the following ways in the teaching and learning environment.

- Teachers can design interactive power point presentations for lecture delivery in class. As it makes teaching easy and learning becomes interesting for students.
- Teachers use projectors, computers and the Internet while they are teaching in classrooms. It makes teaching more flexible and accessible for information sharing.

- Teachers should guide their students to avail visualization or Simulation for understanding of difficult learning materials or hazardous experimentation.
- Programmed learning can also be used for individual mastery learning and its links can be shared with the class for its effective and maximum use. However, if such learning is being planned for younger kids then they must preplan any online monitoring system to ensure constrictive usage of resources.
- Teacher can avail ICT tools and services in their teaching by introducing the concept of online submission of assignments, presentations and projects.
- Teachers can organize interactive content using images, videos, sounds, and animations.
- Interaction or connectivity of educational stakeholders, teachers, students and governing bodies using ICT tools and services has also diminished the geographic distance.
- Teachers can also use Social media websites for interaction and sharing of learning content with learning communities.
- ICT has made it easy to manage student-teacher, teacher-management, teacher-parent, and management-parent interactions systematically.
- A digital library is a rich source for information building. Students and teachers can access e-books for assistance and they can easily share it with peers and colleagues.

Self-Assessment Questions 6.4

Q1. How TPD is effective for ICT integration?

Q2. What is the role of teachers in integrating ICT?

Q3. What type of teacher's training can play its role in integrating ICT into teaching?

Q4. Describe the modes of integrating ICT in teacher professional development.

Key Points

1. Teacher's professional development is a conscious effort for improvement of teaching skills.
2. Professional development can take place in formal or informal settings.
3. The main focus of a teacher's professional development is to provide students with the most favorable learning experiences.
4. Professional development programs may be designed to focus on any single or combination of three types; Professional education, Professional training and professional support.

5. **Needs identification:** Identification of the set of professional skills/knowledge lacking in any specific group of teachers i.e.; Science teachers.
6. ICT can be used for the development of teacher's content and contextual knowledge and pedagogical skills.
7. Three principles of integrating ICT into a teacher's professional development are i. **Equipping the entire teaching program with ICT**, ii. **Contextual implementation of technology** and iii. **Provision of ICT-integrated advanced learning experiences for students**.
8. Utilization of ICT in teacher's professional development programs is worthy due to its **practical**, **specific** and **continuous** nature.
9. Teacher's professional development agencies must undergo and analysis of the situation of the community where the programs are planned to be implemented.
10. Challenges to integration of ICT into CPD programs in contemporary society should also be assessed before planning that program.
11. Ensuring planning and management of the launched change consistently should remain the main target of CPD stakeholders.
12. Competences needed for the integration of ICT into teaching are further subdivided into four groups; i. Pedagogy, ii. **Collaboration and networking, iii. Technology** and **iv. Technical issues.**
13. Implementation of each competency should be ensured keeping in mind the importance of each and without denying the importance of others for the holistic development of teachers using ICT.
14. Pre-service and in-service teacher education are some approaches to teacher professional development.
15. In-service teacher education is further expanded into i. **Recruitment Phase, ii. Induction, iii. On-the-job training, iv. Continuing teacher education** and **v. Innovative educational project.**
16. ICT is being used for teachers' professional development, various programs and processes have been introduced by professional development agencies for updated development of teachers using ICT.
17. ICT has been playing its role for the last decade and facilitating teacher's professional development by expanding professional learning communities.
18. ICT has transformed the trends of **Collegiality, Public or Private Partnerships, Peer Tutoring or Peer Mentoring, Exposure to Experts** and **Exposure to Development Opportunities.**
19. ICT has facilitated the development agencies to promote the vision of learning in teaching learning communities by integration of latest technologies.
20. for successful integration of technology in teaching and learning processes.

21. TPD is the only medium for making teachers aware of integrating ICT into their teaching practices.

Answers of Self-Assessment Questions

Self-Assessment Questions 6.1

1. Continuing
2. Monitoring
3. Professional development
4. Appraisal
5. Informal

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Unit: 7

ICT FOR MANAGING STUDENTS' LEARNING

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Introduction

Information Communication Technologies (ICT) have transformed the landscape of education, offering new opportunities for enhancing student learning experiences. From interactive multimedia resources and online collaboration tools to virtual simulations and personalized learning platforms, ICT provides students with access to a wealth of digital resources and learning opportunities. In this chapter, we will explore the use and significance of ICT in student learning, examining how these technologies are reshaping educational practices and empowering students to engage with content, collaborate with peers, and develop essential 21st-century skills.

Learning Outcomes:

After Studying this unit you will be able to:

1. explore the concept of ICT and its significance in supporting student learning across different educational contexts.
2. examine the potential benefits of integrating ICT into learning practices, including improved engagement, accessibility, and personalized learning experiences.
3. explore the various ICT tools and platforms available for classroom management, such as attendance tracking systems, learning management systems (LMS), and digital communication tools.
4. evaluate the effectiveness of ICT in streamlining administrative tasks, promoting student engagement, and facilitating communication between instructors and students.
5. discuss strategies for integrating ICT into classroom management practices to create a conducive learning environment and optimize instructional delivery.

7.1. Use of ICT for Classroom Management

In today's digital age, Information Communication Technologies (ICT) have become indispensable tools for classroom management, offering innovative solutions to enhance teaching and learning experiences in university settings across Pakistan. From streamlining administrative tasks and facilitating communication to promoting student engagement and collaboration, ICT plays a crucial role in optimizing classroom management practices and fostering a conducive learning environment.

New technological tools not only bring innovation to academic centers, but also speed up the transfer of information, increase student interest, and allow processes to be automated, among other aspects to be taken into account.

- It improves concentration and comprehension. The activities carried out through digital and interactive tools increase student concentration and, therefore, they assimilate concepts more quickly, enhancing learning. This type of tool involves students in more practical learning, with the aim of reinforcing what they have learnt.
- It promotes student flexibility and autonomy. New technologies promote autonomous learning for students. With the incorporation of digital alternatives such as online courses, each student can learn at their own pace, optimising time and resources thanks to the flexibility provided by digitalisation and connectivity.
- It encourages critical thinking. The diverse sources of information that technologies provide bring new points of view to students. In this way, information and communication technologies encourage debate and the acceptance of other people's opinions. In addition, the exchange of thoughts allows students to learn about different cultures.
- It stimulates motivation. The incorporation of technologies in the classroom improves the motivation of students, it is a quick and practical technique to stimulate the study of new concepts. Digital tools are the daily communicative support of the new generations, therefore, they are easily handled in this environment.
- It incorporates new learning methods. Another of the advantages of ICT in education is that teaching professionals can incorporate new teaching methodologies, thus improving academic results and encouraging dynamism in the classroom. Moreover, their use implies the development of the digital skills needed to avoid the digital divide.

Please visit to read more
https://www.telefonica.com/en/communication-room/blog/advantages-disadvantages-ICT-education/

1. **Attendance Tracking and Monitoring**: ICT tools such as attendance management systems and mobile apps enable instructors to efficiently track and monitor student attendance in real time. Automated attendance systems streamline the process of recording attendance, reducing administrative burden and ensuring accurate attendance records.

2. **Course Management and Communication**: Learning management systems (LMS) and communication platforms facilitate seamless course management and communication between instructors and students. Through LMS platforms, instructors can share course materials, assignments, and announcements, while students can access resources, submit assignments, and engage in online discussions.

3. **Interactive Lectures and Multimedia Resources**: ICT enables instructors to deliver interactive lectures and incorporate multimedia resources such as videos, simulations, and online presentations into their teaching. Interactive whiteboards, multimedia projectors, and educational software enhance engagement and promote active learning among students.

4. **Assessment and Feedback**: Online assessment tools and platforms allow instructors to create and administer quizzes, exams, and assignments electronically. ICT also facilitates timely feedback and grading, enabling instructors to provide personalized feedback to students and monitor their progress more effectively.

5. **Collaborative Learning and Group Projects**: ICT tools support collaborative learning and group projects by providing platforms for online collaboration, document sharing, and virtual meetings. Students can collaborate on group assignments, share resources, and communicate with peers, regardless of their physical location.

6. **Virtual Labs and Simulations**: ICT enables the integration of virtual labs and simulations into science and engineering courses, providing students with hands-on learning experiences in virtual environments. Virtual labs allow students to conduct experiments, explore concepts, and visualize complex phenomena, enhancing their understanding of course materials.

See the following map

Reference:https://www.mindmeister.com/105723109/ict-and-classroom-management

7.1.1 Strategies for Using ICT in Classroom

1. **Utilize Learning Management Systems (LMS)**: Encourage students to actively engage with the university's LMS platform to access course materials, participate in online discussions, and submit assignments.

2. **Promote Digital Literacy Skills**: Incorporate activities and assignments that promote digital literacy skills, such as conducting online research, critically evaluating online sources, and effectively communicating using digital tools. Offer workshops or tutorials to help students develop essential digital literacy skills.

3. **Encourage Active Participation**: Use interactive teaching methods and ICT tools to encourage active participation and engagement during lectures and discussions.

4. **Provide Timely Feedback**: Utilize online assessment tools and grading platforms to provide timely feedback on assignments and assessments. Encourage students to reflect on feedback and use it to improve their academic performance.

5. **Facilitate Online Collaboration**: Create opportunities for online collaboration and group work using collaborative platforms and communication tools.

6. **Offer Support and Resources**: Provide students with access to technical support and resources to help them navigate
   By leveraging ICT and implementing tailored strategies, university-level instructors in Pakistan can effectively manage their classrooms, enhance student engagement, and promote academic success among their students.

7.2. ICT AS Scaffolding

Scaffolding in education refers to the instructional support provided by teachers or educational resources to help students learn and master new concepts or skills. The concept draws inspiration from the construction industry, where scaffolds are temporary structures erected to support workers as they build or repair a building. Similarly, in education, scaffolding involves providing temporary support to learners as they work towards achieving a learning goal or completing a task.

The role of scaffolding in education is multifaceted. It aims to bridge the gap between a student's current level of understanding and the desired learning outcome by providing the necessary support, structure, and guidance. Scaffolding helps students build on their existing knowledge and skills, gradually increasing the

complexity of tasks or concepts until they can independently perform the task or understand the concept.
Scaffolding supports student learning and development by:

- Breaking down complex tasks or concepts into smaller, more manageable steps.
- Providing clear explanations, demonstrations, or models to illustrate the task or concept.
- Offering prompts, cues, or hints to guide students through the learning process.
- Offering feedback, encouragement, and reinforcement to motivate students and build their confidence.
- Gradually reducing support as students gain mastery and independence.

Reading
Maity, C., & Haque, L. (2018). Integration Of ICT in Cognitive Scaffolding in Learning Science: A Review. *Journal Of Education and Development*, 523. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Integration+of+ICT+in+Cognitive+Scaffolding+in+Learning+Science%3A+A+Review+June+2018&btnG=

7.2.1 How ICT can serve as a scaffolds to provide support, structure, and guidance to students as they engage with complex tasks or concepts.

Information Communication Technologies (ICT) offer a wide range of tools and resources that can serve as scaffolds to support student learning in various ways. ICT can provide personalized, adaptive, and interactive learning experiences tailored to individual student needs, preferences, and abilities.
ICT can serve as a scaffolds by:

- Providing access to digital resources, such as multimedia presentations, interactive simulations, and online tutorials, to support student understanding of complex concepts.
- Offering adaptive learning platforms and intelligent tutoring systems that adjust the level of difficulty based on students' performance, providing targeted support and remediation as needed.
- Facilitating collaboration and peer interaction through online discussion forums, virtual study groups, and collaborative projects, allowing students to learn from each other and receive peer feedback and support.
- Offering interactive learning environments, such as virtual labs, digital games, and educational apps, that engage students in hands-on learning activities and problem-solving tasks, promoting active learning and exploration.
- Providing scaffolding tools and features, such as concept mapping software, graphic organizers, and guided practice exercises, that help students

organize their thoughts, make connections, and scaffold their understanding of complex topics.

7.2.2 The specific examples of ICT-based scaffolding techniques, such as interactive tutorials, concept maps, and online peer support networks, and their impact on student learning outcomes.

There are numerous examples of ICT-based scaffolding techniques that have been shown to have a positive impact on student learning outcomes. These include:

1. *Interactive Tutorials*: Interactive tutorials, such as online instructional videos, virtual simulations, and interactive multimedia presentations, provide students with step-by-step guidance and explanations of complex concepts.
2. *Concept Maps*: Concept mapping software allows students to create visual representations of their understanding of a topic, organizing key concepts and relationships into a hierarchical structure.
3. *Online Peer Support Networks*: Online peer support networks, such as discussion forums, social media groups, and collaborative platforms, enable students to connect with peers, ask questions, share ideas, and receive feedback and support. *The impact of ICT-based scaffolding techniques on student learning outcomes can be seen in improved academic performance, increased engagement and motivation, enhanced critical thinking and problem-solving skills, and greater independence and self-regulation in learning.*

By addressing each of these objectives in your chapter, you can provide a comprehensive overview of the role of ICT in scaffolding student learning and development, as well as specific examples and their impact on student learning outcomes.

7.3. ICT for Student Learning

There are so many ways in which ICT can be used to enhance student learning process

- Identify the various ways in which ICT can enhance student learning experiences, including access to digital resources, interactive multimedia tools, and personalized learning platforms.
- Analyze the impact of ICT on student engagement, motivation, and academic achievement across different subject areas and grade levels.
- Discuss best practices for integrating ICT into teaching and learning processes to promote active learning, critical thinking, and knowledge construction among students.

7.3.1 The Ways in which ICT may Enhance Student Learning Experiences

There various ways in which ICT enhance student learning experiences. From providing access to digital resources and interactive multimedia tools to offering personalized learning platforms, ICT offer a plethora of opportunities for students to engage with content, explore concepts, and deepen their understanding of subject matter.

Information Communication Technologies (ICT) offer a multitude of ways to enhance student learning experiences by providing access to a wealth of digital resources, interactive multimedia tools, and personalized learning platforms.

1. **Access to Digital Resources:**
    - ICT provide students with access to a vast array of digital resources, including e-books, online journals, educational websites, and digital libraries.
    - These resources offer students the opportunity to explore diverse topics, access up-to-date information, and engage with multimedia content such as videos, animations, and simulations.

2. **Interactive Multimedia Tools:**
    - ICT enable the integration of interactive multimedia tools into teaching and learning processes, such as educational games, virtual labs, and multimedia presentations.
    - These tools engage students in active learning experiences, allowing them to interact with content, manipulate objects, and explore complex concepts in a dynamic and immersive manner.

3. **Personalized Learning Platforms:**
    - Personalized learning platforms leverage ICT to tailor instruction and learning experiences to individual student needs, preferences, and learning styles.
    - These platforms adapt content, pace, and difficulty levels based on students' performance, providing personalized feedback, recommendations, and support to optimize learning outcome.

7.3.3 ICT and Student Engagement, Motivation, and Academic Achievement

Through empirical research and case studies, we will explore how ICT-enhanced learning experiences contribute to increased student engagement, intrinsic motivation, and improved academic performance across different subject areas and grade levels.

ICT have a profound impact on student engagement, motivation, and academic achievement across various subject areas and grade levels, contributing to enhanced learning outcomes and academic success.

1. **Student Engagement:**
    - ICT promote student engagement by providing interactive and immersive learning experiences that capture students' interest and attention.
    - Interactive multimedia tools, collaborative learning platforms, and gamified learning experiences foster active participation and engagement among students, leading to increased motivation and enthusiasm for learning.

2. **Student Motivation:**
    - ICT stimulate student motivation by offering opportunities for autonomy, mastery, and purpose in learning.
    - Personalized learning platforms, adaptive learning technologies, and digital badges and rewards systems incentivize students to set goals, track progress, and achieve academic success, enhancing their intrinsic motivation and sense of achievement.

3. **Academic Achievement:**
    - Research indicates that the effective integration of ICT into teaching and learning processes positively impacts academic achievement across subject areas and grade levels.
    - ICT-enhanced instruction improves students' comprehension, retention, and application of knowledge, leading to higher levels of academic performance and success.

7.4. Use of ICT for Educational Counselling

In today's dynamic educational landscape, the role of Information Communication Technologies (ICT) extends beyond traditional classroom settings to encompass a wide range of support services aimed at enhancing students' well-being and academic success. One such area where ICT have demonstrated significant potential is in the provision of educational counselling and support services to students. In this chapter, we will explore the transformative role of ICT in delivering educational counselling, academic advising, career guidance, and mental health support to students, regardless of their geographical location or socioeconomic background.

7.4.1 Role of ICT in Providing Educational Counselling and Support Services

The digital platforms and communication technologies, educational institutions can offer students access to academic advising, career guidance, and mental health support services, empowering them to navigate academic challenges, explore career pathways, and address personal concerns that may impact their learning journey.

1. **Introduction to Educational Counseling and Support Services:**
    - Define educational counseling and support services, highlighting their importance in promoting student well-being and academic success.
    - Discuss the various types of support services offered to students, including academic advising, career guidance, and mental health support.

2. **ICT Tools and Platforms for Educational Counseling:**
    - Explore the role of ICT in delivering educational counseling services, such as online counseling platforms, video conferencing tools, and virtual advising sessions.
    - Discuss the benefits of using ICT for counseling, including increased accessibility, flexibility, and convenience for students.

3. **Academic Advising and Course Selection:**
    - Examine how ICT can support academic advising and course selection processes, including online course catalogues, degree planning tools, and academic advising portals.
    - Discuss how ICT can help students explore academic pathways, track degree progress, and make informed decisions about course selection and academic goals.

4. **Career Guidance and Exploration:**
    - Explore the role of ICT in providing career guidance and exploration opportunities to students, such as online career assessments, job search platforms, and virtual career fairs.
    - Discuss how ICT can help students explore career options, develop career-related skills, and navigate the job market effectively.

5. **Mental Health Support and Counseling Services:**
    - Discuss the use of ICT for delivering mental health support and counseling services to students, including online therapy platforms, mental health apps, and virtual support groups.

- Examine the benefits of online counseling for students, such as increased accessibility, anonymity, and reduced stigma associated with seeking mental health support.

7.4.2 Use of Online Counseling Platforms and Virtual Support Groups

The use of online counseling platforms, virtual support groups, and digital resources can be used to deliver counseling services to students in remote or underserved areas. With the advent of online counseling platforms and virtual support groups, students can access counseling services and connect with trained professionals and peers in virtual environments, overcoming geographical barriers and increasing accessibility to support services.

1. **Overview of Online Counseling Platforms:**
    - Provide an overview of online counseling platforms and virtual support groups, including their features, functionalities, and benefits for students.
    - Discuss how online counseling platforms can provide students with access to licensed counselors, therapists, and peer support networks in virtual environments.

2. **Benefits of Virtual Support Groups:**
    - Explore the benefits of virtual support groups for students, including increased social support, peer connection, and opportunities for sharing experiences and coping strategies.
    - Discuss how virtual support groups can address specific student needs, such as academic stress, career concerns, and mental health challenges.

3. **Digital Resources for Remote and Underserved Areas:**
    - Examine the use of digital resources, such as educational websites, online forums, and mobile apps, for delivering counseling services to students in remote or underserved areas.
    - Discuss how digital resources can provide students with access to information, resources, and support services, regardless of their geographical location.

7.4.3 Ethical Considerations and Privacy Concerns

As educational institutions increasingly rely on digital platforms to deliver counseling services, it becomes essential to uphold ethical standards and safeguard students' privacy and confidentiality. We will discuss strategies for ensuring confidentiality and privacy in online counseling sessions, as well as addressing

ethical dilemmas and maintaining professional boundaries in digital counseling environments.

1. **Ethical Considerations in Digital Counseling:**
    - Discuss ethical considerations related to the use of ICT for educational counseling, including issues of confidentiality, informed consent, and professional boundaries.
    - Explore ethical guidelines and standards of practice for counselors and educators when delivering counseling services online.

2. **Privacy Concerns and Data Security:**
    - Examine privacy concerns related to the use of ICT for educational counseling, including data security, confidentiality breaches, and student privacy rights.
    - Discuss strategies for ensuring data security and protecting student privacy in online counseling sessions, such as encryption, secure communication channels, and adherence to privacy regulations.

3. **Ensuring Confidentiality and Confidentiality:**
    - Discuss strategies for ensuring confidentiality and confidentiality in online counseling sessions, such as establishing clear policies and procedures, obtaining informed consent from students, and maintaining secure communication channels.
    - Explore the role of counselors and educators in upholding ethical standards and maintaining professional boundaries in digital counseling environments.

Self-Assessment Questions

Q1. Define the concept of scaffolding in education and its role in supporting student learning and development.

Q2. Examine how ICT can serve as scaffolds to provide support, structure, and guidance to students as they engage with complex tasks or concepts.

Q3. Explore the specific examples of ICT-based scaffolding techniques, such as interactive tutorials, concept maps, and online peer support networks, and their impact on student learning outcomes.

Q4. Explain what ICT tools are used for classroom management and give examples of each.

Q5. Describe how ICT can help streamline administrative tasks in the classroom.

Q6. Compare and contrast the different ICT tools for classroom management, highlighting their advantages and disadvantages.

Q7. Evaluate the effectiveness of ICT in promoting student engagement during class activities.

Q8. List various ways in which ICT enhance student learning experiences. Explain how ICT can improve student engagement during lessons. Propose innovative strategies for integrating ICT into classroom management practices to optimize instructional delivery and create a conducive learning environment.

Q9. Define the concept of scaffolding in education and explain its importance in supporting student learning. Describe how ICT can provide support, structure, and guidance to students as they engage with complex tasks or concepts.

Q10. Provide examples of ICT-based scaffolding techniques and explain how they assist students in learning. Evaluate the effectiveness of ICT-based scaffolding techniques in improving student learning outcomes.

Q11. Analyze the role of ICT in facilitating student autonomy and independence in learning. Develop a plan for implementing ICT-based scaffolding techniques in a specific educational context, considering the needs and learning styles of the students.

Q12. Discuss the impact of ICT on student motivation across different subject areas and grade levels. Evaluate the effectiveness of ICT in promoting critical thinking skills among students.

Q13. Critically analyze the role of ICT in transforming traditional teaching and learning practices. Develop a comprehensive plan for integrating ICT into teaching and learning processes to promote active learning, critical thinking, and knowledge construction among students.

Q14. Define educational counseling and describe the role of ICT in providing counseling services to students. Explain how ICT can support academic advising and career guidance for students.

Q15. Explore the benefits of using online counseling platforms and virtual support groups for delivering counseling services to students. Evaluate the ethical considerations and privacy concerns associated with the use of ICT for educational counseling.

Q16. Critically analyze the impact of ICT on improving access to educational counseling services for students in remote or underserved areas.

Q17. Develop a set of guidelines and strategies for ensuring confidentiality and confidentiality in online counseling sessions, taking into account ethical considerations and privacy concerns.

Key Points

1. ICT tools simplify attendance tracking and course management, reducing the administrative burden on instructors.
2. Digital and interactive tools improve concentration, comprehension, and motivation by making learning more practical and stimulating.
3. Online courses and resources allow students to learn at their own pace, promoting independent and flexible learning.
4. ICT facilitates quick and direct communication between teachers and students, enhancing interaction and resource sharing.
5. ICT supports collaborative learning and group projects, enabling students to work together effectively from different locations.
6. Scaffolding in education is about providing instructional support to help students master new concepts or skills, similar to scaffolding in construction, which supports workers as they build.
7. ICT provides digital tools and resources that support student learning by breaking down complex tasks, offering explanations, providing feedback, and gradually reducing support as students gain mastery.
8. ICT tools, such as adaptive learning platforms and intelligent tutoring systems, personalize learning experiences based on individual student needs, adjusting difficulty levels and providing targeted support.
9. ICT facilitates collaboration through online forums, virtual study groups, and collaborative projects, allowing students to engage in peer interaction and receive feedback, enhancing their learning experience.
10. Examples include interactive tutorials for step-by-step guidance, concept mapping software for organizing thoughts, and online peer support networks for community building and resource sharing.

11. ICT-based scaffolding techniques improve academic performance, increase student engagement, foster critical thinking, and promote independence and self-regulation in learning.
12. Effective integration of ICT in teaching positively impacts students' comprehension, retention, and application of knowledge, leading to higher levels of academic performance and success across various subject areas and grade levels.
13. ICT expands access to academic advising, career guidance, and mental health support regardless of location.
14. Online platforms and video conferencing provide flexible and convenient counselling options.
15. Tools like course catalogues and planning portals assist in academic advising.
16. ICT enables online career assessments and virtual career fairs.
17. Online therapy platforms and support groups offer accessible mental health services.
18. Online platforms connect students in remote or underserved areas to counsellors and peers.
19. Virtual support groups enhance social support and coping strategies.
20. Upholding confidentiality and informed consent in digital counselling is crucial.
21. Data security measures protect student privacy in online sessions.

Suggested Readings

Aqsa, M. A. I. M. U. N., & Pei, C. H. U. A. (2009). Language learning via ICT: Uses, challenges and issues. *Wseas transactions on information Science and applications*, *6*(9), 1453-1467.

Eng, T. S. (2005). The impact of ICT on learning: a review of research. *International Education Journal*, *6*(5), 635-650.

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Unit: 8

INFORMATION COMMUNICATION TECHNOLOGY (ICT) FOR MANAGING SCHOOLS

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Reviewed By: Dr. Farkhunda Rasheed Ch.

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Introduction

The Information Communication Technology (ICT) is the field of expertise that connects sophisticated applications of computers and telecommunications technological endeavors through Internet. Technically, it is ranging from a simple radio to a more complex internet device having Terabytes of information connect us to modern world.

Is the Use of Information Technology in Education a New Trend?

Many countries throughout the world have effectively utilized Information Technology in their educational systems to unravel the true potential of their students. Many developed and developing countries are adopting it as it has countless benefits. The Pakistani educational system is also in dire need of such reforms in education. And meet the challenges of 21st century due to:

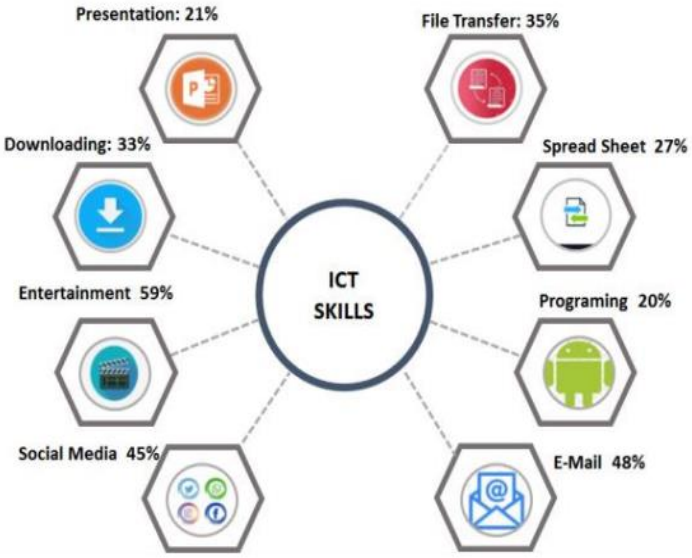
- **Population Expansion**
- **Information Explosion**
- **Knowledge Revolution**

As, Tim Berners-Lee, a computer scientist best known as the inventor of the World Wide Web describes;

- **First Era:** Main Computer was insulted in the institution and many people using that single computer.
- **Second Era:** Personal Computer (PC) was arranged in the institution and each person a computeruter.
- **Third Era:** Ubiquitous that computers are present everywhere and one person using many computers at a time.

ICT a Blended Learning

The use of Information Technology (IT) in education is an emerging trend and is rapidly gaining popularity in educational sectors as blended learning.



<u>Computer in the school:</u> Having a computer and internet facility in the school is an asset. With a computer, the school designs the school portfolio, newsletters, blogs and websites to share the progress and development plans. The school teachers are able to prepare PowerPoint presentations,

demonstrate new lessons, present new material, illustrate how to use new programs, and show new teaching-learning websites.

Website: An easy way to display your student's work is to create a web page designed for your class. Once a web page is designed, teachers can post homework assignments, student work, famous quotes, trivia games, recorded lesson videos and so much more. Today, children should know how to use the computer to navigate their way through a website, so why not give them one where they can be a published author?

Class blogs and wikis: There are a variety of Web 2.0 tools that are currently being implemented in the classroom. Blogs allow for students to maintain a running dialogue. They work a tool for maintaining a journal of thoughts, ideas, and assignments, as well as encourage student comment and reflection. Wikis are more group focused to allow multiple members of the group to edit a single document and create a truly collaborative and carefully edited finished product.

Mobile devices: Mobile devices such as clickers or Smartphone can be used to enhance the experience in the classroom by providing the possibility for professors to get feedback.

Social networking: Social networking sites are virtual communities for people interested in a particular subject. Members communicate by voice, chat, instant message, video conference, and blogs, and the service typically provides a way for members to contact friends of other members. Social networking inherently encourages collaboration and engagement. Social networking can also be used as a motivational tool to promote self-efficacy amongst students. Student interaction is at the core of constructivist learning environments and Social Net-working Sites provide a platform for building collaborative learning communities.

It is without a doubt that the education sector of Pakistan would benefit greatly from such a powerful resource. Our education sector is largely privileged by this unique commodity. This topic would highlight the key aspects of incorporating ICT in our Education, especially in Schools. It advises the learners on how this dynamic field works, enhances efficiency, maximizes the effectiveness of our system and manages academic and **administration tasks**.

Learning Outcomes

After studying this unit, learners will be able to:

- describe guidelines to upload learning documents for end-users
- describe how to analyze, design, information gathering, outline structuring, coding the learning document takes place.
- apply ICT to use in the school examination system and record maintenance.
- use ICT programs to develop school budgets, record maintenance and estimate the future finance requirements.
- use ICT programs to develop pace-based curriculum modeling.
- design comprehensive templates of class timetables
- monitor the students and staff attendance and measure the annual trend of school participation.
- describe the key components of developing an improvement plan
- define the quality control mechanism

8.1 Document Development and Publication

SLO: Describe guidelines for uploading learning documents for the users and

Describe how to analysis, design, information gathering, outline structuring, and coding of learning documents take place.

The period of pandemic of Covid 19 enforced schools of Pakistan to invest in ICT and provide the educational requirements for every child. The schools and government educational departments converted most of the teaching-learning contents in an online format. The sharing of information and communication among students and teachers took placed from home through mobile phone and computer. It was also seen that many schools purchased various E-learning material, assessment and monitoring software programs for students.

8.1.1 Technique for Development of Online Document and Publication For development of an online document, the main aim of the schools is to achieve the desired goals related to administration and academic activities. As an educational service provider, it is important for schools to build simple online documents (software programs) that engage the users (students, teachers & school employees) as well as provide training easily where it requires.

For document preparation, Microsoft Office Home and Student versions include Word, Excel, PowerPoint, Outlook, OneNote, Access and Publisher.



Figure 9: MS Office

MS Word is a popular word-processing program used mainly for **creating documents**, such as brochures, letters, learning activities, quizzes, tests, and

students' homework assignments. This application of Microsoft Office was first released in 1983.

Table 8.1: MS Office Training

MS Office Applications	Use	Tutorials
Word	Text editor	Beginner's Guide to Microsoft Word https://www.youtube.com/watch?v=S-nHYzK-BVg
Excel	Spreadsheets	MS Excel – Basics https://www.youtube.com/watch?v=rJPWi5x0g3I
Power point	Design presentation	Create an Interactive Slide Deck in PowerPoint https://www.youtube.com/watch?v=waSuDm0CXpk
Outlook	Send, make folders and receive e-mails	MS outlook – Rules https://www.youtube.com/watch?v=xPWIzRkKrXU
Access	Use in administration work, save data of students and employees	How to use Microsoft Access - Beginner Tutorial https://www.youtube.com/watch?v=ubmwp8kbfPc
Publisher	Create brochures, calendars, postcard etc.	The Beginner's Guide to Microsoft Publisher https://www.youtube.com/watch?v=Cqo0PVhBFYI

8.1.2 Advanced Program

An advanced program of documentation and publishing is software project development for any special purpose linked with the internet. To create for schools management, a "Technical Writer," and "Program Operator," may be required. They enable to design, maintenance and publishing the online documents as well as they also revise and updating the documents according to the school's needs.

There are two types of Document Development software.

- SDLC - Software Development Life Cycle- Software development process.
- DDLC - Document Development Life Cycle- Documentation development process which goes through the software development process.

Tasks of DDLC and SDLC

S.#	DDLC	Tasks
1.	Requirements analysis	Collect information for designing any software program or application from the Target Audience and analyze data as well as estimate the cost of the project.
2.	Design phase	Design application/ document by using proper formats, styles, fonts, and layouts. There are several tools available called Authoring Tools in designing. For example, RoboHelp, Adobe Frame Maker, Madcap flares, MS Office, and Help N Doc.
3.	Content phase	Create features or content for the application
4.	Document Review	Editing or proofreading of designed applications by experts
5.	Publish the Final draft document	Hyperlinks or several content management tools can be used to publish the content directly.
6.	Maintaining phase	Regular and rapid update of the content software features, alters, or modify as per requirement for continuous use in a little time.

S.#	SDLC	Tasks
1.	Planning and requirement analysis	Discussion with experts about requirements for designing the software program or application. Collect information from Target Audience, analyze data as well as estimate the cost of the project.
2.	Designing project architecture	Technical discussion on designing application/ document. There are several tools available called Authoring Tools in designing. For example, RoboHelp, Adobe Frame Maker, Madcap flares, MS Office, and Help N Doc.
3.	Development and programming	Create features or write content in four stages of programming Algorithm development; Source code writing; Compilation; and Testing and debugging.

4.	Testing	Editing or proofreading of the designed application detects the code flaws and passes them to developers to fix and retest until the software workflow is stable.
5.	Deployment (Delivery and support)	Launch the program for the use of End-users. This is a final project and has no critical issues. For example; Hyperlink or several content management tools can be used to publish the content directly. It can also regularly collect feedback and support users during time of security breaches as well as update the more secure software features.
6.	Models	Not a single model is suitable for all the programs in terms of nature (simple or complex), duration (short or long) and development cost. Some most used, popular and important SDLC models are the Waterfall model; Iterative model; Spiral model; V-shaped model; and Agile model.

For advanced programs, the school may create various software documents on their own choice through SDLC such as;

- A program for online admission, registration and fee collection process through ATM, Debit/Credit Card option;
- An online examination system is to conduct and record the progress of each student at each level;
- A finance plan is to monitor the budget and record inventories with fully automated replenishment.
- A curriculum modeling is to deal with all tasks related to brainstorming, developing, and integrating for launching a curriculum. It also plans classroom activities and making timetables;
- Recording daily attendance and participation rate in interactive classes as well as s howing trends in the form of annual progress;
- Other functions, etc.

The users might be single or multiple to use a single operation system. In multi-user operating systems (e.g Unix, Ubuntu, MacOS, Windows and all Linux-based Operating Systems) are time-sharing and batch processing on mainframe computers. The school system operator must know how to work with the equipment, and school regulations, train other users as well and monitor the performance of the program on the feedbacks of the users. The operator may also consult the technical writer for updating the program.

For further details, please refer to the following material
1. https://www.1training.org/blog/improve-microsoft-office-skills/ 2. https://existek.com/blog/sdlc-models/ 3. SDLC Phases and Examples – What Is Software Development Life Cycle 4. https://www.odoo.com/app/inventory?utm_source=google&utm_medium=cpc&utm_campaign=MEA-EN-Inventory&utm_gclid=Cj0KCQiAjJOQBhCkARIsAEKMtO18b4FJ40XOYAPTX3BJqYFemFAf15XGD5dnTyhj_h9pq0PZJ9GqM-YaAjYQEALw_wcB&gclid=Cj0KCQiAjJOQBhCkARIsAEKMtO18b4FJ40XOYAPTX3BJqYFemFAf15XGD5dnTyhj_h9pq0PZJ9GqM-YaAjYQEALw_wcB 5. https://www.g2.com/categories/curriculum-management 6. https://study.com/academy/lesson/how-operating-systems-manage-multi-users.html#:~:text=Some%20examples%20of%20a%20multi,and%20all%20Linux%20based%20OS.&text=Multi%2Duser%20operating%20systems%20were,batch%20processing%20on%20mainframe%20computers.

Activity

a- The tasks related to school management, provision of computers and internet for academic and administrative work will be discussed.
b- How the schools work during the period of the pandemic of Covid 19?
c- The use of mobile and social networking created illegal problems in schools will be discussed.

SELF ASSESSMENT EXERCISE 8.1

1. Describe the role and responsibilities of technical writers in document preparation.
2. How the MS publishers make the process of publishing effective?
3. What is the role of MS Office in the development of the document, visit all links mentioned in the table and practice.

8.2 Examination

SLO: Apply ICT to use in the school examination system and record maintenance.

Malmivuo, Lindroos, & Nousiainen, (2007) said that "Internet examination is a new innovation in e-learning. It extends the virtual mobility from the learning process to the examination of the student's knowledge the course topic. It also has pedagogical benefits in the case where the students are on the site of teaching". The e-system of examination has already implemented in distance education for many decades. The infrastructure of an electronic examination is simple and straightforward, cost-effective, secure, and speedy in the context of communication. The departments transport student written assignments and test papers between student and tutor/teacher through the internet. However, it is also seen that more sophisticated software is required to solve graphical and mathematical assignments along with software training.

In unit 5 "**ICT in Assessment,"** the learners have studied **s**ome common and effective software and their work related to item creation, delivery for test formation, grading, reporting course results to students and showing the overall dashboard of program performance.

For example:

- **Flex Quiz** is used for designing creative tests, quizzes or course assignments. The main features are: providing designed test question templates, easy-to-set time limits, showing user progress bars, developing question banks for future use, progress through certificates, email notifications and the ability to add logos, images, videos, or audio. The course content can be shared through a user account and unique password protection. It is a reliable assessment reporting tool to view student data on each quiz level.

- **Test Gorilla** is an online managerial decision software test for recruiters to show transparent results publically. It tests multiple competencies of the candidates based on cognitive abilities, software skills, personality or EQ, language, moral characteristics, etc. It makes the better selection of candidates giving the best predictive value.

- **Test Invite** is a cloud-based Exam Software that controls the entire testing process and uses a Lock-Down Browser and Webcam-Video Recording for security purposes.

8.2.1 Guidelines for Exam Controllers

The academic world is moving swiftly on digital online examinations. Online exams are delivered using digital platforms that are easy to conduct and scale therefore immune to disruptions. For Example: the Mettl Website Management System.

Salient feature

1. Examination platform: System to schedule and conduct exams
2. Quality proctoring technology to ensure cheating environment
3. Evaluation platform and dashboards: System to evaluate answer sheets

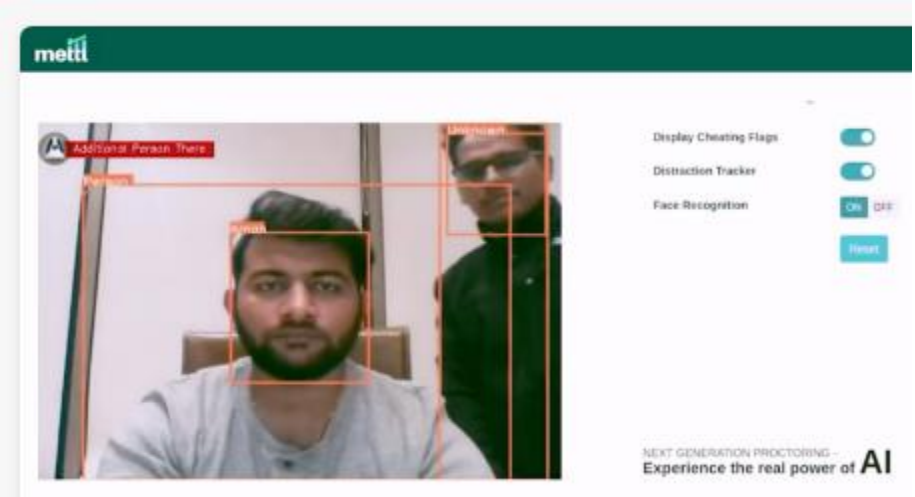
The management needs a platform to combine administration, professors, students and exam controllers on a single online platform.

<table>
<tr><td colspan="2">Secure Browser</td></tr>
<tr><td>➢ No additional tabs
➢ No additional browsers
➢ No external ports</td><td>➢ No screen sharing
➢ No cut/ copy/ paste domains</td></tr>
<tr><td colspan="2">AI and human-based proctoring tools</td></tr>
</table>

Flag candidate face [ ] on computer screen if he/she has;

- Additional devices
- Additional person's presence
- Student distraction
- Multiple voice detection

The tool ensures that the student do not take any external help during examination.



Source: Mettl website Management System.

https://www.mettl.com/examination/platform

8.2.2 How should this system work?

The robust examination system enables to create and manage a large-scale exam. It allows for scheduling of exams, create question papers of various disciplines. It also enables sending invitations to candidates and observing it operation. **Proctoring technology** ensures complete exam integrity. It should enable to use 3-point student authentication system as:

1- email-------- 2- mobile OTP---- 3- ID card verification
One Time Password or OPT is a temporary and secure PIN code. It is sent to users via SMS or e-mail and is valid only for one session. Smart-ID uses OTPs during registration and account renewal to confirm users' contact information.

This system builds a Secure Browser and AI and human-based proctoring tool to provide a safe exam environment.

8.2.4 Evaluation Platform and Dashboards

The exam administration and professors monitor and evaluate signed answer sheets through the dashboard and mark progress. It also generates student credibility reports. Overall, it provides efficient and expeditious evaluation and complete visibility of examination derives. It has multiple language options on 24/7 support. It has multiple benefits and provides **a s**ecure system because specific exam centers are not required; the oversees students free from travelling cost expenses and they take the exam from any part of the world at any time; hiring of invigilators; easy handling and marking of answer sheets; saving valuable time for teaching; display the recoded progress time to time, etc,.

In Objective Test Design (closed-ended), a test is based on factual questions, quickly marked and unambiguously scored by anyone with an answer key. It has two main characteristics: i. it expects a clear, single, definite answer, ii. it ensures objectivity in scoring.

In Subjective Test Design (essay type or open-ended), where scores are influenced by the opinion of or judgment of the person doing the scoring. Subjective tests are more challenging and expensive to prepare, administer and evaluate correctly, but they can be more valid. The marker cannot become too lenient or severe, or succumb to fatigue, or be influenced by the previous test taker's result, or by how the test taker did on previous questions, or by knowing the identity of the test taker.

For further details, please refer to the following material
https://smallseotools.com/plagiarism-checker/ https://www.proprofs.com/quiz-school/templates/s/

SELF ASSESSMENT EXERCISE 8.2

Answer the following questions

1. Why LMS Integration is required to develop proctoring technology of examination?
2. Discuss some popular LMS used by educational institutions for example; Moodle, Blackboard Learn and Schoology.

8.3 Budget and Finance

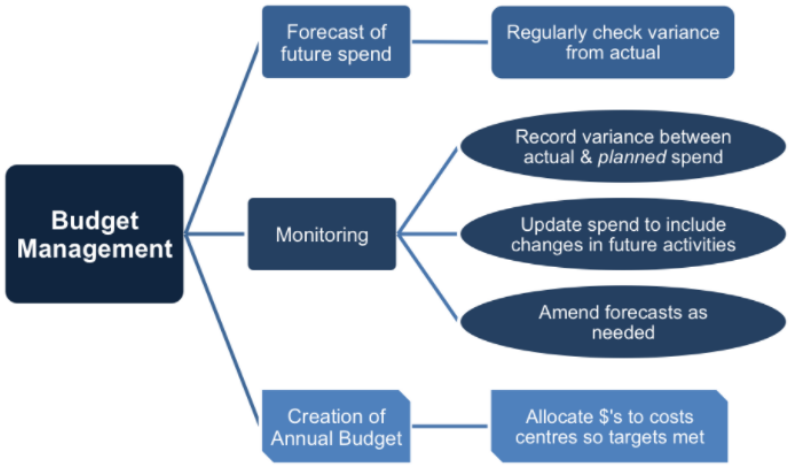
SLO: Use ICT programs to develop the school budget, record maintenance and estimate the future Finance requirements.

Financial Management is an effective and efficient management of money (funds) in such a manner to accomplish objectives, manage resources and develop an environment of trust in the organization (school). This task is associated with Top Management (Principal, Department Heads, Treasurer, or Senior Accountant).

Difference Between Budget and Finance
A budget is a part of a financial plan that includes both financial (pay, bonuses, allowances, insurance, incentives, etc.) and non-financial information (challenges, employer recognition, employee skills, etc). A budget is an estimation of revenue (income or profit) and expenses (yearly, quarterly, monthly, weekly, daily) over a specified future period of time. It also shows the progress of a defined period.

The first role of management is to manage the budget throughout the financial year. This will help them to monitor the actual spending and performance. Secondly, a budget plan for next year. It forecasts future spending based on expenses of the current year.

Budgeting is a continuous monitoring process, where the treasurer should have essential budgetary management skills. In fact, the School management has constant attention to refining budgets as school finances progress to take into account how well actual targets match the desired forecast. The school will also create a Budget Checklist and collect information at http://www.free-management-ebooks.com/dldchk/dlchfi-createbudget.htm.



Source: http://www.free-management-ebooks.com/news/managing-a-budget/

The two most effective spreadsheets EXCEL 2013 and NUMBERS are available online to provide training to school staff. These spreadsheets help to manage the school budget.

EXCEL 2013 Training

1- Level Beginner- Create a chart, Add numbers and basic Math, and understand the use of various designs to interpret the data.
2- Level Intermediate- Add and subtract, sort data, use conditional formatting by using headers and footers, VLOOKUP use and formulas.

Level Advanced- Advanced IF function and Array formula for data analysis, create and manage the drop-down list, a Pivot table for presentation as well as print worksheets and workbooks. It can also record with a Macro to repeat the task.

Free Excel training visit at – https://support.office.com/en-us/article/Excel-2013-videos-and-tutorials-aaae974d-3f47-41d9-895e-97a71c2e8a4a

NUMBERS Apple iPhone

1- The Numbers for iPhone, Apple guides to organize spreadsheets using tables, charts, formulas and more.
2- Free Numbers training visit at– https://www.apple.com/support/mac-apps/numbers/

For further study, please refer to the following free online material:

- Financial Management by Prof. Jonathan Lewellen
- Financial Management by Dr. Balachandran, Dr. G. Raghavan and Dr. G. Shanmuga Sundaram (PDF)
- Management of Financial Services by Dr. M.C. Garg (PDF)

Self-Assessment Exercise 8.3

Answer the following questions

1. Explain how the budget is a part of the financial plan.
2. What software is used to monitor the revenue and expenses of the school?
3. How the school's progress is illustrated through financial plan?
4. Multiple Choice Circle the correct response(s) for each question.

4.1 School Annual Finance report includes, except; a. total revenue & expenses b. activity list c. security fee details d. future recommendations

Answer: c

4.2 Revenue includes a. Student tuition fees b. security fee c. class maintains cost d. teacher salary

Answer: a

5. Write short answers:
   Why the budget planning is necessary with reference to;
   a. manage money effectively and allocate appropriate resources
   b. monitor performance
   c. decision-making for future planning

8.4 Curriculum Modeling

SLO: Use ICT programs to develop pace based Curriculum Modeling

Curriculum modeling is a Summary of the School Annual Plan to conduct academic and non-academic activities in the context of educational goals and objectives. It determines the specific time frame of each program activity. Instructional design is also a part of the Academic Plan that defines the lesson instruction, subject contents, selected learning experiences and evaluation process. While, informal education or

extracurricular activities are the part of Non-academic Plan, which includes: **sports, vocations, community services, arts and crafts, educational clubs, etc,.** These activities are necessary for learners to build leadership qualities, technical awareness, career orientation and a selection of hobbies to engage their time.

In the digital era, the e-design for curriculum modeling can promote **subject-centered, learner-centered, and problem-centered designs**. The eLearning tools help the school management to streamline course building. They have made an extensive list of instructional design software in categories form with provision to attach audio-video software, existing training materials and photo-sharing platforms.

Some examples of free available software tools to make pace-based curriculum modeling are;

- Figma is cloud-based design software used by instructional designers.
- Info-gram is an easy-to-use visualization and infographics platform. It has options for creating and sharing beautiful infographics, online reports, digital charts, interactive maps, dashboards, and social media visuals.
- Watson Text to Speech automatically converts written text into natural-sounding audio.
- MS Office has multiple uses from writing to publishing.
- PDF and Flipping Book Tools are not always designed to be compatible with screen readers.
- Interactive learning tools or Game-based learning offers are motivational, challenging, and fun experience software that can hold learners' attention longer and increase knowledge retention.
- Kahoot is a game-based learning platform and quiz maker on any subject in any language.

- Survey Monkey is an online cloud-based instructional design software that helps in research surveys and enables to launch of different kinds of questionnaires.
- Poll Everywhere facilitates a live classroom or virtual training sessions as well as collects feedback from participants.

For further details, please refer to the following material
Angelovska, E. (2020, November 5). *Top 10 Free Instructional Design Software Tools in 2020.* Retrieved from Microlearning blog: https://www.edapp.com/blog/instructional-design-software-tools/Colman, H. (2021, September 20). *ispring.* Retrieved from 50+ Best Instructional Design Software Tools and Resources in 2022: https://www.ispringsolutions.com/blog/50-best-instructional-design-software-tools
SELF ASSESSMENT EXERCISE 8.4
1. Make a PowerPoint presentation and discuss the above-mentioned articles in the class.

8.5 Planning and Making Timetables

SLO: Design comprehensive templates for class timetable

The planning and timetable templates are available on various sites on the internet and have a provision to modify according to the school's requirements. To make a clear planner or timetable, the option of colours and graphics are also available to differentiate daily tasks for each class or level. The designer can also re-size the content and save, send, and share it to the concerned department. The designer can also duplicate designs for future use. There is thousands of planner and timetable templates available on the internet free of cost and can also be customized according to school requirements. For example; Adobe Spark.

For further details, please refer to the following material
https://www.adobe.com/express/create/timetable

SELF ASSESSMENT EXERCISE 8.5

1. There are planners and timetable templates available on the internet, use them and share some of the advantages and disadvantages in class.

8.6 Improving Attendance

SLO: Monitor the students and staff attendance and measure the annual trend of student participation rate.

The HR department has many issues with employees managing organizational systems manually. Such as:

- Security: The paper document is less secure compared to an electronic system.
- Time: Manually managing and record-keeping is a very tough and time-consuming process, especially in data modification, reviewing and reporting.
- Space: The filing system requires sufficient storage space.
- Cost: The cost of human resources and material (stationary etc.) increases.

The online management network system provides a large and indispensable set of features to support administrative and educational activities. For example:

- The software "Resource inn" is a locally developed system in Pakistan that has multiple functions to support existing workflow and guarantees speed without complexities. It provides a paper-less documentation environment to manage various assignments in core HR, attendance and payroll, recruitment and performance; and training and development process.

  Visit: https://resourceinn.com/
- The software "OpenEduCat" has a variety of features in its core module. This information system keeps a record of students and faculty members, attendance tracking, virtual classroom, fees management, and timetable management.

Study the trend of students' participation in schools and higher education https://resourceinn.com/offers/hrm/?gclid=Cj0KCQiAjJOQBhCkARIsAEKMtO041TTnIZl25Khliy6QRNllV0TNHYE0bzEAGqbQG8Y5_DkD1bJ2Ku4aArFpEALw_wcB https://nsse.indiana.edu/research/annual-results/2021/story1.html https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/648165/HEIPR_PUBLICATION_2015-16.pdf
SELF ASSESSMENT EXERCISE 8.6
1. Compare manual and online systems of management and make PPT presentations to discuss in the class.

8.7 Developing Improvement Plan

SLO: Describe the key components of Developing an Improvement Plan

School administration software for planning and revising the plan is available **for** free with open source options. Before selecting the right product, the following guiding tips should be considered:

- Compare the user limit with the number of users and the provision to install a new edition.
- Review the features offered in the edition as per requirements.
- Check the edition customization tools.
- Compare the training and support services tools.
- Check the integration capabilities in data processing for example; sometimes storing student information would take a lot of time.
- Check the kind of deployment and access options because software can either be cloud-based or on-premise or both. It should also have access through a mobile app so that a teacher or student can access the school administration system from anywhere.

For Example: The administration software **Capterra** helps to create a learning environment where teachers, students, and parents can easily connect over virtual channels. It also tracks every aspect of their school, from staff activities to report cards to student data. Furthermore, it works for attendance tracking; class scheduling; student information systems and faculty management systems.

Power Vista Roll Call is also administration software that has features of curriculum management; financial management; assets or facility management; developing and circulating online calendars; online payments and reporting and analytics of data.

SELF ASSESSMENT EXERCISE 8.7

1. Discuss School administration software for planning and revising the plan.
2. Share the experience of selecting School administration software and add more guiding points in the class.

8.8 Quality Control

:SLO Define the Quality Control mechanism

Quality control begins with the formation of school educational standards which are linked with national curriculum guidelines and/ or national education policy. These educational standards are used so that the operational process should be realistic and achieved toward their standards.

For this purpose, the school management system sets Educational Key Performance Indicators (KPIs) in five measure areas to understand the overall progress of an institution, program, department, course or even a student.

- Student Achievement.
- Discipline Referrals.
- Attendance Rates.
- Graduation Rates.
- Teacher Satisfaction.

These KPIs present the performance metric that can be tracked, measured and analyzed. The use of ICT makes this process easy and effective. For example; Klipfolio- dashboard.

For Further details, please refer to the following material
https://precisioncampus.com/blog/education-kpis/ https://www.klipfolio.com/careers#job-listings https://www.youtube.com/watch?v=CdJPVYgREpA Study 2 Ways to build dashboards with Klipfolio, https://www.youtube.com/watch?v=U6fUtmAES8Y

SELF ASSESSMENT EXERCISE 8.8
1. Discuss the KPIs of your organization and how they help to improve management. 2. Share the dashboard example in the class.

Key Points

Information Communication Technology (ICT) refers to all communication technologies, including the internet, wireless networks, cell phones, computers, software, middleware, video-conferencing, social networking, and other media applications and services. In education, this **technology supports, enhance, and optimise the delivery of information**. Worldwide research has shown that ICT can lead to improved student learning and better teaching methods.

In our society, the main concerns of parents, students, and educators are to ensure that all students receive adequate education and training for their future careers. These materials provide purposeful subject-based teaching with meaningful activities. For example; the use of ICT in schools is adding a lot of value to key learning areas like languages, numeracy, general knowledge and science.

The period of pandemic of Covid 19 forced schools in Pakistan to invest in ICT and provide the educational requirements for every child. The schools and government educational departments converted most of the teaching-learning content into an online format.

The schools use a Technique for the Development of Online Documents and publications to achieve the desired goals related to administration and academic activities. For document preparation, Microsoft Office Home and Student versions include Word, Excel, PowerPoint, Outlook, OneNote, Access and Publisher.

They also use two types of Document Development software for special purposes.

- SDLC - Software Development Life Cycle- Software development process.
- DDLC - Document Development Life Cycle- Documentation development process which goes through the software development process.

The schools can also apply **ICT in the school examination system** and record maintenance. It extends the virtual mobility from the learning process to the examination of the student's knowledge of the course topic as well as teachers get many pedagogical benefits. For Examination, it develops a system to schedule and conduct exams, establishes Quality proctoring technology to ensure cheating cheating-free environment and also provides an Evaluation platform and dashboard system to evaluate answer sheets. It is a platform to combine administration, professors, students and exam controllers together on the single online platform.

ICT programs to develop

school budgets, record maintenance and estimate the future Finance requirements.

For teachers, ICT programs to develop pace-based **Curriculum Modeling.** It defines School Annual Plan to conduct academic and non academic activities in the context of educational goal and objectives. To support teachers, ICT software is available for annual planning and designing timetable templates and has a provision to modify according to the school or class requirement.

For management, ICT has a system to monitor the students and staff attendance and measure the annual trend of student participation rate like; Resource inn. To maintain the quality of school performance, the five main Educational Key Performance Indicators (KPIs), Student Achievement; Discipline Referrals; Attendance Rates; Graduation Rates and Teacher Satisfaction are required to understand the overall progress of an institution, program, department, course or even a student.

Answers of Self-Assessment Questions

SELF ASSESSMENT EXERCISE 8.1

4. Describe the role and responsibilities of technical writers in document preparation.

   Answer: A Technical Writer is a professional software expert. He/she is responsible for creating documentation and clarifying all necessary product features and pros and cones. He/ she works on requirements, like content

strategy or scoping out new products to ensure required information has been included for users to understand what they're reading quickly. He prepares instruction manuals, articles, worksheets etc., with the main goal to communicate traditional, complex, technical information more easily.
Visit section 8.1.2 and https://www.madcapsoftware.com/blog/types-of-technical-writing/ to understand skills and competencies required for specific field.

5. How the MS publishers make the process of publishing effective?
   Answer: MS publishers create brochures, calendars, post card etc.

   The Beginner's Guide to Microsoft Publisher
   https://www.youtube.com/watch?v=Cqo0PVhBFYI

6. What is the role of MS Office in the development of the document, visit all links mentioned in the table and practice.
   Answer: **Visit Table 8.1: MS Office Training**

SELF ASSESSMENT EXERCISE 8.2

3. Why LMS Integration is required to develop proctoring technology for examination?
   Answer: The online examination system has the option to integrate with the learning management system LMS and uses quizzes, tests, course assignments etc. These examination systems enable to create and manage a large-scale exams. It allows for scheduling exams, creating question papers of various disciplines, sending invitations to candidates and observing its operation. LMS is supported by **Proctoring technology** that maintains exam integrity and authenticity. Visit section 8.2.2.
4. Discuss some popular LMS used by educational institutions for example; Moodle, Blackboard Learn and Schoology.
   Answer**: Moodle LMS**
   It is an elearning platform and easier for educators or trainers to create, manage and edit their courses. It has diverse features for learners to organize, engage and update learners.
   https://moodle.com/
5. **Blackboard Learn**
   It is an advanced LMS to enhance life-changing teaching experiences and motivate learners to learn new pedagogical autonomy.

https://www.blackboard.com/en-eu/teaching-learning/learning-management/blackboard-learn

Schoology

It is a college-level or grade 12 learning management system. It provides hybrid learning on multiple moods that can be integrated into various teaching and learning tools.

https://www.powerschool.com/classroom/schoology-learning/

SELF ASSESSMENT EXERCISE 8.3

6. Explain how the budget is a part of the financial plan.
   Answer: A budget is a part of the financial plan that includes both financial (pay, bonuses, allowances, insurance, incentives, etc.) and non-financial information (challenges, employer recognition, employee skills, etc). A budget is an estimation of revenue (income or profit) and expenses (yearly, quarterly, monthly, weekly, daily) over a specified future period of time. It also shows the progress of a defined period. Visit section 8.3.
7. What software is used to monitor the revenue and expenses of the school?
   Answer: the School management has constant attention to refine budgets as school finances progresses to take into account how well actual targets matches the desired forecast. The school will also create a Budget Checklist and collect information at http://www.free-management-ebooks.com/dldchk/dlchfi-createbudget.htm.
8. How the school's progress is illustrated through a financial plan?
   Answer: School finance progress can be reflected by three resource-related functions – **raising revenue, allocating resources, and using resources.**
   These all aim to provide educational opportunities and produce educational outcomes.
   https://www.focus-education.co.uk/blog/managing-school-finance-under-pressure/
9. Multiple Choice Circle the correct response(s) for each question.

9.1 School Annual Finance report includes, except; a. total revenue & expenses b. activity list c. security fee details d. future recommendations **Answer: c**

9.2 Revenue includes: a. Student tuition fees b. security fee c. class maintains cost d. teacher salary

9.3 **Answer: a**

10. Write short answers:

Why the budget planning is necessary with reference to;

d. Manage Money Effectively and Allocate Appropriate Resources

The budget management system of an organization will help to forecast future spending; monitor expenses and create an annual budget plan to manage resources effectively as well as allocate other resources for future new activities.

e. Monitor Performance

Budgetary planning is necessary for constructing a budget of an organization and then monitoring its operational components or key performance indicators (KPIs) to mitigate risk.

The two most effective spreadsheets, EXCEL 2013 and NUMBERS are available online to provide training to school staff as well as monitor school performance in the context of an annual financial plan.

f. decision-making for future planning

Budgeting is a continuous monitoring process to assess how well an actual target matches the desired or set targets. It provides data to the managers to make future decisions and set future targets.

https://www.spendesk.com/en-eu/blog/business-financial-planning/

SELF ASSESSMENT EXERCISE 8.4

2. Make a PowerPoint presentation and discuss the above-mentioned articles in the class.

Visit section 8.4

SELF ASSESSMENT EXERCISE 8.5

2. There are planners and timetable templates available on the internet, use them and share some of the advantages and disadvantages in class.

3. Visit:

https://www.adobe.com/express/create/timetable

SELF ASSESSMENT EXERCISE 8.6

Compare manual and online systems of attendance management and make a PPT presentation to discuss in the class.

Manual	**Online**
Hire employees for Security	High security in the electronic system
Time-consuming process	Less time is required for data modification, reviewing and reporting
More Space is required for the record	Data safety in electronic devices
High Cost of Management	Low Cost of Management
Difficult to update and get information	Easy to update and get information

SELF ASSESSMENT EXERCISE 8.7

3. Discuss School administration software for planning and revising the plan?

   Administration software **Capterra** helps to create a learning environment where teachers, students, and parents can easily connect over virtual channels. It also tracks every aspect of their school, from staff activities to report cards to student data. Furthermore, it works for attendance tracking; class scheduling; student information systems and faculty management systems.

   https://en.wikipedia.org/wiki/Capterra

   PowerVista RollCall is also administration software that has features of curriculum management; financial management; assets or facility management; developing and circulating online calendars; online payments and reporting and analy

   tics of data.

   http://www.powervista.com/rollcall_features.htm

4. Share the experience of selecting School administration software and add more guiding points in the class.

   In Pakistan, schools is very useful in the local education sector. It has a system that can be customized easily for any educational institute's specific requirements. The effective security system, accessibility, and rapid implementation are some features available 24/7 with an internet connection on a PC, laptop, or mobile. https://www.eschool.pk/

SELF ASSESSMENT EXERCISE 8.8

3. Discuss the KPIs of your organization and how they help to improve management.
   According to various research five main KPIs are required to assess the performance of a school.

   KPIs of School Performance:

   - Student Achievement.
   - Discipline Referrals.
   - Attendance Rates.
   - Graduation Rates.
   - Teacher Satisfaction.

   https://flippengroup.com/5-key-indicators-school-performance-2/
4. Share the dashboard example in the class.
   Examples of dashboards:

   https://exceldashboardschool.com/cat/free-templates/

   https://www.thesmallman.com/dashboards

Recommended Books and Articles:

Analytics & ML Will Transform Education (Cloud Next '18). (2018, July 26). rhttps://www.youtube.com/watch?v=JewJZR_YtZE

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Unit: 9

ISSUES IN USING ICT EDUCATIONAL MANAGEMENT

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Introduction

Dear students, as we know that use of ICT is need of time in every field of life. For any school management, use of ICT is essential in this era. In these days, Information and communications technology (ICT) is an important part of most organizations. In the early, 1980s, use of computers started in schools. After COVID-19, ICT became important part of education. Classroom teaching and learning has been improved and modified due to latest technology.

In the previous units, you have read about different ways to use ICT in school management. However, it is the fact that there are problems in using ICT in school management. There can be several reasons for it. School management can play a vital role to embrace the technology for the 21st century learning effectively. Use of ICT has affected all stakeholders including parents, students, the wider community, and the education sector. ICT in education has the potential to transform teaching. It is important to actively engage all stakeholders to ensure maximize learning opportunities using ICT. However, problems arise when teachers are expected to use ICT. One of the hurdles for the wider adoption of technology in school education is the lack of overall institutional capacity. Therefore, it is essential to build the capacity of teachers, trainers, curriculum experts, monitoring officers, school supervisors, resource persons, and policy makers and planners. In this unit we will focus on different aspects of issues of using ICT in school management.

Learning Outcomes

After reading this unit, you will be able to:

1. identify the reasons behind the dearth of special arrangements in educational settings.
2. recognize the impact of the lack of special skills on the learning environment.
3. understand the implications of staff non-willingness on the effectiveness of educational programs.
4. analyze the significance of maintenance issues in educational facilities.
5. evaluate the consequences of connectivity problems between school and home on students' learning experiences.

9.1 Dearth of Special Arrangements

Nowadays, it is expected of job seekers to be proficient with word processing software. The ability to use a computer program like Microsoft Word to create written documents (such as business letters and meeting minutes) is a must for candidates.

Nearly every element of contemporary life has changed as a result of information and communication technology (ICT), including education. ICT has enormous potential in educational management to improve decision-making, foster collaboration and communication, and streamline administrative procedures. But even with its potential, there are still few unique arrangements that make efficient use of ICT for educational management.

9.1.1 Challenges in Harnessing ICT for Educational Management

ICT adoption and integration in school management meet many obstacles, despite its potential benefits. The absence of unique arrangements designed to satisfy the particular demands and requirements of educational institutions is one of the main challenges.

9.1.1.1 Resource Constraints and Funding Priorities

Financial priorities that conflict with one another and resource limitations impede the efficient application of ICT in educational management. Budgetary restrictions force many educational institutions to operate with little money for infrastructure and technology improvements. Because of this, schools might place a higher priority on paying staff, maintaining their facilities, and purchasing instructional materials than on purchasing ICT equipment and software licensing.

9.1.1.2 Lack of Technical Expertise and Professional Development

The effective integration of ICT in school administration might be hampered by a lack of technical skills among educators and administrators in addition to resource limitations. It's possible that many instructors lack the knowledge and experience needed to use ICT platforms and tools efficiently, which results in either underuse or abuse of technological resources.

9.1.1.3 Resistance to Change and Organizational Culture

The integration of ICT in educational administration can also be hindered by entrenched corporate cultures and resistance to change. Because they may not know how to use digital tools, fear losing their autonomy, or worry about their job security, educators and administrators may be hesitant to use new technologies.

9.1.1.4 Lack of Knowledge

Many organizations lack the internal resources necessary to encourage and facilitate the efficient use of ICT for development. They just lack the necessary organizational ability, knowledge, and experience. Information technology utilization is frequently viewed as a complex, challenging subject pertaining to back-office operations

9.1.1.5 Pace of Change

The present personnel, organizational structures, and operational methods of organizations have a powerful momentum that is difficult to stop or reroute. Using ICT to maintain and enhance current organizational structures and methods is very simple, leading to helpful but gradual advancement.

9.1.1.6 Funding

There is also a huge problem in properly planning and funding the use of ICT in development efforts. With cyclical donor funding and pressure to reduce administrative and managerial costs, organizations typically struggle to adequately plan and resource financial and human investments in ICT as a core capability for development programs.

9.1.1.7 Changing Roles and Norms

The introduction of new ICT opportunities may raise deeper and more important issues that call into question or even destroy the underlying presumptions that gave rise to organizations. Thinking back to the reasons behind the founding of organizations, we can identify some distinct differences between impoverished individuals and groups and those in wealthier, developed regions of the world. When it comes to knowledge and understanding gaps, for instance, organizations have historically assisted us in comprehending the extreme need faced by populations in the world's poorest regions. Additionally, there are gaps in communication, resources, and accessibility, all of which organizations have historically been crucial in filling.

9.1.2 Addressing the Dearth of Special Arrangements: Strategies and Solutions

Addressing the dearth of special arrangements for ICT in educational management requires a multifaceted approach that encompasses policy reforms, resource mobilization, capacity building, and stakeholder engagement. Key strategies and solutions include:

i. **Strategic Planning and Needs Assessment:** Educational institutions should develop comprehensive ICT strategic plans that align with their

mission, vision, and goals. This includes conducting needs assessments to identify specific challenges, priorities, and opportunities for ICT integration in educational management.

ii. **Resource Allocation and Funding Prioritization:** Governments, policymakers, and educational stakeholders should prioritize funding and allocate resources strategically to support ICT investments in educational management. This may involve reallocating existing budgets, securing external funding sources, or leveraging public-private partnerships to finance technology initiatives.

iii. **Professional Development and Capacity Building:** Educational institutions should invest in ongoing professional development programs to build the technical skills and digital literacy of educators and administrators. This includes providing access to training workshops, online courses, and certification programs that focus on ICT tools, platforms, and best practices for educational management.

iv. **Partnerships and Collaboration:** Educational institutions should foster partnerships and collaboration with industry stakeholders, technology vendors, and community organizations to leverage expertise, resources, and support for ICT initiatives. This includes engaging in collaborative research projects, sharing best practices, and participating in professional networks and consortia focused on educational technology and management.

V. **Change Management and Organizational Culture:** Educational institutions should implement change management strategies to overcome resistance to change and foster a culture of innovation and continuous improvement. This includes communicating the benefits of ICT integration, soliciting feedback from stakeholders, and empowering educators and administrators to take ownership of technology initiatives.

Even though there are still some of these gaps, one could argue that they are not as strong or obvious as they once were. We may observe that advances and opportunities made possible by ICT fundamentally alter the landscape in relation to several of these gaps, both directly and indirectly.

Self-Assessment Questions 9.1

Q1. What is the main challenge highlighted in the text regarding the integration of ICT in educational management?

Q2. According to the text, what are the benefits of digitizing administrative processes in educational institutions using ICT?

Q3. Identify and explain two key obstacles to ICT adoption in educational management mentioned in the text.
Q4. Propose a strategy to overcome the resistance to change and entrenched organizational culture that hinder the integration of ICT in educational management.

9.2 Lack of Special Skills

In the digital age, information and communication technology (ICT) has become an increasingly important part of educational institution management. However, a fundamental hurdle to efficient use of ICT in school management is a shortage of specialized skills among educators and administrators. This essay investigates the obstacles created by a lack of skills, identifies solutions for overcoming them, and highlights prospects for improving school management through increased ICT competency. By solving these issues, educational institutions can better use technology to expedite administrative operations, improve decision-making, and increase overall organizational effectiveness.

The rapid progress of technology has revolutionized the educational scene, opening up new potential to improve teaching, learning, and administrative operations. In educational management, Information and Communication Technology (ICT) has the potential to transform how institutions work, allowing for more effective resource allocation, quicker communication, and data-driven decision making. Despite the promise of ICT, many educators and administrators lack the specialized skills required to fully realize its potential.

9.2.1 Understanding the Lack of Special Skills in ICT

The lack of special skills in ICT among educators and administrators can be attributed to various factors, including:

i. **Limited Training Opportunities:** Many educators have not received formal training in ICT, either during their initial education or as part of ongoing professional development.
ii. **Technological Complexity:** The rapid pace of technological change can make it challenging for educators to keep pace with the latest tools and trends in ICT.
iii. **Digital Divide:** Disparities in access to technology and digital resources can further exacerbate the lack of skills among educators, particularly in underserved communities.
iv. **Pedagogical Beliefs:** Some educators may hold beliefs that prioritize traditional teaching methods over technology-driven approaches, leading to a reluctance to develop ICT skills.

9.2.2 Impacts of the Lack of Special Skills

The lack of special skills in ICT has several significant impacts on educational management, including:

i. **Inefficiency:** Without adequate ICT skills, educators and administrators may struggle to perform routine tasks efficiently, leading to delays and errors in administrative processes.

ii. **Limited Innovation:** A lack of ICT skills can stifle innovation within educational institutions, preventing educators from leveraging technology to enhance teaching and learning.

iii. **Data Mismanagement:** Inability to effectively utilize ICT tools for data management can result in poor decision-making and limited insights into student performance and institutional effectiveness.

iv. **Missed Opportunities:** Educational institutions may miss out on opportunities to leverage emerging technologies for improving organizational efficiency and effectiveness.

9.2.3 Strategies for Addressing the Lack of Special Skills

To overcome the lack of special skills in ICT among educators and administrators, educational institutions can implement the following strategies:

i. **Professional Development:** Prioritize professional development programs that focus on building ICT skills among educators and administrators. These programs should be tailored to the specific needs and contexts of educational institutions and provide hands-on training in relevant ICT tools and technologies.

ii. **Collaborative Learning Communities:** Foster collaborative learning communities where educators can share knowledge, resources, and best practices related to ICT integration. Peer-to-peer learning can be a valuable supplement to formal professional development programs and help educators support one another in developing ICT skills.

iii. **Integration into Curriculum:** Integrate ICT training into teacher education programs and professional development curricula. By embedding ICT skills development into existing training programs, educational institutions can ensure that educators receive ongoing support and opportunities to develop their skills.

iv. **Mentorship Programs:** Establish mentorship programs where experienced educators can provide guidance and support to colleagues seeking to develop ICT skills. Mentorship can help educators navigate challenges, build confidence, and learn from the experiences of their peers.

v. **Access to Resources:** Provide educators and administrators with access to resources, such as online tutorials, workshops, and learning materials, to support self-directed learning and skill development. Educational institutions should invest in digital resources and infrastructure to ensure equitable access to ICT tools and training opportunities.

Self-Assessment Questions 9.2

Q1. Why is proficiency with word processing software important for job seekers today?

Q2. What are the main benefits of using ICT in educational management?

Q3. What are some of the administrative responsibilities involved in educational management that can be improved by ICT?

Q4. How can digitizing administrative processes benefit educational institutions?

Q5. What is one of the main challenges in harnessing ICT for educational management?

Q6. How do resource constraints and funding priorities affect the application of ICT in educational management?

Q7. What role does professional development play in the effective integration of ICT in school administration?

Q8. How can resistance to change and organizational culture hinder the integration of ICT in educational administration?

Q9. What are some strategies and solutions to address the dearth of special arrangements for ICT in educational management?

9.3 Unwillingness of Staff

There are various forms of technology non-use. Numerous research revealed that society as a whole does not use digital technologies. Nonetheless, there are indications that technology is not used at work as well. It is possible to view involuntary non-use of new ICT at work from a socio-technical perspective as opposed to a more psychologically focused one.

Although people do not utilize technology involuntarily just because it is not there, involuntary non-use of technology can nevertheless happen. When workers desire to use new ICT at work but are unable to do so because of circumstances beyond their control, this is known as involuntary non-use of new ICT. Technology affordance emphasizes the reciprocal interaction between technology and the involuntary non-use of new ICT, even though past experience, social influence,

perceived ease of use, and perceived usefulness are the factors that most aid in technology acceptance.

The technology acceptance models 1 and 2 serve as a foundation for the unified theory of technology acceptance and utilization. The unified theory of acceptance and use of technology is a development of the technological acceptance models. It anticipates behavioral intention to use technology, as opposed to actual use. Perceived utility and perceived ease of use "... fully mediate the influence of external variables on usage behaviors," according to a theory ingrained in the technology adoption model (Burton-Jones & Hubona, 2006, p. 706).

This hypothesis might be rewritten to say that employees' perceptions and opinions of external forces only influence their ICT use habits. Therefore, positive attitudes (in the form of expectations) about the new technology held by employees are critical to the effective usage of ICT. As a result of unfavorable perceptions, non-use occurs. According to this viewpoint, use is solely the responsibility of the individual employee, and non-use should be seen as resistance-related non-acceptance. Similarly, definitions of opposition to technology suggest a purposeful action or inaction: "There is a continuum of resistance behaviors, ranging from non-cooperation to violent destruction, or from sabotage to passive disobedience.

9.3.1 Reasons for not using ICT

The following is a more thorough examination of the factors that may prevent some school employees from embracing information and communication technologies:

1. Lack of Training and Professional Development

Lack of proper training and professional development chances is one of the main causes of certain school employees' reluctance to adopt ICT. A large number of teachers lack professional training on the best ways to use technology into their lesson plans. Using ICT in lesson preparations can seem intimidating and unfeasible if one lacks the requisite abilities and understanding. Furthermore, even educators with prior training may feel out of date and unprepared to use the newest tools and platforms due to the quick speed at which technology is developing.

In order to address this issue, continued funding for professional development programs that enhance teachers' digital literacy and offer useful techniques for incorporating technology into the classroom are needed. Staff members can benefit from peer-to-peer learning groups, online courses, and hands-on workshops in order to feel more knowledgeable and confident when utilizing ICT.

2. Fear of Change and Disruption

When new technology is introduced into the classroom, it can upset long-standing practices and workflows, which can make staff members who are accustomed to

the status quo resistant. Even when change is ultimately for the better, educators who worry that they won't be able to adjust to new techniques or resources may get anxious and uneasy. Concerns over technology's ability to supplant conventional teaching techniques or minimize the importance of teachers in the educational process may also exist.

School administrators need to explain the reasoning for ICT integration and highlight the advantages for teachers and pupils in order to allay these concerns. Staff members can feel less nervous about the change's effects on their practice and more involved in the process if they have plenty of opportunities for collaboration, feedback, and support. Highlighting achievements and providing illustrations of successful ICT integration can also instill confidence and show the real results of embracing innovation.

3. Perceived Complexity and Technical Challenges

The perceived complexity of technology and the technical difficulties in implementing it are further obstacles to ICT adoption in schools. The abundance of tools, platforms, and applications available can leave many instructors feeling overwhelmed and unclear of where to start or how to properly traverse the ecosystem. Concerns regarding compatibility, dependability, and technical support could also discourage employees from using ICT in the classroom.

4. Resource Constraints and Equity Concerns

The efficient use of ICT in schools can be seriously hampered by a lack of funds, outmoded technology, and limited access to it, especially in underprivileged communities. If educators believe that technology is unjust or inaccessible, they could be reluctant to adopt it for fear that it will increase already-existing student disparities and create a wider digital divide. Schools may be discouraged from prioritizing ICT integration activities even more by worries about the sustainability of continued investments and the price of technology tools.

5. Pedagogical Beliefs and Resistance to Change

Lastly, some educators may have pedagogical or philosophical misgivings regarding the use of technology in the classroom, favoring more conventional teaching strategies or doubting the ability of ICT to foster deeper learning results. These opinions could originate from a conviction that technology is fundamentally shallow, distracting, or hostile to creativity and critical thought. ICT in educational settings may also be viewed with skepticism due to worries about screen usage, privacy, and internet safety.

Schools need to have meaningful conversations with staff members to address these pedagogical assumptions and reluctance to change. These conversations should focus on exploring the potential advantages of ICT integration and dispelling

common misconceptions or anxieties. Instilling confidence in educators to utilize ICT as a tool to improve teaching and learning can be accomplished by highlighting the significance of media literacy, digital citizenship, and responsible technology use. Additionally, by giving teachers the chance to be creative and experiment, they can explore various methods of incorporating technology into their teaching and figure out what best suits their students' needs and learning objectives.

Self-Assessment Questions 9.3

Q1. What is meant by involuntary non-use of new ICT at work, and how does it differ from deliberate non-use?

Q2. How do the technology acceptance models 1 and 2 contribute to the unified theory of technology acceptance and utilization?

Q3. What role do perceived utility and perceived ease of use play in the technology adoption model?

Q4. How can lack of training and professional development affect the adoption of ICT by school staff?

Q5. What strategies can school administrators use to address staff fears of change and disruption due to new ICT?

9.4 Maintenance Issues

In the digital age, the seamless functioning and long-term viability of systems in a variety of sectors, including as government, business, healthcare, and education, depend heavily on the efficient maintenance of information and communication technology (ICT) infrastructure. ICT maintenance, however, comes with a wide range of difficulties, from network management and cybersecurity to hardware and software upkeep. This long essay explores the complex world of ICT maintenance, looking at the underlying causes of problems, suggesting mitigation techniques, and emphasizing proactive maintenance best practices. Organizations may maximize the performance, reliability, and security of their ICT systems to meet their mission-critical operations and objectives by taking on these difficulties head-on and putting strong maintenance policies in place.

9.4.1 Understanding Maintenance Issues In ICT

ICT maintenance difficulties cover a broad spectrum of problems, such as cybersecurity risks, network disruptions, software vulnerabilities, and hardware malfunctions. These problems can be caused by a number of things, including organizational culture, lack of experience, resource constraints, and technological complexity.

9.4.1.1 Hardware Maintenance Challenges: Updating physical components including servers, PCs, networking devices, and peripherals is known as hardware maintenance. Hardware obsolescence, compatibility problems, and breakdowns are obstacles that must be overcome by enterprises in order to maintain performance and dependability. Proactive maintenance procedures and planned hardware updates are necessary.

9.4.1.2 Software Maintenance Challenges: Managing licenses, patches, operating system, application, and database configurations are all part of software maintenance. Compatibility problems, software vulnerabilities, and the requirement for regular upgrades to address security risks and performance problems are some of the challenges.

9.4.1.3 Network Infrastructure Maintenance Challenges: Network infrastructure maintenance entails managing routers, switches, firewalls, and other networking devices to ensure consistent connectivity and data transfer. Challenges include bandwidth management, congestion, security risks, and the necessity for continual monitoring and optimization to meet the organization's networking needs.

9.4.1.4 Cybersecurity Maintenance Challenges: Cybersecurity maintenance entails defending ICT systems against unauthorized access, data breaches, malware infections, and other cyber threats. Challenges include the changing threat landscape, human error, insider threats, and the need for strong security solutions like firewalls, encryption, access restrictions, and security awareness training to mitigate risks and protect organizational assets.

9.4.2 Root Causes of Maintenance Issues: Maintenance challenges in ICT can be caused by a variety of variables, including technological complexity, limited resources, a lack of experience, dispersed systems, and corporate culture.

9.4.2.1 Technological Complexity: ICT systems are getting more complicated, with numerous hardware and software components, integration hurdles, and interoperability issues. As systems become more complex, the challenges associated with their maintenance increase, necessitating investments in specialized skills, tools, and resources to successfully manage maintenance issues.

9.4.2.2 Limited Resources: Organizations sometimes operate on tight budgets and may lack the funds to engage in comprehensive maintenance programs, employee training, and technology updates. Limited resources can impede an organization's ability to address maintenance issues proactively, resulting in higher downtime, lower productivity, and increased security concerns.

9.4.2.3 Lack of Expertise: Staff may lack particular knowledge and skills required to manage ICT systems. Without proper training and knowledge, organizations may struggle to successfully detect and handle maintenance issues, resulting in extended downtime, greater expenses, and lower user satisfaction.

9.4.2.4 Fragmented Systems: Organizations may use a mix of ICT systems and technologies from many vendors, resulting in compatibility concerns, integration hurdles, and increased maintenance complexity. Fragmented systems can make it difficult for enterprises to streamline maintenance operations, improve performance, and assure system compatibility.

9.4.2.5 Organizational Culture: The degree to which maintenance concerns are addressed can be influenced by the prevailing culture inside firms, which includes attitudes toward technology, risk aversion, and resistance to change. Proactive maintenance procedures and investments in technological resources are more likely to be supported by a culture that places a high value on innovation, cooperation, and continuous development.

9.4.3 Strategies for Mitigating Maintenance Issues: Organizations can use a variety of approaches, such as thorough maintenance planning, resource investment, proactive monitoring and management, standardization and simplification, cooperation and partnerships, to handle maintenance difficulties in ICT.

9.4.3.1 Comprehensive Maintenance Planning: Create thorough maintenance plans that include steps for maintaining network infrastructure, cybersecurity, hardware and software, and emergency preparedness. The plans must to be in harmony with the strategic objectives and priorities of the company, incorporating feedback from significant stakeholders and incorporating provisions for routine maintenance inspections, performance evaluations, and preventive maintenance assignments.

9.4.3.2 Investment in Resources: Provide adequate resources, including finance, people, and training, to support continuous maintenance tasks. Prioritize maintenance needs in budget allocations, and seek external funding sources as needed to ensure enough support for maintenance activities. Invest in staff training and professional development programs to help employees learn and maintain the specific skills needed to effectively maintain ICT systems.

9.4.3.3 Proactive Monitoring and Management:
Use proactive monitoring technologies to detect hardware failures, software vulnerabilities, network difficulties, and cybersecurity threats in real time. Set up routines for regular system checks, performance monitoring, and preventive

maintenance tasks to identify and fix potential issues before they become serious problems.

9.4.3.4 Standardization and Simplification: Standardize ICT systems and technologies whenever possible in order to decrease complexity, promote interoperability, and streamline maintenance operations. Simplify software configurations, reduce modifications, and centralize management for easier maintenance and support. Adopt industry best practices and standards for ICT maintenance to maintain consistency and dependability across systems.

9.4.3.5 Collaboration and Partnerships: Collaborate with external vendors, technology partners, and industry experts to benefit from their expertise, resources, and assistance for ICT maintenance. Form partnerships for hardware maintenance, software licensing, cybersecurity assessments, and staff training to supplement internal capabilities and provide comprehensive support for maintenance activities.

9.4.4 Best Practices for Proactive Maintenance: In addition to developing measures for reducing maintenance difficulties, companies can use best practices for proactive maintenance to improve the performance, reliability, and security of their ICT systems.

9.4.4.1 Regular Maintenance Checks: Perform regular maintenance checks and inspections of hardware, software, and network infrastructure to identify potential problems, complete normal maintenance activities, and ensure compliance with maintenance schedules and procedures.

9.4.4.2 Timely Updates and Patch Management: Stay up to date on software updates, patches, and security fixes for operating systems, apps, and firmware to resolve vulnerabilities, improve performance, and reduce security risks. Create a patch management procedure that includes testing fixes in a controlled environment before deploying them on production systems.

9.4.4.3 Continuous Monitoring and Optimization: Set up continuous monitoring tools and systems to track system performance, network traffic, and security events in real time. Monitor key performance indicators (KPIs) and metrics to discover trends, anomalies, and potential concerns that must be addressed. Optimize system configurations, network settings, and security policies using monitoring data and analysis to increase efficiency and reduce risks.

9.4.4.4 Regular Backup and Disaster Recovery Planning: Implement regular backup methods to safeguard vital data and applications from loss or corruption caused by hardware failures, software problems, or cyber assaults. Create a complete disaster recovery plan that includes backup and recovery procedures, data

retention policies, and testing protocols to guarantee you're prepared for any emergency.

9.4.4.5 Security Awareness Training: Provide continuing security awareness training and instruction to employees in order to promote best practices in cybersecurity, enhance awareness of common threats and vulnerabilities, and equip them to notice and respond to security occurrences. Create a culture of security knowledge and accountability within the organization to reduce the human aspect in cybersecurity threats.

Self-Assessment Questions 9.4

Q1. What are some of the main challenges associated with hardware maintenance in ICT infrastructure?

Q2. How does technological complexity contribute to maintenance issues in ICT systems?

Q3. Why is proactive monitoring and management important for maintaining ICT infrastructure?

Q4. What role does organizational culture play in addressing ICT maintenance issues?

Q5. How can regular backup and disaster recovery planning help organizations manage ICT maintenance challenges?

9.5 Connectivity Problems between School and Home

It makes sense that when homes and schools are connected, technological issues could arise. When virtual programs were implemented in COVID schools, this issue got worse because technology use for teaching and learning was still relatively new for both teachers and students. However, even now, a few years later, the amount of issues that parents, teachers, and students have with communication, accessing daily lessons and performance tasks, and receiving instruction is growing everyday. It is astounding how tough it is for so many educators and families to maintain links between the home and school in this digital age.

Many schools have given families options for their children's education during this uncertain period. A lot of parents have chosen to enroll their kids in an online course offered by their regular school. Some parents have chosen to enroll their kids in a hybrid program offered by their school, which allows them to participate in an online program at home and attend in-person sessions part of the time. The sole educational alternative available to pupils enrolled in the remaining institutions that have prolonged their building closures is to take part in a virtual program until the facilities reopen.

There are three main causes of connectivity issues.

1. Digital Gap

For many students and their families, the digital divide is acutely felt. This refers to the fact that a large number of families and students live without internet connection and without electronic devices at home. It is known as "digital divide." Every day, they can engage in educational activities and receive unbroken instruction and learning for the students who accompany them. Pupils who don't have access to computers, iPads, the internet at home, or other technological devices miss school, deteriorate academically, and have no opportunity to catch up. Without the necessary technologies, students' educational experiences become unfair and uneven. This problem has developed into a form of equality and inequality in the classroom. The justifications are quite simple. Pupils who possess gadgets, have internet connection at home, or have had school-issued device loans have an advantage over their classmates in terms of study.

2. Education Disruptions

Many families with internet-connected devices and children also experience disruptions in their education. In these situations, the district and the schools themselves have internal technological issues. These issues—which have also been referred to as unstable connections, crashing websites, overloaded systems, or bad connections—have been linked to both the educational system and the internet provider. As a result, both teachers and pupils are unable to engage with one another and deliver teaching.

In fact, schools are putting a lot of effort into finding internal answers to these problems as well as outside help from internet providers.

3. Poor Connectivity

Despite the issues with kids not having access to gadgets or the internet, as well as the poor connectivity in classrooms.

Despite the impression that practically everyone has access to the internet, a startling proportion of families do not have fast or dependable internet connections. Approximately 5 million homes with children in school age do not have access to broadband internet at home. Millions of kids are thereby falling behind. Lack of internet connectivity can have a variety of effects on a student's academic achievement. Without internet, students are unable to complete their assignments, conduct independent research, or communicate with teachers or fellow students. Families that do not have internet access may find themselves without access to information or a direct channel of communication with educators and schools.

The incapacity of pupils without internet access at home to finish their schoolwork is one of their main issues. There has been much discussion over homework in the education sector for a long time. Should students be given homework? Those who

answer in the affirmative contend that homework helps students stay up to date on their studies and gets them ready for the demands of college. Some argue that homework is unfair since not all pupils have equal access to resources and a conducive learning environment at home. The internet has only intensified this debate. Up to 70% of educators provide assignments that calls for online research. Approximately 65% of students utilize the internet for homework completion, which includes researching topics, turning in assignments, corresponding with teachers via email, and working together virtually with classmates. What does that entail, though, for pupils whose homes do not provide internet access? They can get behind schedule or lose hours searching for free Wi-Fi hotspots.

The following recommendations may help to improve the situation that currently exists.

Instead of teachers expecting all of their students to be signed in for daily live lessons, they should consult videotape lessons. Students will be able to log in to classes at various times throughout the day. This will help lessen the burden on websites used to assist student learning. Lessons will be recorded, allowing teachers to cover more content in a single class. This would allow some students to not only engage in live recorded courses and interact with their teachers, but also to watch lessons as many times as they needed. Videotaping lessons would allow teachers to schedule additional time for office hours.

1. Online communication between school and home

The use of digital telecommunication to exchange ideas and information between educators, parents, students, and school administration is known as online communication between home and school. Email and the internet are being used more and more in education, and this makes them more effective and useful tools for improving student learning and fostering communication between schools, parents, and students.

Online communication places a strong emphasis on global awareness, self-directed learning, self-advocacy, and 21st century skills for students. Schools support students in gaining technical and computer skills as well as Netiquette by using online communication tools. Educators can also use learning management systems, official websites, and automated emails to send parents regular updates about school activities and their kids' development. More time flexibility is offered by the ability to communicate synchronously or asynchronously.

Nevertheless, not all parents, kids, or educators have access to digital technology required for online communication, or to limitless internet access, and the initial expense of implementing the necessary hardware, software, and information technology may be high. To make sure that all potential users are prepared to engage, schools must also offer technical help and orientation to the online settings. Instructors will also need to put in more time on the internet by actively participating in communication activities (such as moderating comments).

Furthermore, because internet connection is instantaneous, parents and students may develop irrational expectations that instructors are always "on call."

2. Online communication between parents and school

Online platforms for communication between parents and teachers allow for the flow of ideas between them and the schools. Online communication facilitates parent outreach and partnership building for educators and administrators. Online communication gives parents flexible chances to ask questions and share information with instructors and school administration, as well as real-time updates on their child's academic achievement and activities.

Challenges

Teachers and parents must work together to overcome certain obstacles, even if their goal is to foster communication most of the time. The most prevalent challenges are language problems, parents' inconsistent internet connection, and their ability to operate the program. If the school offers parents training or interpretation services to improve the inclusivity of online communication, there can be a financial expense involved. The availability of online communication tools has led to a "huge volume" of hostile emails and texts from parents, according to some teachers. Instructors have also felt compelled to reply to parents' expectations of daily communication in the nights and on the weekends.

3. Online communication between students and teachers

The sharing of ideas and e-learning are facilitated by online communication between educators and students. Students can connect with peers and teachers online and access learning resources outside of regular school hours.

With the development of Web 2.0 and social networks, students can now easily access and contribute to communal information that is freely available online. Encouraging online connection between educators and learners gives students the chance to get input and support from classmates and teachers outside of the traditional classroom and school day. Students can examine official websites for relevant information, send queries via email or post them, and share their thoughts in peer conversations.

Challenges

In online forums, students may exhibit hostility toward peer interdependence or online communication. Online interactions between students and teachers must be based on mutual trust, interaction, shared goals, and expectations in order to be fruitful. Some students have unrealistic expectations of professors, believing that they should be available to them around-the-clock, seven days a week. Furthermore, as the majority of kids participate in online communication from home, parental assistance is frequently needed but might not be available. Lastly,

it's possible that students don't have the technological know-how or access to engage in online conversation.

Role of teachers

Because of their leadership role, teachers bear a tremendous deal of responsibility when it comes to creating online communities and contact with students. A number of their in-class attributes, like their capacity to direct student conduct and learning, must translate into the virtual classroom. Throughout their ongoing involvement, educators need to set an example of proper Netiquette for students to follow when communicating online. Instructors ought to support their students' development into learning communities where individual conduct can be influenced by group dynamics. Openness, friendliness, and trust should be encouraged in these virtual spaces so that solving problems becomes a collective activity.

Technology and tools

Email is the most popular online communication medium among educators since it allows for file sharing, asynchronous communication, immediate mass distribution, and mobile access. Websites made by teachers give users internet access to calendars, links, blogs, and other administrative data. Online discussion boards enable educators and students to share ideas, offer and receive criticism, consider other people's viewpoints, and get concept clarification. Social networking platforms are used by individuals to communicate openly and purposefully. Through blogs, people may communicate their ideas more fully and multimedia-richly.

From birth until puberty, parents are your child's primary source of education. They assist in laying the groundwork for the formation of their lifetime attitudes and interests as well as the development of their character and mental health. Additionally, given your child's home is the primary setting in which their personality and potential will develop, you must foster an environment that is open, supportive, and encourages learning in addition to what happens in the school.

When parents and teachers collaborate effectively, everyone benefits. Parents and instructors can assist each other with various insights and views on the same child, resulting in a full awareness of the child's abilities, strengths, and challenges. The instructor will know a lot more about the curriculum and the school culture, whereas you will know more about your child's personality, tendencies, and family life. An effective parent-teacher relationship also demonstrates to a child that she is supported by a large group of adults.

Self Assessment Questions 9.5

Q1. How did the COVID-19 pandemic exacerbate connectivity problems between school and home, and what impact has this had on communication and learning?

Q2. What is the "digital divide," and how does it affect students' educational experiences and opportunities?

Q3. How do internal technological issues within schools contribute to education disruptions, and what steps are schools taking to address these problems?

Q4. What are the main challenges associated with online communication between parents and schools, and how can schools improve this communication?

Q5. In what ways can teachers support effective online communication with students, and what role do technological tools play in facilitating this interaction?

Key Points

1. ICT's potential in educational management is vast, offering improvements in decision-making, collaboration, and administrative efficiency.
2. Challenges to ICT adoption in education include resource constraints, funding priorities, lack of technical expertise, resistance to change, and organizational culture.
3. Strategies to address ICT gaps involve strategic planning, resource allocation, professional development, partnerships, and change management.
4. Infrastructure barriers, such as physical infrastructure, electricity supply, and connectivity issues, hinder ICT implementation in schools.
5. Solutions to address this issue include professional development, collaboration, curriculum integration, mentorship, and resource access.
6. development, addressing fear of change, simplifying technology, ensuring equitable access, and addressing pedagogical concerns.
7. Effective maintenance of ICT infrastructure is crucial for organizations across various sectors, including government, business, healthcare, and education, to ensure seamless functioning and long-term viability.
8. ICT maintenance encompasses challenges such as cybersecurity risks, network disruptions, software vulnerabilities, and hardware malfunctions, which can be attributed to factors like organizational culture, limited resources, and technological complexity.
9. Root causes of maintenance issues include technological complexity, limited resources, lack of expertise, fragmented systems, and organizational culture, which can hinder organizations' ability to address maintenance challenges effectively.
10. Strategies for mitigating maintenance issues include comprehensive maintenance planning, investment in resources, proactive monitoring and management, standardization and simplification, and collaboration and partnerships.
11. Best practices for proactive maintenance include regular maintenance checks, timely updates and patch management, continuous monitoring and optimization, regular backup and disaster recovery planning, and security awareness training.

12. By understanding maintenance challenges, implementing effective strategies, and adopting proactive maintenance best practices, organizations can optimize the performance, reliability, and security of their ICT systems to meet their mission-critical objectives and deliver value to stakeholders.
13. Recommendations include flexible lesson delivery, establishment of office hours, and creation of learning laboratories to address connectivity challenges.
14. Online communication between school and home, parents and school, and students and teachers has benefits like enhanced parental involvement and student engagement but faces challenges like language barriers and technical difficulties.
15. Teachers play a crucial role in fostering online communities, promoting proper online conduct, and utilizing communication tools effectively.
16. Parent-teacher collaboration is essential for a supportive learning environment and a comprehensive understanding of students' needs and strengths.
17. Parental involvement at home is crucial for shaping children's attitudes toward learning and supporting their educational journey.

Answers to Self Assessment Questions

Self Assessment Questions 9.1
Read the relevant section
Self Assessment Questions 9.2
Read the relevant section
Self Assessment Questions 9.3
Read the relevant section
Self Assessment Questions 9.4
Read the relevant section
Self Assessment Questions 9.5
Read the relevant section

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