ENRICHING ICTS IN ACADEMIC LIBRARIES

S. Dhanavandan
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Knowledge is Our Business

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By S. Dhanavandan, Dr. Trapty Agrawal

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CONTENT

Chapter 1. Information and Communication Technology (ICT) Definition of Concepts and Development 1

— Dr. Trapty Agrawal

Chapter 2. ICT Evolution in the Pre-Electronic and Electronic Ages 8

— Dr. Trapty Agrawal

Chapter 3. Types and Elements of Information and Communication Technologies 14

— Dr. Trapty Agrawal

Chapter 4. Information and Communication Technology and Libraries: An Overview 20

— Dr. Trapty Agrawal

Chapter 5. ICT use In Libraries Regular Activities and Services 26

— Dr. Trapty Agrawal

Chapter 6. Exploring the ICT Application Contents to Readers Services 34

— Dr. Trapty Agrawal

Chapter 7. ICT Advantages to Resources and Multiple Services 40

— Dr. Trapty Agrawal

Chapter 8. Library Automation and Resources from the Internet 46

— Dr. Trapty Agrawal

Chapter 9. A Comprehensive Review of Electronic Storage Systems 54

— Dr. Trapty Agrawal

Chapter 10. ICT Integrationin Libraries: Difficulties and Opportunities 63

— Dr. Trapty Agrawal

Chapter 11. Difficulties with ICT Application in Nigerian Libraries 70

— Dr. Trapty Agrawal

Chapter 12. A Brief Discussion on Electronic Libraries 75

— Dr. Trapty Agrawal

Chapter 13. Comprehensive Review of Library Materials Preservation 82

— Dr. Trapty Agrawal

CHAPTER 1

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) DEFINITION OF CONCEPTS AND DEVELOPMENT

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ABSTRACT:

Information and communication technology (ICT) ideas and their historical evolution are thoroughly examined in this essay. It provides a thorough explanation of the fundamental elements, operations, and developmental phases of ICT, illuminating its crucial contribution to the development of the contemporary world. Information, communication, and technology (ICT) key principles are defined at the beginning of the essay. It clarifies how these ideas are connected and necessary for ICT systems to operate. The definitions provide as a framework for future talks on the advancement of ICT. ICT's historical evolution may be followed from its early beginnings to the modern digital era. This voyage includes the development of ICT throughout the pre-electronic era, including antiquated communication networks and primitive data processing techniques. It draws attention to the crucial role that developments like writing systems, the printing press, and early telegraphy had in creating the foundation for contemporary ICT. An important turning point in ICT development was the advent of the electronic age. The essay examines significant events in this time period, including the development of electronic communication devices and digital computers.

KEYWORDS:

Communication, Framework, ICT,Technology.

INTRODUCTION

Information and communication technology (ICT) has revolutionized the way people work, interact, and access information, becoming an essential part of our everyday lives. On a worldwide scale, it has changed cultures, economies, and industries. Definitions of ICT's foundational ideas and a timeline of its development are necessary in order to comprehend the relevance of ICT. This essay explores the meanings of crucial ICT terms and offers a timeline of the field's evolution from its conception to the present. This paper has two goals: first, to provide a thorough understanding of the fundamental ideas underlying ICT, such as information, communication, and technology; and second, to explore the development of ICT over time, from its origins in pre-electronic communication techniques to its widespread use in the electronic age. By doing this, we want to provide a thorough framework for understanding the multidimensional nature of ICT and its significant influence on contemporary society. We will go into the definitions of these fundamental ideas in the sections that follow, examining their interdependencies and responsibilities within the larger ICT framework. Then, we'll set out on a historical trip to uncover the significant turning points, breakthroughs, and major players that helped make ICT the dynamic force it is today. The importance of ICT in the history, present, and future of our linked world will be highlighted through this investigation, along with its transformational potential and relevance in a number of facets of human life. We will learn how the fusion of information, communication, and technology has redefined how we interact, learn, conduct business, and even govern as we delve deeper into the definitions and historical development of information and communication technology.

Understanding the development of ICT enables us to understand the innovations that have transformed our lives from writing handwritten letters to holding immediate worldwide video conferences and from visiting libraries to having access to enormous digital information collections[1].

This investigation will also highlight the connections between ICT and other disciplines including physics, engineering, and the social sciences, demonstrating how multidisciplinary cooperation has fueled its development. We will be led through the interesting growth of ICT by the pioneers, innovators, and forward-thinkers who have contributed to its evolution. We shall begin a thorough investigation of ICT in the pages that follow, looking at its history, development, and effects on the modern world. By doing this, we seek to provide a comprehensive knowledge of this influential force that continues to influence how we interact with one another in the digital age and how we live and work.

ICT has, in conclusion, changed the contemporary world in ways that were unthinkable only a few decades ago. It is a dynamic and always changing sector. Its revolutionary influence permeates every facet of our lives, from healthcare and education to business and government. ICT will undoubtedly continue to be a driver for innovation, connection, and advancement in our increasingly digitised and networked global society as we move to the future. Being able to navigate and thrive in this digital world requires more than simply academic understanding of its principles and growth[2], [3].

DISCUSSION

The word "information technology" refers to a broad spectrum of hardware and software. Information is processed, saved, and/or transferred (communicated) using information technology (IT) systems. IT combines computers with quick data, sound, and video transmission lines. Personal computers, phones, televisions, and numerous portable gadgets are some examples. Information Technology (IT) is centred on computers and communications.Information Technology (IT) is defined as "the study or use of an electronic process for storing information and making it available" in the Longman Dictionary of Contemporary English. This definition is inadequate because it restricts the capabilities that represent the expanding network of hardware and software, particularly in the context of the internet and the communication possibilities it offers. One may see that communication is involved if we consider the words "storing and making information available."

The communication must be encoded, sent through a media, and then decoded before being used. There is language present coded in spoken and written communication as well as in signals, signs, and symbols. Information may be expressed in a variety of ways, including text, numbers, images, sound, video, and multimedia. Information Technology (IT) systems employ computers, telecommunications networks, and other electronic devices to convey information. It follows that the term "communication" must be included. Consequently, we have ICT, or information and communication technology.

Information and Communication Technology (ICT) is the term used to describe the process by which information and communication shifts from traditional verbal and print media to more contemporary electronic media. ICT may thus be defined as the set of networks, hardware, and software components as well as the modes of interaction, collaboration, and communication that enable the processing, administration, and sharing of data, information, and knowledge. The ICT is often used to refer to IT. ICT's primary goal is to simply facilitate better information management across all facets of life. This is a comprehensive description. In order to improve an efficient information and communication network, it combines both the traditional information technology and the new innovation made possible by communication[4], [5].

The advancement of technology has made the globe a global village, and information is being processed with ultra-high-tech machinery at breakneck speed.With the use of ICT, the whole globe may be contacted in a matter of seconds from any location. For human growth, information and communication technology (ICT) is essential. It provides a broad variety of tools that encourage and facilitate the transformation of library and information services into an engaging and user-centered process. This explains why the globe is divided into developed, developing, and underdeveloped regions. Some countries are more advanced than others due to access to ICT and effective use of its advantages. As a consequence of advanced ICT, rich nations are breaking new ground in technical advancement, whereas emerging and underdeveloped countries are struggling with the remnants of technology. Effective network and information processing is improved by ICT.

Needs for Information and Communication Technology in Libraries

After the Second World War, there was an acute demand for CT in libraries since there had been a tremendous volume of information created as books and other printed materials, leading to an exponential expansion in information. Instead of an information explosion, there is now information pollution. The conventional methods used by libraries to gather, organise, and distribute information have proven to be highly challenging. With the aid of information and communication technology (ICT), libraries are forced to plan, organise, and communicate the vast amounts of information in accordance with the needs of users. Information is no longer restricted to books and documents held by individuals or educational institutions; rather, it now encompasses audio-visual, digital, multimedia with colour motion and three-dimensional features, etc.

All of these are now available to individuals because to the computer and communication technologies used in contemporary society. Libraries have access to a variety of electronic/digital/computer-based resources, including online and offline ones like e-journals, e-books, e-databases, compact disc (CDs/DVDs), and the Internet. In light of this development in the current environment, it appears that libraries must apply information and communication technology (ICT). The first stage in using ICT in libraries is the construction of databases.

The library must have the necessary resources in order to create databases. Software package designed with consideration for the daily operations of libraries, including acquisition, cataloguing, circulation, serials control, OPAC, administration, indexing, and abstracting of e-books, e-journals, e-databases, current activities services (CAS), and selective dissemination of information (SDI), among others, in order to keep up with technological advancement and satiate user needs.In this respect, a number of reasons have helped to bring about the transition of conventional library operations to ICT-based library operations[6], [7].

Rapid Information Processing

ICT has advantages because it makes it possible to gather, store, access, share, and analyse useful information. This provides SC visibility and enables data analysis and choices to be taken to maximize profitability. A tremendous volume of data can be sorted or searched by the computer. One byte (or character) at a time is the maximum amount of data that the computer can convey. This mechanism, known as asynchronous transmission, is also capable of sending or processing data in blocks. We refer to this as synchronous transmission. Within a certain amount of time, both little and large amounts of data may be sent.

Easy Handling of Large Amount of Information

Libraries and information centers are already using the advantages that ICT provides. For usage at different units and in various regular activities of the libraries, which are no longer handled manually, the majority of libraries and information centers have computerized their

systems. ICT has facilitated networking and eliminated the bottleneck associated with information access, organisations, and retrieval. Today, the majority of library services, operations, and administration do not need librarians to struggle with the manual process of information management. Individual users also have access to information resources and services at any time and from any location. A librarian may assist a user simultaneously at many places. Teleconferences or videoconferences are used for this. This is a crucial advancement that ICT makes possible for distance learning.

Improved Quality of Instruction

ICT usage in libraries has made it possible to operate and provide services that are more user-centered. By enhancing the user's motivation to research, find, and develop original solutions to their issues, information and communication technology (ICT) raises the quality of services offered. On the other hand, the librarian is no longer seen as the main information source; rather, with the aid of ICT, he is now considered as a support, collaborator, and facilitator to users as they learn to obtain and assess the information on their own.ICT usage essentially alters the responsibilities that users and librarians play in the library industry. Multimedia tools might be used to deliver information services, which would lower the presentation's level or quality. An efficient and succinct presentation is improved by ICT.

ICT Extends Human Experience

When dealing with materials that are not in the user's immediate environment or, on the other hand, when dealing with materials that could endanger the users' lives, for instance, a wild animal like a lion cannot be brought into libraries in person; however, a film instead can present it live in the class, or a zoo could be networked to the libraries through the internet. Through internet connection, clinical students at a college of medicine in Nigeria may see a live surgery taking place at a facility in the United States of America. ICT may enhance the human experience via methods like teleconferencing, web hosting, videoconferencing, etc[8], [9].

ICT Helps to Overcome Physical Limitation

Many practises and methods in many kinds of activities have altered as a result of ICT. Users are increasingly using devices including mobile phones, digital cameras, PDAs, gaming consoles, and MP3 players. The situation among users who have better access to information and equally engage with contemporary devices that might enhance their learning is changing as a result of exposure to these resources.The globe has become a small, interconnected community as a result of the availability of satellite, internet connections, and other technologies. Distance is no longer a barrier for users in rich nations and certain institutions in developing countries to contact their libraries. Students enrolled in distance learning don't have to leave their homes or businesses to use the libraries and information resources available to them. Even users who must wait for the actual library to open have a better chance than they do. ICT allows users and librarians to communicate at anytime, anywhere, as long as they are linked to the internet.

General Terms/Concepts Used in Information and Communication Technology

The "driving force" of our day, information and communication technology (ICT), has become commonplace. As a result of the Information Age, there is always access to vast amounts of knowledge. People are being affected by this in unforeseen ways. Information overload is one of the results. When the quantity of information accessible considerably outweighs the length of time required to process it, there is information overload. To evaluate the effects of information and communication technology (ICT) on libraries, learning, and education, it is necessary to define basic words and ideas.

Terms/Concepts of Information and Communication Technology (ICT)

For a be It is necessary to define some of the terminology that are often used in order to better grasp the notion of ICT. Due to their interdependence, these words are the first category to be clarified.

Information

When you are intrigued about something, you do research and get some information. When these findings are saved or gathered, they assist you in making judgements or in confirming or disputing your claims. These findings are facts or information that provide information on a person, an event, or a circumstance. These specifics may help you determine if a person or circumstance is incorrect.Information is defined as "facts or details that tell you something about a situation, person, events, etc." in The Longman Dictionary of Contemporary English. Information is defined as "data that have been summarized or otherwise manipulated for use in decision making," such as the total votes cast for each contender, which are used to determine the winner. Information is essentially the facts or details that are distilled or altered to aid in decision-making.

Communication

One may argue that without communication, no human action would be complete. It is fundamental to daily life since communication allows us to learn how to control our surroundings. Humans could be converted to machines if this information is compromised since both our mental and physical attentiveness would be compromised. Technology has advanced dramatically as a consequence of greater communication.To various individuals, communication might imply different things. It may refer to the exchange of ideas between two or more individuals, or the transmission of information from the source (sender) to the destination (receiver), depending on the context. According to O'Leary and O'Leary (2005), a person with a technological bias can interpret the term as meaning the process of transferring data, software, and information between two or more computers.It is possible to communicate verbally or nonverbally. According to Ogunmilade it may happen between two animals, between humans and lesser animals, between humans and machines, between machines and animals, and between machines and machines.

Technology

Technology has existed since the dawn of human history. It is a method of putting a fix on issues that arise. To stay warm, cook, and preserve his food, the early man devised fire. Technology might signify different things to different individuals. Science underlies it. Galbraith (1967) used this to develop his definition of technology as "the systematic application of scientific or other organised knowledge to practical job. Technology is "an application of scientific knowledge and principles about human learning, communication, and management to the solution of problems in teaching and learning," according to Akanbi (1988). Technology is the process of putting a tool to use that could address human wants or issues. This is inextricably linked to human culture and needs. As a result, we have technology for printing, woodworking, textiles, education, etc.

Information Technology

Information technology (IT) is the practise of creating, processing, storing, protecting, and exchanging all types of electronic data via the use of computers, networking, storage, and other hardware, software, infrastructure, and procedures.The word "IT" is used to refer to the whole range of information processing technologies, including software, hardware, communications technologies, and associated services. Embedded technologies that don't provide data for corporate usage are often excluded from IT.

Communication Technology

It is a mechanism used to send and receive electronic messages and information. Communication has undergone revolutionary changes as a result of the instantaneous ability to transmit or receive many forms of information from anywhere in the globe, including personal messages, letters, articles, computer programming files, photographs, music, and more. This is now the most practical instrument for many forms of communication (personal, professional, etc.). This tool may be used to provide the necessary data at the appropriate moment. Currently, libraries employ this live technology to assist library patrons; primarily, it is used to renew or return (check-in) library items. It may also be regarded as a faster-information medium[10], [11].

CONCLUSION

The evolution of information and communication technology (ICT) and its definitions have shed light on the tremendous effects that this broad sector has had on our planet. We consider the main lessons learned from our examination of the ideas and development of ICT in the last section. We have first and foremost defined the key terms that constitute the foundation of ICT: information, communication, and technology. These principles, which are intimately interwoven, act as the foundational elements of ICT. Information is the data and information we want to send, communication is the channel, and technology is the infrastructure and tools that make that transfer possible. Understanding the larger ICT ecosystem requires a firm grasp of these ideas. ICT has come a long way in its historical evolution. ICT has continuously advanced from the first means of data storage and transmission in pre-electric periods through the development of printing presses and telegraph networks to the electronic era, when computers and the Internet have become commonplace. Pushing the frontiers of what is possible, facilitating the worldwide interchange of knowledge, and revolutionizing every aspect of human life have all been made possible by visionaries and inventors. The fusion of ICT with numerous disciplines in the current digital era has sparked creativity like never before. ICT is now a genuinely multidisciplinary area since it has benefited from the rise of mathematics, engineering, and the social sciences. Experts from several fields have worked together to produce innovations that are still reshaping our world.

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CHAPTER 2

ICT EVOLUTION IN THE PRE-ELECTRONIC AND ELECTRONIC AGES

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ABSTRACT:

In this essay, the pre-electronic and electronic periods' respective contributions to the historical evolution of information and communication technology (ICT) are examined. The paper traces the evolutionary route that led to the contemporary digital era by giving a thorough review of the significant turning points, technical developments, and social effects that characterised these times. ICT growth during the pre-electronic era was motivated by people's demand for effective communication and information dissemination. This essay explores early inventions including the printing press, primitive telegraphy, and writing systems. The eventual digitalization and globalisation of information were made possible by these breakthroughs. A paradigm changes in ICT history occurred with the advent of the electronic age. The development of electronic components, digital computers, and telecommunications technologies define this age. We look at important advancements including the creation of the telegraph, the telephone, and the widespread use of early computers. These turning points not only transformed communication but also paved the way for the development of the Internet, which became a revolutionary force in the electronic age. This essay also emphasises how important individuals like Johannes Gutenberg, Samuel Morse, Alan Turing, and Tim Berners-Lee influenced the growth of ICT. Their achievements are examined in the context of their particular times, highlighting the crucial part that people played in the advancement of communication and technology. This study attempts to give a thorough knowledge of how human inventiveness and technology innovation have consistently changed the ways people communicate, access information, and interact with the world by looking at the historical trajectory of ICT in both the pre-electronic and electronic periods. This historical viewpoint provides a useful framework for understanding ICT's continuous development and the wide-ranging effects it will have on modern society and the future.

KEYWORDS:

Communication, Electronic Ages, Evolution,ICT, Pre-Electronic.

INTRODUCTION

From crude means of communication and information storage in the pre-electronic period to the digital revolution in the electronic era, the development of Information and Communication Technology (ICT) spans millennia. Humanity's search for effective communication and knowledge preservation in the pre-electronic age led to the development of writing systems, the printing press, and early telegraphy, which laid the foundation for information transmission. The development of the telegraph and telephone networks, the advent of computers, and the worldwide interconnection of the Internet all contributed to the following move into the electronic age, which was marked by a significant change. This introduction lays the groundwork for a more thorough investigation of ICT's historical evolution, tracing its origins, turning points, and transformational effects on society, finally demonstrating its role in creating the contemporary world.

We dive into the creative solutions used by past civilizations to address the problems of communication and knowledge transfer as we explore the pre-electronic age. As written language developed, technologies like the printing press democratised information access while also revolutionizing the preservation of culture and history. These accomplishments were but harbingers of the electronic age, which saw an explosion in connectedness and invention brought on by the combination of electricity, computers, and telecommunications. By comprehending the evolution of ICT, we are better able to appreciate how the human desire to transcend temporal and geographic boundaries has radically changed how we live, work, and interact in the contemporary digital age[1], [2].

DISCUSSION

Collection creation, reference services administration, document delivery service, access to structured collections maintained by the library, and assistance to users in information search and retrieval are today's essential functions of libraries. These tasks are carefully handled by manual procedure.Information and communication technology has become fundamentally necessary with the development of ICT in order to manage the massive library collection. Utilising contemporary technology is essential to accelerating library services.A new generation of technologically competent internet users that include information access and usage in all aspects of their lives is challenging libraries. Their life in previously unheard-of ways. With time, generational differences are becoming more pronounced, and the current generation of library patrons is too obsessed with technology.

It is common knowledge that every success hinges on how happy the library's patrons are. Therefore, in the current environment, the fastest library service is more easily accessible through the internet and the World Wide Web. Using web-based technical settings, it is feasible to offer information to the "right users" at "any time," from "anywhere," in the right way.

Due to the quicker advancement of technology, the discipline of library and information science has seen tremendous expansion. With the usage of the internet and technology over the last several decades, library work has become very quick. The most crucial factors in meeting library patrons' requirements are accuracy and quickness. Information and communication technology (ICT) improves library workflow by lowering the amount of human labour required, which expands the range of services offered by libraries. The ability to provide ICT-based information services to satisfy customer requests is one of the most notable benefits of ICT (Woodward, 2009). New ICTs have transformed conventional libraries into knowledge hubs, and librarians now perform more of an information engineer or knowledge manager consulting role (Sampath, Kumar, and Biradar, 2010).

Different facets of library administration have seen significant modifications as a result of contemporary technology. The usage of the internet and library software has helped greatly with everything from cleaning to user management. In order to offer services like automated library material circulation, access to OPAC, and library databases, among others, ICT is primarily employed in libraries. As a result, ICT services have had a significant influence on all areas of academic library activity as well as given the chance to provide users access to a broad range of digital-based information resources and value-added information services.

Information technology (IT) is now extensively used across a variety of industries, including library and information services, to cut costs, increase operational efficiency, and most importantly improve service quality and customer satisfaction. The creation of information systems is among the impressive accomplishments of information and communication technology in libraries[3], [4].

Information System

Five components make up an information system: people, processes, software, hardware, and data. Computer connectivity enables information sharing, considerably enhancing the functionality and value of an information system. In Nigeria, most individuals had little direct contact with computers more than 20 years ago. Even though they completed computerized forms, exams, and bill payments, experts such as programmers, data entry clerks, and computer operators did the actual job with computers. Almost everyone can now operate a computer thanks to the development of microcomputers. Today, it's possible:

1. Using computers to calculate and measure distance, length, and quantity for writers, artists, engineers, and scientists. Students and business people carry out all of these tasks and more.
2. For the creation of a new system of learning. People who regularly travel or work irregular hours may enrol in online courses that do not have to take place within the typical quarter or semester.
3. To have new channels for communication, locating individuals who share interests, and making purchases. All different types of individuals use electronic commerce (e-commerce), electronic mail (e-mail), and the internet to connect with each other and exchange ideas and goods nowadays.

How do people utilise information and communication technology (ICT), including you? ICT has recently been put to numerous intriguing and useful purposes, and these applications have had a significant beneficial influence on people's lives.These innovations have enhanced the richness and intrigue of people's daily lives, and they include tools for anything from making personalised webpages to capturing digital video clips.Reminding knowledgeable end users that an information system is made up of five components people, process, software, hardware, and data is important. They also need to comprehend connection, the wireless revolution, the internet, the web, and the role that information and communication technology plays in their professional life[5], [6].

Development of Information and Communication Technology (ICT)

Through the centuries, technology changed. The development of technology began in the Stone Age. Through the spark of light from the stones, man was able to get fire (light), and he stopped eating his meal uncooked. He preserved his meat with fire. The Iron Age followed the Stone Age, during which time agriculture tools and military equipment including hoes, cutlasses, arrows, spears, and swords began to be produced. The development of writing began throughout the Middle Ages, when individuals started using feathers as pens.

The Middle Age was followed by the Industrial Age. Manufacturing machinery and military equipment were created throughout the Industrial Age. The advent or emergence of the Electronic Age is the product of technological advancement. The internet and computers are widely used in this day and age. Due to this evolution and the velocity at which people are being inundated with information, there is a need to learn more and to have knowledge gathered or divided into pieces.Due to the constant availability of information, we are living in the Information Age. Unimaginable impacts on humans are being caused by this. Information overload is one of the outcomes. The International Data Corporation (IDC) reportedly made a prediction, according to Williams and Sawyer. Through the centuries, technology changed. The development of technology began in the Stone Age. Through the spark of light from the stones, man was able to get fire (light), and he stopped eating his meal uncooked. He preserved his meat with fire. The Iron Age followed the Stone Age, during which time agriculture tools and military equipment including hoes, cutlasses, arrows, spears, and swords began to be produced. The development of writing began throughout the Middle Ages, when individuals started using feathers as pens.

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Due to the constant availability of information, we are living in the Information Age. Unimaginable impacts on humans are being caused by this. Information overload is one of the outcomes. The International Data Corporation (IDC) reportedly made a prediction, according to Williams and Sawyer. The timeline shows how Information and Communication Technology (ICT) has evolved from a localised to a worldwide technology. ICT is the integration of information processing, computer, and communication technologies, as is seen from the aforementioned trends and developments. ICT is transforming how we study, work, and live in society, and is often discussed in a specific context, such as in libraries, health care, or education. Consider all the ways that digital technology is now used by people, companies, and organisations to help them utilise information while thinking about ICT. ICT is concerned with items that can store, retrieve, alter, send, or receive information electronically in a digital form. Importantly, it is also concerned with how these many uses such as personal computers, digital television, email, and robots can cooperate[7], [8].

Many of the items we use at home, the workplace, school, or any other kind of professional or social event include computer chips. Access cards, mobile phones, point-of-sale scanners, medical equipment, TV remote controls, microwave ovens, DVD players, digital cameras, PDAs and other items fall under this category.Information Technology (IT) is defined as the study, design, advanced development, achievement, support, or administration of computer-based information systems, primarily software and hardware. Information technology uses electronic computers and software to update, protect, generate, and disseminate many types of information. Information technology has expanded to include a wide range of computer and technological aspects, and the term is now more widely used than ever. The study of information technology may include a wide range of disciplines. IT specialists do a variety of tasks, from installing apps to developing sophisticated computer networks.Data management, networking, database management, software creation, computer hardware, management, and system administration are among the duties of IT professionals. Computer and communications terms are combined to generate the portmanteau IT (Information Technology), sometimes known as "InfoTech".

Any technology that aids in the creation, manipulation, collection, communication, or dissemination of information is referred to as information technology. The phrase "information and communications technology" has recently gained popularity for its clear inclusion of the area of electronic communication, leading to the acronym ICT (Information and Communications Technology).In the 1970s, the phrase "information technology" developed. However, its fundamental idea may be linked to the World War II partnership between industry and the military in the creation of electronics, computers, and information theory. The military continued to be a key source of research and development money after the 1940s for the growth of automation to replace human labour with machine power. Computers have undergone four stages of development since the 1950s. Each generation saw a reduction in size but an improvement in the hardware's ability to regulate computer activities. Vacuum tubes were utilised in the first generation, followed by transistors in the second, integrated circuits in the third, and integrated circuits on a single computer chip in the fourth. The fifth generation of computers, which are still at the experimental stage, are characterised by advancements in artificial intelligence that will reduce the need for intricate programming.

John Eckert and John W. Mauchly created the UNIVAC I, the first commercial computer, in 1951. The Census Bureau used it to forecast the results of the 1952 presidential election. Large organisations employed mainframe computers to do computations and handle vast volumes of data stored in databases throughout the following 25 years. Supercomputers were used in the fields of research and engineering, the construction of nuclear reactors and aeroplanes, as well as the forecasting of global weather patterns.Early in the 1980s, factories, industrial facilities, and small enterprises all began to use minicomputers.

Microcomputers were created in 1975 at the Massachusetts Institute of Technology. The first Radio Shack microcomputer from Tandy Corporation was released in 1976, while the Apple microcomputer debuted in 1977. When IBM unveiled the first personal computer in the autumn of 1981, the market for microcomputers had a significant growth. Personal computers currently perform more functions than the biggest computers of the mid-1960s at a fraction of the cost due to significant advancements in computer components and manufacturing.Today's computers are broken down into four groups based on their size, price, and computing power. They are the personal computer, sometimes referred to as a supercomputer, mainframe, minicomputer [9], [10].There are many types of personal computers, including desktop, network, laptop, and handheld.

Mainframe Computers

Up until the late 1960s, they were the only kind of computer available. They come in a range of sizes, from little to huge, depending on their intended usage.Midsize computers are a common name for small mainframes. Minicomputers used to be the name for them. Today, the phrase is seldom used. They are used by big businesses to handle millions of transactions, including banks, airlines, insurance firms, etc. A terminal is how users access mainframe computers. This can enter and output data and has a keyboard, but it cannot analyse data on its own. Each second, mainframes handle billions of instructions.Mainframe computers are housed in properly connected, cool rooms.Supercomputers are more potent, yet they can process information quickly and store a lot of data.

Workstations

It was first made available in the early 1980s. Workstations are pricey, powerful personal computers often used for difficult computations in science, math, and engineering, as well as computer-aided design (CAD) and computer manufacturing. Their capacity is equivalent to that of midsize mainframes. They are used in the design of medicine prescriptions, movie special effects, and aeroplane fuselages. Their graphic powers made them popular with filmmakers[11], [12].

CONCLUSION

A tribute to human intellect, inventiveness, and the persistent need to connect, communicate, and exchange information, the evolution of Information and Communication Technology (ICT) in both the pre-electronic and electronic eras is a journey. As we draw to a close, some important conclusions become clear. The development of writing systems, the spread of knowledge via the printing press, and early attempts at long-distance telegraphy communication established the groundwork for ICT in the pre-electronic age. These inventions had a crucial role in enabling the transfer of information and ideas across very long distances and periods. They not only influenced nations and civilizations, but they also prepared the way for the revolutionary advancements of the electronic era. The digital revolution brought forth by the technological age radically changed how people interact and absorb information. The introduction of electrical devices, such as telegraphs and computers, as well as the creation of the Internet, linked our globe in previously unheard-of ways.

These developments were made possible by visionaries like Samuel Morse, Alan Turing, and Tim Berners-Lee, who forever changed the course of ICT. In addition, it became clear that the creation of ICT was multidisciplinary, with contributions from engineering, physics, and mathematics. Physics allowed for the miniaturisation of electronic components, mathematics gave the logic and algorithms required for computers, and engineering combined these elements to produce useful systems and devices.

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CHAPTER 3

TYPES AND ELEMENTS OF INFORMATION AND COMMUNICATION TECHNOLOGIES

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ABSTRACT:

The term "information and communication technology" (ICT) refers to a broad range of tools and systems that make it easier to share information, analyse data, and communicate with others. This essay gives a general overview of the many forms and crucial elements that make up ICT. This research attempts to provide a full knowledge of the diverse world of ICT, its relevance, and its role in influencing the digital era by classifying various technologies and analysing their essential elements. The report starts out by dividing ICT into several areas, such as networking, computers, and telecommunications. Each category is thoroughly examined, emphasising its unique characteristics and uses. Traditional telephone systems, cutting-edge mobile networks, and satellite communications are all included in the field of telecommunications. While networking studies the foundation of the Internet and the protocols that permit data flow, computing digs into the realm of hardware and software components, including personal computers, servers, and operating systems. The study also breaks down the crucial elements that support ICT systems. It goes in-depth on the function of hardware in processing data, including CPUs, memory, and storage devices. The crucial role that software elements, including as operating systems, applications, and programming languages, play in allowing human-computer interaction and problem-solving is discussed. The report also looks at the crucial function of information and data management systems, highlighting the importance of databases, data analytics, and cybersecurity in the ICT environment.

KEYWORDS:

Communication Technologies,Data analytics, Elements, Information.

INTRODUCTION

The smooth interchange of information and communication in our digital era is made possible by information and communication technology (ICT), a multidimensional field with a variety of sorts and vital components. These include computing, which involves the intricate interaction of hardware (such as processors and memory) and software (such as operating systems and applications), telecommunications, which covers a wide range of communication methods from traditional landlines to cutting-edge mobile networks and satellite systems, and networking, which is the foundation of the Internet and includes protocols and technologies that facilitate data transfer. Hardware, software, and data management systems are also essential elements of ICT. Together, these elements enable people, organisations, and governments to harness technology for improved productivity, creativity, and connectedness in an increasingly digital world. It is essential to comprehend these categories and elements in order to fully appreciate the scope and importance of ICT's influence on contemporary society.The smooth interchange of information and communication in our digital era is made possible by information and communication technology (ICT), a multidimensional field with a variety of sorts and vital components.

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Hardware, software, and data management systems are also essential elements of ICT. Together, these elements enable people, organisations, and governments to harness technology for improved productivity, creativity, and connectedness in an increasingly digital world. It is essential to comprehend these categories and elements in order to fully appreciate the scope and importance of ICT's influence on contemporary society.Telecommunications are the backbone of our interconnected world in the context of ICT. It covers a wide range of communication channels, from conventional landlines to modern mobile networks and satellite systems. The development of telecommunications has significantly changed how humans communicate, dissolving distance constraints and enabling global immediate communication. This category emphasises the crucial role it plays in our contemporary information culture by including not just voice communication but also the transfer of data, video, and multimedia content.

The digital era is being fueled by computing, another key element of ICT. It includes both software and hardware components that allow different applications and power devices. On the hardware side, there are a variety of specialised computing devices, servers, laptops, and personal computers, all of which include cutting-edge CPUs, memory modules, and storage systems. Users may carry out activities, find solutions to issues, and communicate with digital systems thanks to software components, which include operating systems and a wide range of apps. The fundamental building block of the digital world is computing.

The linked architecture that enables data to flow easily between devices and over the Internet is known as networking, or the "plumbing" of ICT. It includes a wide range of technologies and protocols, from local networks (LANs) that link devices in homes and businesses to global infrastructure (WANs) that connects continents and regions. The invisible threads connecting our digital world include networking technologies like routers, switches, and wireless access points, as well as communication protocols like TCP/IP.

ICT also comprises crucial elements that enable people, organisations, and governments to successfully utilise the potential of technology. The actual equipment, from servers in data centres to smartphones in our pockets, are referred to as hardware components. Each of these devices has a specific function in the processing and exchange of information. The interaction and manipulation of digital data is made possible by software systems, which include operating systems, applications, and programming languages. For storing, organising, and gleaning useful insights from the ever-expanding ocean of information, data management systems, databases, and data analytics tools are essential.In essence, ICT connects individuals, organisations, and countries while bridging geographical borders to serve as the contemporary backbone of our global society. In order to successfully navigate the increasingly linked and digitalized world we live in, it is crucial to understand its many kinds and components. This knowledge enables us to take use of technology's promise while tackling its problems and ethical issues [3], [4].

DISCUSSION

Information technology (sometimes known as "InfoTech") is the outcome of combining computer and telecommunication technologies. Any technology that facilitates the production, manipulation, resolution, communication, and/or dissemination of information is referred to as information technology (IT).

High-speed communications networks conveying data, sound, and video converge with information technology.Information technology (sometimes known as "InfoTech") is the outcome of combining computer and telecommunication technologies. 2005 (Williams and Sawyer). Any technology that facilitates the production, manipulation, resolution, communication, and/or dissemination of information is referred to as information technology (IT). High-speed communications networks conveying data, sound, and video converge with information technology.

Videoconferencing

With the use of this video output, individuals from various regions may interact. Using computers and communications, they are able to see and hear one other. This includes anything from desktop systems with some video cameras, microphones, and speakers to group conference rooms with cameras and multimedia equipment[5], [6].

Audio Conferencing

This is a technique to have a meeting or debate while everyone is on the phone. Only audio information is shared here. There isn't any direct communication. The only thing that is related is the noises. No matter where the pupils are situated, as long as they are linked, a teacher may have an audio conference with them.

The Internet

The Information Age is at its core at this point. The phrase "mother of all networks" refers to it. Anyone with a microcomputer and a way to connect it may access the extensive computer network. It is a huge computer network that links many smaller networks on a global scale. Satellites, cables, and wires make form the network. Internet networks connect people, businesses, non-profits, military organisations, and educational institutions.

World-Wide-Web (www)

This is the internet's multimedia component. It is often known as the "web." The system of servers on the internet that supports specifically structured documents in multimedia format is termed the media interconnected system of servers.

Local Area Network (LAN)

A localised network architecture known as a local area network (LAN) links computers and other devices within a specific geographic region, usually only one building or a collection of nearby buildings. High-speed data transmission capabilities offered by LANs make it possible for linked devices to communicate and share resources effectively. They are distinguished by their private ownership and management and are often created by businesses or people to promote efficient communication and information sharing. LANs, which may be wireless or wired and use Ethernet cables or Wi-Fi technology, are crucial for boosting connection and productivity in a variety of locations, including homes, workplaces, schools, and small enterprises. These networks are a crucial part of contemporary computer and communication infrastructures because they use particular communication protocols and often include security mechanisms to protect data integrity and privacy inside the constrained network environment.

Asynchronous Transmission

The majority of computers use this technique. Additionally known as start-stop gearbox. Asynchronous transmission sends data 1 byte (or character) at a time. Special control bits are used to bracket or mark off each group of bits that make up a byte. A character's beginning and ending are represented by'start' and'stop' bits, respectively.

The approach is rather sluggish since it only transmits 1 byte at a time. As a consequence, anytime there is a significant quantity of data involved, this transmission technique is not employed. The ability to deliver data whenever it is convenient for the sender is the sole benefit it possesses.

Synchronous Transmission

Instead of using the traditional start and stop bit patterns, this mode delivers data in blocks with synch bytes acting as the start and stop bits at the start and end of each block. The internal clocks of the transmitting and receiving devices are brought into sync with one another by these start and finish bit patterns. Because it is more sophisticated and costly than asynchronous transmission, this is seldom utilised with microcomputers. Both the transmitting and receiving devices need to be timed precisely. It is suitable for computer systems that must swiftly transport high-quality data. As you go through the course, more terminology and ideas that are not covered by the concepts will be explained[7], [8].

Micrographic & reprographic technology

Globally, libraries continue to employ these technologies extensively.The majority of research libraries contain photocopying equipment and can make copies of any material upon request. Microfilm or other comparable optical media (including study) are used for the high-density recording and storing of optically encoded information in the form of microimages of printed documents, bit patterns, or holograms. The word "microform" is used to refer to all information carriers that utilise these optical media (including study)[9], [10].

Networking Technology

The crucial role of networks is to link computers and other communication tools so that data may be promptly transmitted from one place to another. Networks provide widespread access to the resources that a library or collection of libraries has. It is a publicly accessible computerised library catalogue. The majority of OPACs are available to people worldwide through the Internet.

Library management software package:

Software is made up of the detailed instructions that specify what to perform for the machine. The most popular computer programmes used in a university library are library software for automation, database administration, antivirus protection, and applications. CDS/ISIS, SOUL, LIBSYS, KOHA, and other software packages are often used for automation in the area of library & information services and management. SYSTEMS FOR LIBRARY RETRIEVAL: This entails acquiring specialised CD-ROM databases via the use of the Compact Disc Read-Only Memory (CDROM) technical mechanism in a variety of courses, including those in the humanities, social sciences, law, technology, and agriculture. They may be bought commercially[11], [12].

RFID Technology

RFID (Radio Frequency Identification) is the most recent technology being utilised in libraries today to stop material theft. The phrase "radio frequency identification" is used to describe systems that employ radio waves to automatically identify certain products. It is the quickest, simplest, and most effective method of tracking, locating, and managing library resources. Libraries use it for automated check-in and check-out circulation processes as well as stock management. In terms of automation and security for libraries, it is a new technology that is more efficient, practical, and affordable. Bar codes and RFID are both widely utilised nowadays.Expanded reading ranges, quicker processing, and higher memory capacity are all results of ongoing RFID technology developments[13], [14].

CONCLUSION

Information and communication technology (ICT) is the cornerstone on which our linked world is constructed in the current digital era. This investigation of the many forms and fundamental elements of ICT emphasises its significant influence on society, from revolutionising data processing and communication to altering how we live and work. The fundamental components of ICT are telecommunications, computers, and networking, each of which facilitates the easy flow of knowledge and ideas. We are linked across continents thanks to telecommunications, which includes everything from conventional telephones to cutting-edge mobile networks and satellite systems. With its robust hardware and flexible software, computing enables us to carry out jobs, resolve challenging issues, and produce innovative digital products. By facilitating the flow of data and creating the invisible web of connectedness, networking enables the sharing of information on a worldwide scale. The essential elements of ICT functioning are at its core. From home computers to data centre servers, hardware components include a wide range of gadgets with the computing power, memory, and storage that power our digital world. Software systems allow us to communicate, process data, and complete activities effectively by bridging the gap between people and machines. Databases and analytics tools are only two examples of the data management technologies that assist us in managing the vast amount of information produced in the digital sphere.

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CHAPTER 4

INFORMATION AND COMMUNICATION TECHNOLOGY AND LIBRARIES: AN OVERVIEW

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ABSTRACT:

In recent decades, libraries have witnessed a transformation fueled by information and communication technology (ICT). This essay examines the significant effects of ICT on libraries, highlighting how technology has transformed how information is accessible, saved, shared, and used inside these vital establishments. This research investigates the complex integration of ICT into library services, including everything from the digitalization of collections to the adoption of cutting-edge library management systems and the emergence of online databases. Additionally, it evaluates the difficulties and possibilities brought about by this digital transition, emphasising the changing function of libraries as entryways to information in the digital era. In the end, this investigation highlights how important it is for libraries and ICT to work together to shape the information environment and satisfy society's changing requirements.

KEYWORDS:

Communication,Democratization, Libraries, Technology.

INTRODUCTION

A critical turning point in the development of information management and distribution may be seen in the confluence of libraries and information and communication technology (ICT). Libraries have evolved as dynamic centres at a time of fast digital transition, adjusting to the quickly shifting information environment. Information gathering, storing, accessing, and sharing have fundamentally changed as a result of the integration of ICT into library services. With the advent of this change, a new age of conventional libraries that expand into the digital sphere and provide limitless chances for information distribution and acquisition has begun. In this investigation, we set out on a thorough trip through the complex interaction between ICT and libraries, exposing the technical advancements, difficulties, and significant social repercussions that characterise this synergy.In addition to redefining libraries' roles, information and communication technology (ICT) integration has completely changed how society interacts with knowledge and information. Libraries have expanded outside their conventional bounds and the restrictions imposed by physical structures thanks to the development of ICT. With the democratisation of access to enormous digital information repositories, digitised collections, and online databases, libraries are now able to reach audiences across the world. This progress has ushered in a democratisation of information, giving people and groups hitherto unheard-of chances for lifelong learning, self-education, and research.

However, this change also carries with it a number of complex problems, such as concerns with internet access, privacy, and the ever-growing amount of information. The symbiotic link between ICT and libraries emerges as a cornerstone in forming the information environment of the 21st century as libraries continue to traverse this digital frontier.

Additionally, the incorporation of information and communication technology (ICT) into libraries has increased operations' efficiency and effectiveness while also widening access. Modern library management systems expedite cataloguing, circulation, and user services thanks to cutting-edge software and databases. This frees librarians to concentrate more on selecting and providing their customers with useful information. The use of ICT has also encouraged the development of online cataloguing systems and virtual libraries, allowing users to browse and access items from the convenience of their homes or portable devices. Through this accessibility, which crosses geographic boundaries and opens up information resources to isolated and underprivileged groups, inclusion is promoted and the digital gap is closed. The dynamic nature of libraries' role in an ICT-driven world is highlighted by the challenges they face as they work to adapt to this new digital environment, including the need to preserve and archive digital content, address copyright and intellectual property issues, and guarantee equitable access for all[1], [2].

DISCUSSION

The way information is collected, stored, and retrieved in libraries has undergone a significant transformation because to the application of ICT. In particular, conventional libraries have undergone a full transformation into digital libraries thanks to the internet. Information may be retrieved over the internet from across the whole cosmos. Users' usage of print resources and conventional libraries has already been impacted by the introduction and growth of electronic resources. Additionally, it has spurred a fresh wave of research on how people see and favour print and electronic resources. The method that information is kept and accessible has undergone a significant transformation in the digital era. "The phrase "digital library" as well as "libraries without walls" and "virtual libraries" are among the many new ones that are being used to describe libraries in the modern day. According to common perception, a digital library is an electronic counterpart of a physical library with digital storage that enables direct connectivity to collect materials and copyright them from a master version.

The way libraries operate in different parts of the globe has changed due to the development of technology. Since the start of the twenty-first century, libraries in India have begun to make an attempt to transform from being organisations reliant on manual procedures into ones that are contemporary and entirely or partially reliant on ICT applications. Since most academic libraries in India are leaning towards computerising their operations, this adaptability of ICT-driven library operations that would properly and effectively address the information demands of patrons has been extensively recognised in existent literature. No academic library in the nation has been fully automated or computerised, although many of them are in various phases of adaption towards having their operations be ICT led or ICT dependant. Academic libraries provide information services to faculty members, students, researchers, and other academic oriented people. Academic libraries are libraries that are affiliated to post-secondary institutions, and they are as different and unique as the institutions they are intended to serve. University libraries and non-university libraries may both be classified as academic libraries (Aina, 2004). University libraries are the most advanced category of academic libraries in India; they get higher funding than other categories of libraries and provide the kinds of information services that are available everywhere in the globe.

ICT is a technology that academic libraries in India employ to address the information needs of its users, who in this case are students and teachers. Academic libraries are created to help their parent institutions achieve their goals of fostering teaching, learning, and research. As a result, academic libraries are supposed to assist students, professors, and other academic community members. Academic libraries provide a range of services, including user education (orientation/instruction services), interlibrary loan/connection services, abstracting

and indexing services, referral services, and circulation services, to suit the information needs of its patrons. Additionally offered are reference services, photocopying, internet services, and library book loans.Services, creation of reading lists and bibliographies, e-mail, internet access, CD-Researching, and publication are all available. ICT has altered how information is acquired, catalogued and categorised, circulated, controlled for serials, managed statistically, and used for administrative tasks like budgeting in libraries. As a result, consumers received information services that were more effective, and libraries and other information institutions as a whole performed better [3], [4].

Therefore, librarians are urged to take on the difficulties of seizing this chance to develop new skills to employ multimedia in information packing, repackaging, and distribution for the best service delivery in the twenty-first century.ICT has had an influence on many aspects of academic library work, but particularly on consortia, building, and collection development plans. ICT gives businesses the chance to provide their customers access to a broad range of digital information resources as well as information services with value added. Academic libraries are also utilising contemporary ICTs to automate their fundamental operations, set up effective networks for library cooperation and resource sharing, put in place management information systems, create institutional repositories for digital local content, create digital libraries, and launch ICT-based programmes for patrons.

Academic library and information services have undergone unprecedented changes and transformation thanks to information and communication technology (ICT). ICT makes it possible to provide traditional library and information services like OPAC, users' services, reference services, bibliographic services, current awareness services, document delivery, interlibrary loan, audio visual services, and customer relations more conveniently and effectively. Changes in format, content, and production methods as well as changes in how information products are delivered characterise the influence of ICT on information services. The emergence of the internet as the largest information and knowledge repository, the transformation of librarians and information science professionals' roles from intermediary to facilitator, the transition from a physical to virtual services environment, the abolition of some traditional information services, and the emergence of new and innovative web-based.

The library's collection is no longer restricted to the physical space that a user must physically visit. Due of consumers' lack of time, printed collections have grown more costly and difficult to obtain. The invasion of technology has drastically altered how information is processed. No library today can confront the users' expectations when using printed sources of information. Information is being used as a main source of information by individuals. The internet may be utilised to efficiently satisfy information demands and retrieve information. All sorts of libraries today see ICT-based resources as being of utmost significance, and their budgets are being significantly reduced as a result. They are widely used.

The space issue has been resolved thanks to these resources. Academic libraries are important sources of information for many types of study. According to Ahmad and Fatima, the services that academic libraries presently provide to their clients have altered as a result of the accessibility of internet resources. It has altered the way that libraries previously provided information to patrons. Users now have online access to a wide range of information and academic publications.

There aren't many information resources accessible in libraries, but there are a tonne on the internet. E-books, e-reference materials, academic databases, e-conference proceedings, e-thesis/dissertations, and other electronic resources are now available via the library. These e-journals, as well as aggregated e-journal databases from the vast majority of digital library holdings, are expanding very quickly. "E-journals are the digital versions of their print counterparts and include a tonne of extra features.

Online journals, electronic periodicals, and electronic serials are terms that are often used interchangeably to describe e-journals. In 2010 (Sreekumar). No library has the resources to purchase every journal in a certain field. Journals of science and scholarship are published in a variety of formats, including CD-ROM, floppy disc, and the internet. E-journals are distributed through CD-ROM and the internet[5], [6].

CD-ROM may be used the same way as other forms of media. Many journals are accessible online for free. Publishers are adopting the internet as a publishing platform. Many e-journal publishers, including Elsevier, the American Chemical Society, H.W. Wilson, Academic Press, Springer, Oxford University Press, and others, produce e-journals and make them available to readers via their websites. Many open access journals are available online, cost-free, and without copyrights or other limitations.Since the 1940s, western nations have advanced the use of information technology in libraries and information centres. The application of information technology in developing nations began in the 1960s and is now in various phases. The technique of information collecting, processing, storing, and disseminating has been particularly impacted by the fast growth of information and communication technology. The situation of libraries and information services has undergone a significant transformation as a result of the development of the Internet. The effect of information technology has given information professionals worldwide both possibilities and problems. The importance of Information and communication Technology is very huge for the library and information work[7], [8].

Advantages of ICT in Libraries

ICT integration into libraries has brought about a wide range of benefits that have significantly improved the efficacy and efficiency of library services. First, ICT has greatly increased the breadth and accessibility of information by enabling users to instantly access a wide range of digital resources, such as e-books, online journals, and multimedia archives. Second, the cataloguing and searching operations have been transformed by ICT-driven library management systems, making it possible to retrieve resources quickly and precisely. In addition to streamlining the user experience, this also makes it easier for librarians to organise and manage their collections. ICT has also expanded beyond the confines of actual libraries, enabling users to access information remotely, democratising knowledge, and reaching underprivileged populations. Additionally, common chores have been automated, freeing up employees to concentrate on higher-value services like research support and community participation. ICT has essentially transformed libraries into dynamic information centres, reinforcing their significance in the digital era and giving users easy access to a vast amount of knowledge[9], [10].

Disadvantages of ICT in Libraries

Although information and communication technology (ICT) has brought about a number of positives, its incorporation into libraries also has some significant drawbacks. First, there is the problem of the "digital divide," where those with little access to technology or the internet may be shut out of the richness of digital resources, resulting in unequal access to knowledge. Additionally, the significant infrastructure, software, and training costs necessary for ICT deployment might strain a library's already tight budget. Additionally, the quick speed of technology advancement needs continual staff training and regular upgrades, which presents difficulties for libraries with limited resources. Digital preservation is another issue since it is susceptible to data loss, format changes, and obsolescence. Last but not least, the ease of remote access may cause fewer people to visit libraries in person, which may have an adverse effect on the feeling of community and cooperation that physical library facilities generally engender. Therefore, even though ICT has many benefits, it is essential to carefully analyse and address these drawbacks if libraries are to fully realise their potential in the digital era.

A strong data protection strategy is required since patron data, including as borrowing histories and personal information, are maintained digitally. This may also pose privacy and security issues. Additionally, the abundance of digital information may sometimes result in information overload, making it difficult for users to go through and separate reliable sources from false ones. Last but not least, although digitization initiatives have increased access to documents, they may also lead to the neglect of physical collections, which might result in the loss of priceless historical artefacts and cultural heritage. Libraries must strike a careful balance between embracing technology's benefits and protecting against its possible downsides in order to successfully manage these problems, all the while guaranteeing fair access and maintaining the fundamental principles of libraries in the digital era[11], [12].

CONCLUSION

The marriage of libraries with information and communication technology (ICT) constitutes a transformational force that has altered the fundamental nature of libraries and their function in society, in conclusion. Libraries have transformed from being static collections of books to dynamic centres of knowledge and information thanks to the arrival of ICT. Libraries have embraced ICT to improve accessibility, broaden their influence beyond geographical restrictions, and provide people and communities unmatched access to a multitude of digital materials. In addition to revolutionising the way information is handled and communicated, this synergy has also created new obstacles, such as concerns about digital fairness and privacy as well as the need for effective data preservation measures.

However, it cannot be denied that the use of ICT has contributed to the democratisation of knowledge, supporting inclusiveness and lifelong learning. The symbiotic link between ICT and libraries highlights their lasting significance as guardians of information and gates to knowledge as libraries continue to develop in this digital era. By ensuring that the revolutionary potential of technology is used for the benefit of everyone, this progression reinforces the crucial role libraries play in promoting a more informed, connected, and empowered society.

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CHAPTER 5

ICT USE IN LIBRARIES REGULAR ACTIVITIES AND SERVICES

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ABSTRACT:

Information and communication technology (ICT) has transformed the conventional functions and services of libraries in the contemporary world. This essay explores the many ways that ICT is used to improve and expedite the routine services and activities that libraries provide. This research investigates the broad effects of technology on library operations, including digitizing collections, installing library management systems, enabling online catalogue searches, and providing remote access to digital resources. Additionally, it draws attention to the difficulties and possibilities associated with ICT adoption, highlighting the crucial role it plays in addressing the altering demands of library users in the digital era. In the end, this investigation highlights the mutually beneficial link between libraries and ICT, promoting a greater comprehension of how technology is transforming these crucial institutions in our information-driven society.

KEYWORDS:

Activities,Digitization, ICT, Regular Services.

INTRODUCTION

Libraries have not been unaffected by the unrelenting march of technology in our day. Information and communication technology (ICT) has subtly altered the landscape of library services and operations by integrating itself into the very fabric of these historic institutions. This change marks a revolution in how libraries function and engage with their users, not just an adaptation to modernity. Among other improvements, ICT has made it possible for libraries to digitise their holdings, create complex library management systems, and provide online catalogue searches. These programmes have improved libraries' productivity while also opening up previously unthinkable new avenues for information access. In this investigation, we go through the many ICT applications in libraries to see how technology is changing the fundamental functions and offerings of these crucial informational hubs in our increasingly digital world.Information and communication technology (ICT) integration in libraries has sparked a transformational wave that affects the range of routine services and activities offered by these organisations. The digitalization of collections is one of ICT in libraries' most significant effects. Libraries, previously renowned for their enormous bookcases filled with actual books, today include an ever-expanding digital collection of e-books, electronic journals, multimedia resources, and archive documents. This digitization endeavour broadens access by enabling users to explore and borrow digital resources from almost anywhere with an internet connection in addition to preserving and extending the life of physical items[1], [2].

ICT has also completely changed how libraries run their businesses. The use of sophisticated software and databases to power library management systems (LMS) has replaced manual record-keeping and made effective cataloguing, circulation, and inventory management possible. These tools automate repetitive operations, relieving library employees of administrative duties and providing them with important time to focus on providing more individualized customer care and community participation.Another distinguishing feature of ICT use in libraries is the ability to do online catalogue searches.

With just a few clicks, users may now put holds on items or apply for interlibrary loans while browsing a library catalogue from a distance. This ease improves the user experience and inspires visitors to thoroughly explore the library's offerings. In addition, reference services have undergone a revolution thanks to ICT usage. Customers may quickly and completely get answers to their questions using online databases and search engines that are available both inside and outside of library buildings. Through email, chat, or video conferencing, librarians and users are interacting more often, bringing reference services online.Unrestricted access to digital materials is one of the major advantages provided by ICT. Customers no longer need to physically visit the library since they have access to e-books, research databases, and other digital information from the comfort of their homes. This feature not only supports inclusiveness but also the flexible and convenient contemporary living.

Additionally, ICT makes it possible for libraries to provide specialised services like data visualisation, virtual reality encounters, and online courses or webinars, enhancing the range of educational and cultural options accessible to visitors. In addition to meeting the community's wide range of needs and interests, these cutting-edge services also help to establish libraries as vibrant hubs of education and inquiry.

ICT in libraries offers many benefits, however there are still problems. To ensure long-term accessibility of digital assets, libraries must overcome challenges with digital preservation. Budget restrictions for purchasing and maintaining ICT equipment and resources are another issue they struggle with. Additionally, worries about privacy and data security need the careful protection of customer data. ICT has a ubiquitous impact on libraries that goes well beyond simple automation; it transforms the fundamental nature of these organisations. Examples of how ICT improves standard library operations and services include the digitalization of collections, effective library administration, online catalogue searches, and the availability of remote access.

The relationship between ICT and libraries continues to be crucial in helping these institutions satisfy the varied and constantly changing requirements of their users while also reinforcing their ongoing importance in our information-driven society as libraries continue to adapt and develop in the digital era[3], [4].

DISCUSSION

Globally, library and information services have been revolutionized by information and communications technology (ICT). All people now have access to information thanks to the Internet. The pace at which knowledge, information, and data are being converted to electronic format has drastically grown thanks to technological advancement. The way information is organised, saved, accessed, and retrieved has changed as a result of developments in the software industry's ability to create sophisticated knowledge management software (Tam & Robertson, 2002:2).

Libraries have historically served as centres for educational materials. They have offered academics and researchers access to knowledge from the beginning. It is challenging for any library to be a useful learning resource because of the continuously rising volume of information that is created and published, the growing methods of information storage and retrieval, and the continuously changing education and research demands of library users.

The main function of a library is to promote people's pursuits of education, leisure, culture, economic development, and technology in their local communities. Although it is not readily apparent, technical services is thought of as the central department to the library. Its operations and services are so essential that it is safe to say that a library without a technical services department is dead, according to the National Policy on Education (2004).

The majority of the duties performed by the technical services department need not just specialised training but also a solid knowledge. The technical services department's activities all contribute significantly to the efficient and successful operation of the library, thus it is important to understand the distinction between normal library operations and technical services.According to Tauber (1954), technical services in libraries "involve the operations and techniques for acquiring, recording, and preserving materials." Tauber continues by defining "service" as all the effort associated with a certain activity, like acquisitions[5], [6].

Concept of Technical Services

One of the first facets of librarianship is technical services. One of the first facets of librarianship is the provision of services including the methods and procedures for collecting, cataloguing, and conserving resource. Who tracks the development of technical services in academic and research libraries from 1876 to 1976, the phrase "technical services" is relatively new.The idea of technical services, which include activities for collection and processing, was originally put forward in written form by Coney at the University of Chicago in 1939. Major technical services activities include:

Acquisition of library resources

Acquisition of library materials, or the beginning of technological services, is the starting point for those provided by the library. In this sense, "stock" refers to any paper or digital resource that is utilised to fulfil informational demands. Professional librarians often have exclusive access to stock procurement. An acquisition policy is often involved in the purchase of library materials. The selection of materials to be obtained is guided by a defined strategy called the acquisition policy, which is typically agreed upon.

Cataloguing and Classification

The main organisational tasks carried out by the technical services are cataloguing and categorization. "Making available" is the key element in this situation. Materials become disorganised after purchase, making it harder for customers to recover the item. Information retrieval is made feasible by cataloguing and categorization processes since every library seeks to acquire, maintain, and make materials accessible.

Application of ICT on Technical Services

According to Nwankwo (2006), the greatest strategy to help researchers successfully address their literature needs for successful research activities is to use ICTs to library works and services. This is so that efficient reference and information services can be provided, network operations like cataloguing, authority control, inter-library loans, and cooperation can be used, and libraries can participate in global bibliographic projects, the author claims.

Cataloguing and Classification

Another technical function where ICT has been used in libraries is cataloguing and categorization. The use of ICT has significantly altered cataloguing and categorization. The creation of Machine-Readable Catalogues (MARC), Online Computer Library Centre (OCLC), and Online Public Access Catalogue (OPAC) is credited to the author's use of ICT in library cataloguing and categorization. He claims that all of these have changed the cataloguing process and are enabling libraries to tap into regional, national, and worldwide networks in order to expedite their cataloguing procedures.

Countered that ICT has not altered how the cataloguer does his job but, rather, has highlighted the necessity for the cataloguer to be technically and strategically competent. However, the author argued that ICT has made Machine Readable Catalogues of libraries more widely produced and accessible.

Cataloguing

Users of the library catalogue may search for the same information simultaneously using multiple terminals thanks to the online public access catalogue (OPAC), which is conceivable but not possible with the conventional card catalogue. Additionally, visitors may utilise ISSN, ISBN, and combinations of title and author to search the online library catalogue. Users get overdue reminders in their e-mails once they have produced them.A Web-based interface has now replaced the card catalogue that was replaced in the early 1990s. As a result, accurate information maintenance, typically handled by library support staff, is required, and as the capacity to store and access information has increased, so too has the sophistication and technical expertise required to handle the amount of information added to the library's own knowledge base each year. It's also vital to remember that the online catalogue is a web-based catalogue and can be accessed from anywhere.

Librarians have long been aware that the objective of making materials and information resources accessible would have been challenging without cataloguing and categorization. Remote libraries may now access the massive databases of large libraries in industrialised countries to adopt or modify their bibliographic data for their own library usage thanks to the development and widespread use of ICT; in fact, online catalogues have completely changed the landscape of libraries worldwide. categorization and categorising (Adeleke Olorunsola, 2010). The cataloguing and classifying process has been stress-free thanks to the Internet and many web-sources. A resource may now be classified or catalogued in the shortest amount of time thanks to organisations like the Library of Congress (LC). The Library of Congress' enormous holdings of materials is represented via a database of records called the LC online catalogue.

Cross-references, annotations, circulation statistics, and details about library items that are currently being acquired are all provided through the online catalogue. Information from LC catalogue entries on various resources (books, serials, manuscripts, cartographic materials, computer files, sound recordings, music, etc.) is readily accessible to the public and may be quickly imported or copied. The introduction of library automation software has made it feasible to do all of the cataloguing tasks. Time spent cataloguing has been decreased thanks to the import of bibliographic data from reputable websites like OCLC World Cat and Trove - National Library of Australia.

Metadata may now be easily catalogued and made as soon as feasible accessible to users by importing it in MARC format. By importing bibliographic records, resources including books, microfilm, audio, videocassettes, CDs, and pamphlets are categorised; necessary fields are manually changed in accordance with the library's requirements. The user receives updates from automation software on the status of the library resources. Following the processing of books or any other requested resources, consumers are automatically reminded about the availability of books[7], [8].

Classification

With the advancement of technology, internet tools have made categorization work feasible. One may get the whole bibliographic record of the library resources from one of the various online catalogue entries that are accessible. We can find the categorization number in the catalogue record together with the record itself. You may search the catalogue record and copy the data for your own catalogue preparation using the British Library catalogue, Trove-National Library of Australia catalogue, and Library of Congress online catalogue. There are various online places where library resources and items may be classed in addition to the categorization information provided by these libraries in their catalogue records. Examples of online categorization tools include Web Dewey, LOC classification web, and OCLC classify.

Acquisition of Library Resources

Libraries may now place orders, pay publishers and retailers, and evaluate and authenticate new items thanks to the trustworthy sources provided by ICT utilities. In the context of ICT application, choosing information resources also entails considerations like site licences and choosing between stand-alone CD-ROM workstations and networked CD-ROM subscription. It is necessary for librarians in charge of acquisition to understand how to obtain gateway access to How to include electronic resources into collection development strategies from commercial suppliers, as well as how to choose between purchasing print or electronic versions of resources. They must also decide whether to purchase a resource or use another method to acquire it. When public libraries in Nigeria implement the discussion on the use of ICT in acquisition/collection development procedures, it would have a significant influence on their operations.

The web has greatly eased the process of acquisition. Using ICT technology, tasks like making orders and checking for duplications and prices are completed extremely successfully. It is now simple to place orders for library items online, receive requests, or make recommendations. The amount of effort has decreased as a result of publishers and sellers being accessible via the internet, such as Amazon, Flipkart, Infibeam, etc. This allows time to be saved and used to other services. The ability to download invoices from websites speeds up service and prevents mail delays. Email makes it easier to send reminders to book publishers, sellers, and even book borrowers (Antherjanam & Sheeja, 2008). Online book stores and publisher websites free up the librarians' time. Orders for journals are made with publishers on the Internet in the format specified. The ability to download invoices from websites speeds up service and prevents mail delays. Email is useful for reminding book publishers, sellers, and even book-loan recipients. The university library's serial control procedure benefits from IT as well. It facilitates the creation of a union list of serials and facilitates email distribution to the branch libraries. It offers consumers, including personnel, alert services. The user community is routinely sent a list of the library's latest additions. The main effect of ICT in the technical area is this service[9], [10].

Collection Development

Collection development is the process of choosing and acquiring library resources based on the requirements of present and future users. Management of collections extends beyond this. It is focused with controlling how a collection is used, stored, and made available. This makes collection development a subset of collection management. ICT may help collection growth by giving users access to a larger variety of information resources, but it also has a detrimental effect on how libraries build their collections.Academic librarians work in a time of unmatched information accessibility. More than 172 000 journal titles are listed as being available in the most recent edition of Uhlrich's. Even if this seems like a most perfect circumstance it is not because the acquisitions departments' financial resources have not necessarily risen.

The sheer amount of information accessible makes it difficult to choose the best information. Collection management has become a highly demanding and complicated activity as a result of the effect of electronic resources. Budgetary restrictions, a wide variety of formats, and constantly shifting user demands all exist. Collection management include taking part in activities including requirement analysis, contract negotiation, and resource appraisal.

Digital preservation of data

The cost of converting material into digital format and preserving it is one of the biggest expenses confronting academic libraries. This excludes the price of converting audio-visual content and the cost of the annotation for indexing purposes.

The fact that the technique utilised to preserve these pages as a digital picture produces big files that have storage implications and create demands on band-with is one of the issues with turning recordings into digital images. The money set out for digital content preservation is often insufficient. This is due to the likelihood that long-term digital preservation costs will be quite costly. The expense of archiving digital content and the computer systems required to retrieve it are likewise difficult to predict. There are various difficulties with digital material preservation. The fact that computer technology is evolving at an unparalleled pace adds to its complexity[11], [12].

Bibliographic Service

A large portion of LIS labour, especially in research and academic libraries, involves compiling bibliographies, reading lists, and state-of-the-art reports.It takes a lot of time and effort to manually search through abstracts and indexes, and the results are not always current.Databases that are available electronically on CDROM or online make it easy, quick, and affordable to get information. Additionally, electronic databases provide special search functions including searching on several parameters (keyword, topic, author, source, categorization code, year of publication, language, etc.), as well as a selection of display formats and styles. Many databases also provide cutting-edge capabilities like natural language query rating the search results. entire text searches and links to the papers' entire texts are made possible via web-based services. Some of the well-known database firms that provide bibliographic and reference databases on CDROM and online platforms are Dialogue, STN, and Silver Platter.

Serial Control

Periodicals and serials form the foundation of the library.The fastest information access concerning the specific resources is provided by automated serials management. The serial control programme may be used to carry out the following tasks:

1. Current holdings status
2. Tracing missing volume and issue
3. Preparation of budget for periodical subscription
4. Preparation of periodicals list and its verification
5. Online Letters to publishers, vendors, etc.
6. Processing of online electronic magazines and receiving copies of the periodicals
7. Preparation of New arrivals

ICT has now been included into the administration and control of serials in libraries. It is not unexpected that automation was hesitant to play a substantial part in the administration and control of serials given that they reflect a highly complex environment (De Kamp, 1983). The author explained how software created by Swets and Zeitlinger B.V., a firm that produces computer software for service-oriented businesses, works to manage serial publications in libraries.

Among other topics, he covered ordering, cataloguing, claiming, financial control, reporting, check-in, routing, duplicate issue storage and distribution, management reports, and other steps in the process of managing serials via automation. In a similar spirit, Chizoba (2011) said that the use of ICT in serials management makes it easier to do both prospective and retroactive information searches. He said that regular tasks connected to registering and checking orders, confirming payments, renewing journal subscriptions, issuing claim letters for unreceived serials issues, and other associated duties are made easier by ICT. The ICTs used in the serial unit are based on the tasks carried out by the unit. These tasks are identical to those carried out in the library; therefore the serials unit uses ICT resources, however with attention for the unique characteristics of serials.

ICT services include, among other things, computer bar-coding technology, database services, electronic books, electronic journals, networking technology, chat services, electronic resources (CD-ROMs), indexing and abstracting services, document scanning services, bulletin board services, Online Public Access Catalogue (OPAC), library management software package, RFID (Radio Frequency Identification, p. The following services may be provided by ICT facilities in the serials unit: subscription control, the procurement process, order preparation, fund analysis, and accounting. They may also be used. ICT has now been included into the administration and control of serials in libraries. It is not unexpected that automation was hesitant to play a substantial part in the administration and control of serials given that they reflect a highly complex environment (De Kamp, 1983). The author explained how software created by Swets and Zeitlinger B.V., a firm that produces computer software for service-oriented businesses, works to manage serial publications in libraries. Among other topics, he covered ordering, cataloguing, claiming, financial control, reporting, check-in, routing, duplicate issue storage and distribution, management reports, and other steps in the process of managing serials via automation. In a similar spirit, said that the use of ICT in serials management makes it easier to do both prospective and retroactive information searches. He said that regular tasks connected to registering and checking orders, confirming payments, renewing journal subscriptions, issuing claim letters for unreceived serials issues, and other associated duties are made easier by ICT. The ICTs used in the serial unit are based on the tasks carried out by the unit. These tasks are identical to those carried out in the library;therefore, the serials unit uses ICT resources, however with attention for the unique characteristics of serials.ICT services include, among other things, computer bar-coding technology, database services, electronic books, electronic journals, networking technology, chat services, electronic resources (CD-ROMs), indexing and abstracting services, document scanning services, bulletin board services, Online Public Access Catalogue (OPAC), library management software package, RFID (Radio Frequency Identification, p. The following services may be provided by ICT facilities in the serial's unit: subscription control, the procurement process, order preparation, fund analysis, and accounting. They may also be used[13], [14].

CONCLUSION

Libraries have entered a revolutionary period as a result of integrating information and communication technology (ICT), which has changed the nature of their routine operations and services. This tour of ICT applications in libraries demonstrates how doing so has resulted in a dramatic transformation in how libraries function and provide services to their users, rather than just an adjustment to the digital age.The cornerstone of this revolution, the digitization of collections, has drastically increased access to a variety of digital resources, democratising knowledge and removing geographical limitations. By automating activities and allowing librarians to concentrate on individualised services, the deployment of library management systems has improved operations.Information retrieval has become more effective and accessible thanks to online catalogue searches, and remote access to digital resources fits nicely with contemporary lives and encourages inclusion. In order to improve reference services, librarians have embraced technology and worked with clients in both real and virtual settings.A dynamic learning and cultural environment is fostered by libraries' diversification of their offerings with specialised services and cutting-edge programmes. This digital progress is not without difficulties, however; they include issues with data security, budgetary restraints, and digital preservation that require continual attention.Libraries remain steadfast information centres in the digital era, and their symbiotic connection with ICT continues to be essential in addressing the changing demands of society. ICT enables libraries to be dynamic hubs of learning, research, and community participation rather than only repositories. Libraries continue to be indispensable as they navigate this dynamic environment, acting as knowledge-beacons and stewards of the past, present, and future.

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CHAPTER 6

EXPLORING THE ICT APPLICATION CONTENTS TO READERS SERVICES

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ABSTRACT:

The way libraries and information institutions interact with customers and improve their reading experiences has been completely transformed by the deployment of information and communication technology (ICT) in reader services. This article explores the many ICT applications in reader services, illuminating the digital tools, platforms, and approaches libraries use to meet readers' changing requirements and preferences. This research examines how technology is changing the landscape of reader services, from digital catalogues and personalized suggestions to virtual reading communities and accessible formats. It also looks at the potential and difficulties brought on by the use of ICT, highlighting its importance in nurturing a love of reading, increasing literacy, and introducing readers to a world of information and creativity.

KEYWORDS:

Application, Dramatic revolution, Readers, Services.

INTRODUCTION

In the digital age, reading and literature have experienced a dramatic revolution, and the incorporation of information and communication technology (ICT) into reader services is at the core of this transition. The possibilities for reader involvement, connectedness, and personalisation have all been extended by ICT, which has also completely changed how readers access and consume material. This investigation dives into the many uses of ICT in reader services, revealing how technology has completely changed how libraries and information organisations provide services to their users. A dynamic symbiosis between technology and literature has been fostered through the incorporation of ICT, from digital catalogues and e-books to personalised suggestions and virtual reading communities. We set out on a thorough trip through the ICT applications in reader services in an ever-changing environment, illustrating how technology is fundamentally changing what it means to read and connect with literature.

In addition, the development of information and communication technology (ICT) has changed not just how we read but also how libraries and other information institutions interact with readers. ICT applications include a broad range of digital devices, platforms, and tactics that are tailored to readers' various requirements and preferences in our increasingly digital environment. We will dig into the diverse range of ICT uses in reader services in this investigation, revealing the creative ways that technology improves the reading experience.

The contents of ICT applications are transforming how we find, interact with, and share the written word. These contents range from personalised recommendation algorithms that link readers with their next literary adventure to digital catalogues that provide fast access to a wide range of titles. We will also look at how online book clubs, virtual reading communities, and accessible formats are promoting a feeling of community and inclusion among readers, bridging geographic divides and facilitating lively debates.

We will explore the obstacles and possibilities given by ICT adoption as we move through this exciting confluence of technology and literature, highlighting its critical role in encouraging literacy, a love of reading, and a worldwide community of voracious readers [1], [2].

DISCUSSION

Circulation services describe the methods used to loan out library resources to patrons through the lending systems set up in libraries. It has to do with borrowing and returning library resources over time, both from users and to the library. There are many circulation procedures in use, but the most well-liked is the Browne system, which calls for the employment of:

1. Reader's ticket which determines the number of books that can be borrowed at a time.
2. Book pocket to accommodate book card.
3. Book card which carries details of title, author and call number of book.
4. Date due label on which date by which material must be returned is indicated.

The system keeps track of who borrowed what and when it was due back and enables library employees to loan out library goods. The laborious operation of charging and discharging in the manual process of circulation may be eliminated using computer technology. Similar to maintaining the list of borrowers, overdue materials may be maintained automatically using automated resources. The following circulation services are provided: user registration, holding materials for users in need, brief loan services, shelving and shelf reading, precise record-keeping of transactions, and essential statistics.

Another essential area of library and information science where ICT is applied is circulation management. ICT-based document delivery services have taken the place of manual document delivery methods since they provide the intended results more slowly. The primary responsibilities of circulation staff include lending and renewing materials, placing things on hold, charging and releasing library materials, and fining patrons who have overdue materials. These jobs are now less strenuous because to ICTs. These tasks are easily and quickly completed by the automated system.The automated management system's circulation control module's data allows for improved stock management since overdue warnings are automatically created and the amount owing is instantly known. These days, other libraries may access automated libraries over the Internet. Similar to this, libraries or users may request papers online and get them by email. The British Document Supply Services (BLDSS) is an excellent example of a company that offers ICT-based document distribution services.

The use of ICT in circulation operations improves the lending and finding of library information processes. Additionally, it offers correct information on overdue materials, up-to-date information on lending services, use data, and the preliminary printing of circulation lists, as well as information on penalties and payment from library defaulters. Using computer technology might simplify the process of running the library's circulation department. In certain libraries, borrowers may self-issue items over the Internet. If the lending limit has been reached, the borrower's status may be determined. The other products that are out on loan are immediately made visible to the borrower. Additionally, a computer might indicate if the requested item is damaged or unavailable. It is also possible to reserve the informative items you want. Also, information supplied by a computerised circulation system may help with efficient stock management. The amount of fines collected may also be seen by the library at a glance. Time for sorting past-due cards is always saved.

Because of the increased efficiency brought about by ICTs, librarians must have the necessary computer competences and abilities to remain relevant in this information-driven era. The skills librarians need to be successful in the information world. These abilities may be categorised into three categories: solid technical capabilities, information literacy teaching abilities, and content management abilities.

The conventional field of librarianship may evolve as a result of skills, which might be categorised as general professional criteria. In order to promote variety and provide the groundwork for ongoing, creative learning, librarians must be adaptable users of digital technology. Therefore, by making good use of computer technology, librarians must rethink how to employ conventional library abilities and consider novel applications for these talents[3], [4].

The use of electronic tools like computers, barcode scanners, and library management software helps to carry out ordinary circulation activities in the simplest and fastest method thanks to the use of ICT in circulating services. The development of barcode technology has sped up library transactions. Today, we rely on the internet, email, telephone, and other technologies for all forms of communication. The daily operations of the circulation department of the library also make use of these technology. Basically, ICT is used in the circulation to carry out the following tasks:

1. Issue, returns
2. Overdue reminder
3. Renewal
4. Reservation of books/documents
5. Membership registration
6. User guides
7. Daily check-in and check-out statistics

Another essential area of library and information science where, ICT is applied is circulation management. ICT-based document delivery services have taken the place of manual document delivery methods since they provide the intended results more slowly. The primary responsibilities of circulation staff include lending and renewing materials, placing things on hold, charging and releasing library materials, and fining patrons who have overdue materials. These jobs are now less strenuous because to ICTs. These tasks are easily and quickly completed by the automated system.

The automated management system's circulation control module's data allows for improved stock management since overdue warnings are automatically created and the amount owing is instantly known. The authors claimed that other libraries may access automated libraries through the Internet. Similar to this, libraries or users may request papers online and get them by email. They said that there are other ICT-based document delivery service providers throughout the globe, with the British Document Supply Services (BLDSS) serving as an excellent example.

Olaniyi, Omotosho, Oluwatosin, Towolawi, and Grant-Ezeronye (2012) presented a library readers' desk management system with the use of finger biometric and barcode technology to activities of a library's readers' services, highlighting yet another aspect of the use of ICT in circulation control. The method may cut down on the time and mistakes involved in charging in and charging out books to library users as well as in the identification and authentication of users and library materials. Although Close Circuit Television (CCTV) would also be a significant aspect in providing almost absolute security, the authors contend that biometric scanners like finger print and face recognition provide security a better advantage. Users won't require ID cards anymore, but access will still be quick and secure, they noted[5], [6].

Stock-taking/Verification

The most crucial use of computers is stock checking. The storing of the library via the computer's database allows for the verification of the stock to be done.Through the use of an RFID reader and barcode scanner, the library's inventory is scanned and data is gathered. These data are gathered and compared to data found in automation software. We can determine how many books have been lost in this method.

Reference/ ILL Service

Utilising computer and internet technologies has made the reference service quite straightforward. On the internet, many different kinds of information resources may be utilised to provide consumers the information they need, including encyclopaedias, directories, dictionaries, databases, online library catalogues, maps, biographies, patents, and online information resources. Questions in the reference area are handled over the phone. The library staff makes use of email and the Internet to provide quick reference services. The reference section has been very quick thanks to the computer. Here are some examples of how technology is used in reference services:

1. Library staffs fulfil the demands of the users through various electronic resources like database, library catalogue database, directories etc.
2. In reference service, services are also provided to the users regarding information available on the internet after getting delivered through the computer.

Reference services in academic libraries are seen to have been significantly impacted by the use of ICTs listed the implications, which included altering conventional services, introducing new services, eliminating middlemen, and expanding services to distant customers. Internet access, online searching, e-queries, and online public access catalogues are some of the ICT resources listed as supporting efficient reference services in libraries.One of the most crucial ICT tools for providing reference services is probably the internet. According to Ilo, the electronic resource is now having the most influence on the professional activities, services, and operations of librarians.First of all, compared to other resources utilised in a library context, it is more active and comprehensive. In addition, it offers a channel of communication that has expanded the possibility of librarians for contacts outside of the actual library (with patrons, colleagues, and other professionals), beyond any prior capabilities, and in a variety of novel ways. The biggest technological development that has an impact on online searches is the internet[7], [8].

An essential reference tool in today's information system is the online database. It may be characterised as electronic data repositories that are accessible via the host computer or through computer networks. Given that articles and books are now accessible online electronically, online searching as a reference tool is crucial. Information that is needed may now be accessed online by users and reference librarians. It facilitates and speeds up access. A Web-enabled modern reference service called E- Query Service is made available to the library's registered users mostly via emails. Since it makes information retrieval simple, the online public access catalogue (OPAC) is a need for reference and circulation operations in the library. It is a crucial resource for discovering both materials kept in the library and information kept elsewhere but accessible online. Anytime, anyplace, you may access a web-based OPAC system over the internet.

Both synchronous and asynchronous ICT facilities are employed in reference services. Asynchronous reference services, like email reference services, entail a lag between receiving a query and responding with a response. It is comparable to email reference services in which a user submits a question in the form of a message and waits for a response. In addition to utilizing e-mail, it also entails filling out online forms and using 'Ask A' services and other

similar services. Even when the library is closed, a user may still submit a request, and the reference librarian will respond as soon as possible by email, fax, or phone. Synchronous reference services feature transactions that happen in "real time" and provide an instantaneous answer to a user's inquiry, which is why they are also known as "real-time digital reference services." Video conferencing, Voice over Internet Protocol (VoIP), chat reference, and digital reference robot are all employed in this kind of reference service. These have ramifications for reference services in that it is challenging to determine the urgency of the information, which may result in urgent inquiries being unanswered; users may have to wait for a long time, which may be stressful; and it is labor-intensive. The disadvantages of using a synchronous reference service include information being sent more quickly than through email, the possibility of ignoring more important enquiries, the possibility of typing typos preventing users from omprehending the information they need, etc. Reference services, ICT, libraries, and information centres are characterized, who also examines the difficulties reference librarians have as a result of the use of ICT in libraries. He came to the conclusion that the use of ICT in libraries called for a new breed of information workers who needed to be well-versed in IT knowledge and abilities to operate in today's ICT-driven libraries. There is no possibility for public libraries to employ ICT to provide patrons reference services[9], [10].

CONCLUSION

Information and communication technology (ICT) applications in reader services have transformed the world of reading and literary interaction with their contents. This investigation of the many elements of ICT applications has highlighted the fact that technology may enhance reading experiences by linking readers to a world of literature that is always developing. ICT has enabled readers to explore, discover, and connect with books in previously unthinkable ways, from personalized recommendation algorithms that serve as literary guides to digital catalogues that provide quick access to a wide variety of literary treasures.

The emergence of online book clubs and virtual reading communities has increased readers' feeling of community and connection, transcending geographical borders and fostering a worldwide community of book lovers. It becomes clear when we consider the uses of ICT in reader services that technology does not replace the traditional pleasures of reading but rather serves as a supplement to broaden and deepen literary engagement. Additionally, it is essential for advancing literacy, closing the digital divide, and guaranteeing that everyone has equal access to information and creativity.

The contents of ICT applications in reader services continue to change in this constantly changing environment, bringing both possibilities and problems. Innovators in this shift include libraries and information organisations, which have adapted to accommodate readers' changing demands and tastes in the digital era. The adventure of reading remains fascinating and engaging as technology and literature continue to interact and inspire one another, led by the dynamic contents of ICT applications in reader services.

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CHAPTER 7

ICT ADVANTAGES TO RESOURCES AND MULTIPLE SERVICES

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ABSTRACT:

A new age of accessibility, effectiveness, and creativity has emerged within the library environment as a result of the use of information and communication technology (ICT) to library resources and services. This paper examines the various ways that information and communication technologies (ICT) improve the acquisition, organization, distribution, and utilisation of library resources, from digitizing collections to implementing integrated library systems to providing online catalogue searches, virtual reference services, and tailored user experiences. It explores the tremendous effects that ICT has on both users and librarians, highlighting the advantages of remote access, data analytics, and better resource management. It also draws attention to the difficulties and moral dilemmas involved with ICT adoption in libraries, providing a thorough comprehension of the dynamic relationship between technology and library services in the digital age.

KEYWORDS:

Development,Pivotal Point,Resources, Services in Libraries.

INTRODUCTION

A pivotal point in the development of libraries and information institutions is being reached with the incorporation of information and communication technology (ICT) into library resources and services. Libraries have evolved beyond their conventional functions in an age defined by the digital revolution, becoming vibrant centres of information and creativity. In-depth examination of the several ways that ICT has altered the availability of library resources and services, as well as how information is managed, distributed, and accessible, is provided in this investigation. ICT applications have improved the library experience for users and librarians alike by digitising enormous collections, creating complex library administration systems, and providing personalised user experiences. As we go across this digital frontier, it becomes clear that the incorporation of technology into library services is not only an adaptation but rather a deep transformation that emphasises the libraries' ongoing importance in our information-driven society.

Additionally, the introduction of Information and Communication Technology (ICT) has propelled libraries into a vibrant period of innovation in which technology melds with conventional library services. In our increasingly digital environment, ICT applications have brought forth a variety of digital tools, platforms, and tactics that enable libraries to adjust to the requirements and preferences of users as they change over time[1], [2].

In this investigation, we'll set out on a thorough tour through the many ways that ICT is used to library resources and services. We'll show you how digitising large collections using technology makes them available to a worldwide audience and automates repetitive chores so that librarians can concentrate on one-on-one contacts with clients and involvement in the community.We'll also go into the worlds of personalised user experiences, virtual reference services, and online catalogue searches to show how these innovations provide increased convenience, connectedness, and personalization for library users.

The advantages of remote access, data analytics, and improved resource management will also be highlighted, illustrating how ICT can revolutionize business processes for libraries.However, as technology continues to change the way libraries operate, new problems and moral questions arise that must be carefully considered. Navigating this dynamic nexus between technology and library services requires balancing the benefits of ICT with concerns about privacy, equality, and digital preservation.Libraries act as robust information hubs in the digital era, using ICT's capacity to act as doors to knowledge and innovation. In our information-driven culture, libraries play an essential role as information custodians and promoters of lifelong learning. The integration of ICT into library resources and services is not simply an evolution but a fundamental revolution[3], [4]

DISCUSSION

The library's collection is no longer restricted to the physical space that a user must physically visit. Due of consumers' lack of time, printed collections have grown more costly and difficult to obtain. The invasion of technology has drastically altered how information is processed. No library in the IT age can satisfy user needs with printed sources of knowledge. Information is being used as a main source of information by individuals. The internet may be utilised to efficiently satisfy information demands and retrieve information. All sorts of libraries today see ICT-based resources as being of utmost significance, and their budgets are being significantly reduced as a result. They are widely used. The space issue has been resolved thanks to these resources. Libraries are important resources for various types of study. The accessibility of internet resources has altered how the services are provided. offered by libraries to its patrons. It has altered the way that libraries previously provided information to patrons. Users may now access a wide range of information and academic publications online[5], [6].

Electronic Books and Texts

With the launch of Project Gutenberg in the l970s, electronic books first appeared. Later on, in the 1980s and 1990s, book sellers saw the possibility of offering electronic books on CD-ROM. In the early years of the new century, reading electronic book devices like the Rocket e-book were invented. E-books are not a new concept; they may be read online or off, on a variety of devices including PDAs and pocket PCs. Many free online books may be found at sites like Bartlebay.com, Books-On-Line.com, and free online books. It's all about mobility and information flow with e-books. E-book material in digital format escapes the pages of a traditional book since it is, quite simply, no longer attached to the physical book. The contents of an electronic book are contained in a digital artefact that is often conceived of as an electronic analogue of a physical novel. Various electronic books as well as other printed materials (such essays, poetry, or historical records) are accessible via the library. A number of these digital books and texts are included in large, searchable databases. The majority of our primary electronic book and text collections may be found via the Library’s Electronic Resources page. However, many more individual titles may be located using the Library Catalogue.

Electronic Journals:

E-journals are either free source or fee-based.The openness of certain e-journals varies. Openaccess journals are academic publications that readers may access online free of charge or any other restrictions. There are two methods to provide open access: green and gold. Green open access refers to self-archiving, when a researcher submits a copy of their work to one or more open access databases. On the other hand, gold open access publishes papers in journals that are open access and provide free access to their contents. Psycoloquy's editor in chief, Stevan Hamad, was one among those who originally advocated for access to the magazine to be made public. There are many factors that open access.

Due to the overwhelming majority of peer reviewed scientific journals, university libraries cannot hold all the titles necessary for the demands of the research team inside the institution. The serials crisis encourages open access as well. And most academic research is accessible to anybody with Internet access. You may locate online editions of our publications with the aid of the library's E-publications Database.Through Find It!, the Library now provides access to journals' electronic editions[7], [8].

Online Database and Image Databases

The earliest online databases were created in the 1970s.These included bibliographical information, references, and summaries of pieces from scholarly and professional literature. Since then, the range of internet databases has increased significantly. Databases on the internet and on CD-ROMs provide access to a wide variety of information. Business is the industry with the most databases, followed by science, technology, law, health, and life sciences. Numerous databases fall into one or more of the following categories: multimedia databases, full-text databases, directory databases, bibliographic databases, and databases with full-text content. Many databases also include visuals and images, including pictures, paintings, and maps. To find them, utilize the Database Finder page.Additionally, there is a wealth of information on finding photos in the Art Subject Guide.

Electronic Thesis and Dissertation databases

Graduate theses and dissertations have been considered the cornerstone for scientific labor, teaching, research, and writing for many years. Experts in the subject are in charge of the study, and funds are often used to support highly competitive scholarship. Researchers may benefit most from secondary sources of knowledge like theses and dissertations in the humanities. However, the great majority of these texts are forgotten in college and university libraries. The greatest approach to learn is via basic research using the World Wide Web's free and open access distribution of these resources.

Although it is not a brand-new concept, instructors, administrators, graduate students, and librarians are increasingly realizing the importance of making information more accessible on college and university campuses throughout the globe.INFLIBNET hosts databases of Ph.D. bibliographic records that have been submitted to different bibliographic records[9], [10].

Types of ICT Based Services in Libraries

The usage of modern ICT, such as computers, the Internet, the Web, Extranet, and other technologies, is growing as libraries embrace electronic habits. The upshot is that libraries are facing new expectations from their patrons. They must have access to the most recent information, up-to-date information sources, and ICT tools that they may utilize for their job. ICT usage in libraries improves patron satisfaction. It offers library patrons a variety of advantages. Several advantages include:

1. Provide speedy and easy access to information;
2. Provides remote access to users;
3. Provides rounds the clock access to users;
4. Provides access to unlimited information from different sources;
5. Provides information flexibility to be used by any individual according to his/her requirements;
6. Provides increased flexibility;
7. Facilitates the reformatting and combining of data from different sources.

Additionally, libraries provide their patrons a range of ICT-based services, such as the following.

Bulletin board service

A Bulletin Board Service (BBS) marks a fondly remembered period in the development of online community and communication. BBSs were the forerunners of today's social media sites and online forums in the late 20th century. These text-based platforms provide a virtual setting for users to interact, have conversations on message boards, and exchange files. BBSs contributed significantly to the development of the early online communities and shaped the current digital environment. BBSs had a unique role in the development of online communication, emphasizing the ongoing allure of interacting with others who have similar interests and exchanging information in a virtual space, despite being mostly superseded by contemporary social networks.

Current Awareness & Selective Dissemination Services

The library has begun offering a variety of current-awareness services, such as Table of Contents (TOC) alerts, List of New Arrivals of Journals and Books, Press Clippings, Research Digest, and Abstracting and Indexing Service. A user is kept up to date on new resources on certain themes using methods and resources that are utilized for selective dissemination of information.

Document scanning services

For enterprises and organizations seeking speed, accessibility, and efficient document management in an increasingly digital environment, the need to transform physical documents into digital forms has become crucial. Document scanning services have become an essential response to this expanding need. These services provide a thorough method for converting mountains of paper documents, pictures, and other tangible data into digital files, making it simpler to save, retrieve, and share information. The main aspects of document scanning services are examined in this introduction, along with the advantages, techniques, and uses that make them essential in the current information management era.

Internet and Chat services

The Internet has transformed into an information superhighway and opened the floodgates for academic communication as a source of important topics in the universe of knowledge. The term "internet" is a condensed form of the term "internetworking," which describes linking two or more computer networks. The term "Internet" refers to a global network of computers and people. It is a crucial tool for international online services. The development of the Internet provides very high bandwidth, which will greatly expand the possibilities for information processing and distribution. Universities, colleges, schools, and other educational institutions are linked through the internet for the exchange of knowledge. The whole landscape of librarianship has transformed as a result of internet access to information. Any kind of Internet communication that allows for the immediate transfer of text-based communications from sender to recipient is referred to as online chat. It may be used in libraries for both real-time consultation services and online reference services. Point-to-point and multicast communications from one sender to many recipients are both possible in online chat.

Online readers' advisory services

Readers' Advisory Services and Reference Services are being implemented by libraries as Web-based options. Finding the best information that satisfies their requirements, interests, and reading ability is helpful in finding the proper information or reading material for the right person at the right time. These include offerings like giving evaluations and suggestions, facilities for readers to interact with the reference staff (Virtual Reference Desks), updating users through the Web about new purchases, etc.[11], [12].

CONCLUSION

A transformational period has begun with the incorporation of information and communication technology (ICT) into library resources and services, changing the function of libraries in our digital society. This investigation of ICT's many uses highlights the significant influence that technology has on both users and librarians, as well as the ongoing importance of libraries in the twenty-first century. ICT applications have enhanced resource acquisition, organization, and dissemination via activities like digitizing large collections and automating library administration duties. Users of libraries today enjoy more ease, connectedness, and customization thanks to online catalogue searches, virtual reference services, and personalized user experiences. This has led to a stronger engagement with information. With the use of ICT, library operations have been optimized and the user experience has been enhanced. These advantages include remote access, data analytics, and better resource management. ICT adoption in libraries, however, also presents difficulties, including privacy issues and moral dilemmas over data management and digital preservation. In this changing environment, libraries have become thriving centers of innovation, embracing technology to close the digital divide, advance literacy, and provide people and communities access to a wealth of knowledge. The symbiotic link between ICT and library materials and services reinforces the crucial role that libraries play in building a more educated, connected, and empowered society as they continue to flourish in the digital era. This change highlights the continuing value of libraries as repositories of information and entryways to lifelong learning.

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CHAPTER 8

LIBRARY AUTOMATION AND RESOURCES FROM THE INTERNET

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ABSTRACT:

Modern libraries have undergone a transformation thanks to library automation and the incorporation of online resources. The dynamic interaction between library automation systems and the large array of online resources that are accessible to libraries is explored in this study. It looks at how automation technologies have improved access to digital collections and online databases while streamlining conventional library operations like cataloguing, circulation, and acquisitions. It also looks at how the internet has helped libraries throughout the world connect, provide remote access to materials, and extend their services. The transformational effects of library automation and internet resources on information access, user experience, and the changing function of libraries in the digital era are highlighted in this research.

KEYWORDS:

Automation,Crucial operations, Internet, Library.

INTRODUCTION

Libraries are at the forefront of using the revolutionary potential of automation and the wide universe of online resources in an age marked by fast technical breakthroughs and the digitalization of knowledge. By automating crucial operations like cataloguing, circulation, and acquisitions, library automation has altered the conventional duties of libraries and is powered by sophisticated information systems and software. In addition, the incorporation of internet resources has broadened the scope of libraries by providing access to a constantly growing digital universe of information, databases, and multimedia materials. This introduction sets out on a trip through the dynamic synergy between online resources and library automation, revealing the advances' many effects on the environment of modern libraries. It looks at how automation boosts operational effectiveness while giving customers easy access to online databases and digital collections. Additionally, it emphasizes how the internet connects libraries globally, encourages collaborative projects, and allows remote access to materials, altering the idea of library services in the digital era[1], [2]. The incorporation of automation and internet resources underscores libraries' ongoing relevance and revolutionary potential in our information-driven society as they develop as lively centres of knowledge and information.This investigation also explores the significant effects that online resources and library automation will have on both users and librarians. Automation not only streamlines library operations but also frees up librarians to concentrate on higher-value services like community involvement and research assistance. Resources on the internet provide users with unparalleled ease and access to a plethora of knowledge, bridging geographic distances and encouraging a culture of lifelong learning. The synergy between library automation and online resources is not just an adaptation; it is a revolution that redefines how libraries serve their communities as we go through this digital frontier. It emphasizes the crucial function of libraries in building a more knowledgeable, connected, and empowered society by serving as information gateways. In order to illuminate their transformational potential in an information environment that is always changing, this investigation tries to untangle the complex web of library automation and online resources[3], [4].

DISCUSSION

The phrase "data communication" refers to the transfer of organised computer records, as opposed to unformatted text seen in messages and word processing communications, which are often incomprehensible when conveyed. Information is transported from a source to a destination via data communication. Data is a broad term for the discrete (or digital) symbolic representation of information. Digital information is encoded into a discrete set of some parameter, such as a voltage level, while analogue information is information encoded according to a continuous physical parameter, such as the height or amplitude of a waveform. This digital data is often made up of bits, which are collections of binary digits (ones and zeros). The binary system is employed because of its universal recognizability and because digital data may be processed in a flexible manner and are more resistant to electronic noise than analogue data. Eight-bit groups constitute a data byte or character. These letters make up the alphabets, which are used in data transfers. They also include alphabetic, numeric, and special symbols. Computers, computer peripherals, and other data devices [such as digital phones, cellular phones, personal digital assistants (PDAs), and digital imaging applications] are the most frequent data sources and destinations. The data are typically groups of characters that make up text, hypertext (text organised according to topic rather than linear sequence), or multimedia data, such as audio, graphics, animation, and video data.Below are some fundamental terms, practises, and guidelines related to high-speed data communication.

Speed

Baud is the name of the unit used to measure data transmission speed. It speaks about the quantity of signal components sent out each second. Between 300 and 1200 bauds are the typical rates accessible to terminal users connecting to distant systems. There are other options for faster transmission rates of 2400, 4800, 9600, and even 24,000 and 96,000 bauds. The bandwidth of the channel being utilized to transmit the datawhich is measured in Hertz or cycle per seconddetermines the speed of transmission. For this precise reason, the number of bits sent per second could not be the same as a baud.

Serials vs. Parallel Data Transmission

Parallel data pathways that concurrently transmit 8, 16, and 32 bits are often used in computers. Where the cost of extra wires or tracks on circuit boards is not prohibitive, parallel data buses are used to achieve substantially greater transmission rates. While serial lines must convey data and supporting information multiplexed in a bit-by-bit fashion in accordance with a communication protocol, parallel interfaces assign specialized functions to the wires. Parallel data transmission buses, such as those with 18 pins, 24 pins, etc., are often used between computers, printers, and disc drives to increase speed and accuracy.Since the expense of an interface for a lengthy parallel transmission wire becomes prohibitive, serial transmission is preferred for any long-distance data transfer.

Communication Channels

Data transmission occurs in one of three modes:

1. Simplex
2. Half Duplex (HDX)
3. Full Duplex (FDX)

The choice of transmission mechanism depends on access to the host computer system. Simplex transmission is only appropriate for equipment like printers that never transfer data. Full duplex mode enables simultaneous data transmission along both directions of the communication channels. When operating in full duplex mode, pressing a key on the keyboard generates a sequence of bits that are sent down the channels to the host computer

and then "echoed back" for display on the console or screen, which double-checks the character the computer really received. Data may be communicated in half-duplex mode in one way at a time via the channels; as a result, the terminal shows the characters that were sent. As a result, the presence of characters on the screen is not proof that the host computer successfully received the supplied data[5], [6].

Communication Modes

On a line, information may be sent synchronously or asynchronously. Asynchronous or start-stop transmission, which is easier to operate, is often utilized when terminals connect to distant computer systems. In this scenario, each character being transferred has a start code prefixed and a stop code appended. A transmission speed of 300 baud is approximately comparable to 30 characters per second (cps), as an ASCII character with an 8-bit width is sent as a string of 10 or 11 bits. Data octets are transferred in a continuous series without start or stop pulses during synchronous transmission. A number of synchronization characters are used to delimit each set of synchronous characters in a continuous starting sequence of bits, and after the last synchronous character, groups of 8-bit octets are counted.

Communication connections

Computer systems and terminals may be linked to one another in a number of different ways. Dial-up access uses a phone connection to connect directly to the host computer system.This technology cannot be utilized for rapid and precise data transfer, while being cost-effective. Large amounts of data may be sent quickly using leased lines. An efficient alternative for remote access is a data network. The costs associated with utilizing such a network are often based on the volume of data sent rather than the distance[7], [8].

Switching Techniques

Circuit switching, packet switching, or message switching are all methods that computers linked to transmission lines may use to create a route. The two machines are connected by a line called circuit switching, and as long as they are in communication, only those two machines may utilise that line. In packet switching, blocks of messages that need to be sent between computers are organised into packets with synchronised sources and destinations, error detection, and control bits, and they are then sent across the channel. Utilising the address information, packets are routed. In message switching, every machine sends every packet to a central computer. The messages are stored and forwarded by the main computer to the correct destination addresses. Using packet switching for data transfer is more cost-effective.

Network Topologies

The number of network nodes, the concentration of terminals and devices at different places, and the effectiveness of their interconnection are all addressed by network topologies. Network topologies are different configurations of how computers are connected to one another in a network. A Mesh Network, which has several communication lines between nodes, or a Star Network, which has dedicated channels between each station and the control hub, may link computers in various places. The hub is where all communications between stations must go. Bus networks with a linear architecture with stations connected by tabs, as opposed to tree networks, which are bus networks with a succession of branches that indirectly converge at a control point and provide just one service. Transmission paths between any two stations; and Ring Networks, where messages are sent around a closed ring by connecting each node to its two neighbouring nodes. A loop network is a ring network where transmission is controlled by a single master station. Every one of these topologies has benefits and drawbacks. When selecting a particular topology, local needs and computer configurations may be taken into account [9], [10].

Communication Media

The physical channels that allow data to be sent between computers in a network are called communication media. There are two types of media: limited (such as wires, cables, and optical fibres) and unbounded (such as ether or airwaves via which radio, television, depending on the requirements and protocol requirements, sent data may travel through simplex, half-duplex, or full-duplex lines.

Bound Media

Twisted-pair wires are a cheap kind of media that are utilised in voice-grade telephone lines. They are used to transmit signals at modest speeds, typically about 1200 bps. Coaxial cables may be used to transmit high-speed data across distances of up to several kilometres. Wide bandwidth on the order of 400 MHz is included in coaxial cables. They are suitable for LAN application at transmission rates of around 1 Mega bps. Glass fibres used in fibre optic cables provide high-quality data transmission at rates up to 1000 Megabits per second (Mbps) across lengths of up to 25 miles.

Unbound Media

Short-range communications or communications between computers in inaccessible areas employ radio waves in the very high frequency band (VHF) at roughly 300 MHz. Wide bandwidth line-of-sight communication uses microwaves. With this medium, transmission rates up to 20 Giga bps are feasible. In the sky, communication satellites serve as microwave relay stations.

Signals supplied from an earth station are received, amplified, and retransmitted using transponders on the satellite. The key benefit of satellite is that it may be utilised from remote locations due to its extensive coverage over a huge region. A transponder can handle 400 channels at a speed of 64 kbps, giving it a very big capacity.

Local Area Network

Many computers may be connected over a local area network (LAN), which is most often the grounds of a single office block. Within a small geographic region, data transmission speeds may reach extremely high levels. The network enables users to exchange languages, databases, and unique resources like an expensive supercomputer. LANs may be categorized as high, medium, or low speed networks and are often used in star, bus, or ring configurations.

Special cables are used in certain low-speed LANs created for use with personal computers, whereas telephone lines and digital PBX controllers are used in other low-speed networks. In order to accomplish high-speed data transfer in a LAN, optical fibre cables are employed. Whatever LAN type is used locally, it must be coordinated with the communications components connecting geographically separated processing centres.

Wide Area Network

A wide-area network (WAN) is used to link a number of computers that are scattered across many cities in one country or across several nations.WANs make advantage of communication channels managed by phone or telegraph companies. These networks often include satellite communications, microwave communication, subterranean coaxial cables, and land telephone lines. The major goal of this interconnection is to provide network users access to specialized library programmes, databases, etc. that are accessible at any of the network computers. In the USA, the two largest networks of this kind are TYMNET and ARPANET.

Metropolitan Area Network (MAN)

The term Metropolitan Area Network (MAN) describes the interconnections that exist inside the bounds of a city or municipality. Often known as "last mile" issue, the MANs also have issues related to the inadequate local telephone authority telephone network infrastructure. The dependability of intra-city connection in the case of MANs is questionable, but satellite-based WANs provide great connectivity between distant places regardless of distance.

Distributed Data Processing Network

A distributed data processing network is made up of several independently located computer systems that are geographically separated and linked via a communications network. It provides the required data and the processing and connectivity capabilities at the end user's location to process the data. A single organisation or a large number of organisations may employ DDP networks. The star and ring structures are examples of potential DDP network designs. The Biotechnology Information System (BTIS), which consists of 9 DICs dispersed across 7 Indian cities, is an example of a distributed data processing network[11], [12].

Gateways

Gateways are made up of the hardware and software needed to link various networks. Any variations in packet sizes, protocols, and addressing techniques between the two networks it connects are dealt with via gateways. By using a bridge, a particular kind of gateway, two comparable LANs are linked. Since the protocols are the same in these situations, there is no need to change the data packets' format or content when they go from one network to another. In order to create a single, bigger network, two comparable LANs are bridged together while preserving the uniqueness of each network's performance, dependability, and security. Gateways may also link LANs to WANs, and WANs can connect to other WANs to form domestic and worldwide data transmission networks.

The International Gateway Packet Switching System (GPSS) has been contracted by the Videsh Sanchar Nigam (India) to provide a dependable and affordable public data transfer service. The system can handle data transmission at rates of 300 bps to 9.6 kbps. A GPSS customer may contact PADS (Packet Assemblers/Dissemblers) placed at the VSNL buildings in Bangalore, Bombay, Hyderabad, New Delhi, and Pune through STD or local PSTN dial-up. The PAD is then connected to international data networks in several nations all over the world. Users may connect to GPSS via leased lines from clients' locations. Based on the technology and communication medium they use, the communications networks may be divided into the following three categories:

Public Switched Telephone Network

Common carriers, often telephone corporations or agencies, administer the Public Switched Telephone Networks (PSTN) all over the globe. Two fundamental services are typically offered by the PSTN: standard dial-up connections for customers and a permanently leased connection between subscriber sites. Dial-up connections are sometimes referred to as switched lines since it takes many intermediary switches to link two telephones. Between two subscriber locations, a single traceable line is provided through permanent leased connections. Compared to dial-up lines, leased lines are often less noise-prone.

However, data transfer over MODEM may be accomplished via the PSTN or common carriers. For low-speed asynchronous and synchronous data transfer up to 2400 bps, straightforward dial-up connections may be employed. For asynchronous connections, leased lines may run at up to 2400 bps, and for synchronous lines, up to 9600 bps.

Public Data Network

Many domestic common carriers provide data communications services on a specialised network called a Public Data Network (PDN), which operates similarly to the public telephone network. A public data network may provide circuit switching services, packet switching (PSDN), and perhaps many more improved services in the future.In the United States, examples of public data networks include GTE Telenet, Tymnet, Graphnet, and Faxpac; in Canada, Datapac, PSS (Packet Switching Service), Transpac, and DDX and Venus; in the United Kingdom; and France.Public data networks in the United States, such GTE Telenet and Tymnet, are linked to public data networks in more than 25 other nations.

Integrated Services Digital Networks (ISDN)

Integrated Digital Networks and Integrated Digital Services Network (ISDN) are made feasible by improvements in digital switching and transmission technology. A network called an ISDN offers end-to-end digital communication to serve a variety of services, both voice and non-voice. A small number of common multi-purpose user interfaces are used to provide user's access. It offers 64 kbit/s circuit switched digital connections. The network has circuit switched routes at data rates greater and lower than 64 KBs in addition to packet switching capabilities[13].

International Data Communication Networks

Depending on its scope and purpose, national and international telecommunications services may be categorised as common carriers, specialised common carriers, or value-added carriers (VAN) categories.Large public telephone and telegraph networks as well as a wide variety of services are offered by common carriers. Broadband technologies like microwave and satellite systems are often used by specialised common carriers to build public networks that only offer a few services. Value-added carriers often make use of other carriers' telephone lines and transmission infrastructure. The received data is divided into character packets, briefly stored, then routed to its destinations across high-speed leased channels. Large organisations are also setting up their own private bypass networks to get around some of the services provided by local telephone providers and long-distance systems. Most global data communication networks used for remote terminal internet searches is value-added carriers. Gateways connect several national and international networks to one another.

Networks falling into the latter two types are described in this article since it concentrates on computer communication networks.The majority of data networks use packet switching methods that were first developed for use on the ARPANET, a data communication network operated by the US Advanced Project Agency of the Department of Defence. Its goal was to investigate network architecture and set up links between computers at facilities where ARPA-sponsored research was being done. One of the first few data networks to operate in North America was the Tymnet, which began operations in 1971, and the Telenet, which began operations in 1975. Because the operators of both networks lease transmission lines from AT&T (American Telephone and Telegraph Company) and install their own switching and communications facilities, they are both value-added networks (VANs). The public switched data networks that are now in use throughout various nations are listed in Table 1 according to the dates of their debut[14], [15].

CONCLUSION

A revolutionary change in information management and access has been brought about by the integration of Internet resources with library automation. We have seen throughout this investigation how automation of typical library tasks has increased productivity and freed up librarians to focus more on user-centered services. In addition, the addition of internet resources has broadened the scope of libraries by making a vast digital universe of knowledge

and information available to users all over the world. The dynamic interaction between automation and online resources, in conclusion, emphasizes the vital importance of libraries as active and important institutions in the digital age. Reaffirming their role as keepers of knowledge and promoters of lifelong learning, it also acknowledges the evolving demands and standards of the contemporary information consumer. This integration will become more and more crucial in determining how libraries develop in the future. As a result, libraries will be able to adapt, develop, and fulfil the always changing demands of their users, guaranteeing their continuous relevance and importance in a society that is information-driven. In the end, the path of library automation and internet resources in libraries is one of revolutionary potential, providing limitless opportunity to improve people's lives and communities via knowledge and access to information.

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CHAPTER 9

A COMPREHENSIVE REVIEW OF ELECTRONIC STORAGE SYSTEMS

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ABSTRACT:

The way data is maintained and kept in the digital era has been completely transformed by electronic storage devices. This essay explores the many facets of electronic storage systems, including their development, parts, categories, and uses. It explores the crucial function that electronic storage plays across a range of industries, including banking, entertainment, and information technology. The research also looks at potential and problems related to electronic storage systems, such as security, data retrieval, and scalability concerns. This study gives insights into how these systems have evolved into the core of our data-driven civilization and continue to impact our technological environment by dissecting the multifarious world of electronic storage.

KEYWORDS:

Digital Information, Electronic,Permeated, Storage Systems.

INTRODUCTION

Electronic storage systems have become the foundation of our data-driven civilization in an era marked by the exponential expansion of digital information. These systems change how organisations, organisations, and people retain their priceless information assets, representing the growth of how we manage, protect, and access data. This introduction sets out on a voyage through the complex world of electronic storage systems, illuminating its development, its parts, and its varied uses in different fields. Electronic storage has permeated every aspect of our modern environment, from the enormous data centres that run the internet to individual gadgets and cloud storage options. This investigation highlights the crucial part that electronic storage systems had in creating the information era and discusses the benefits and problems they bring in our never-ending effort to properly store, safeguard, and use data.In addition, the widespread use of electronic storage devices has fundamentally changed how we use and interact with digital information. These systems have improved in efficiency and cost-effectiveness while also expanding their capacity to handle the rising amounts of data produced by people, businesses, and networked gadgets[1], [2]. We will examine the elements of electronic storage systems in this investigation, including their hardware, software, and data management strategies. We'll show how these systems have impacted a variety of industries, from the powerful data centres that drive the internet's global infrastructure to the portable storage devices that enable people to take their digital lives with them. We will also go over how important electronic storage systems are for maintaining data security, accessibility, and integrity. These solutions are crucial for protecting sensitive data given the development of cybersecurity threats and data privacy issues. We will also discuss the potential and difficulties that electronic storage systems bring as we begin this research. They include issues like the difficulties of data retrieval and scalability as well as the moral questions raised by data ownership and accountability. Understanding electronic storage systems is essential to maximising their potential and meeting the changing requirements of our digital civilization in an increasingly linked and data-driven world[3], [4].

DISCUSSION

Electronic storage is a set of administrative and information technology (IT) procedures that permits the preservation of documents on digital media while guaranteeing their validity and enforceability in court.This service is available for papers that were initially generated digitally as well as for paper documents that have already undergone dematerialization; in the latter case, the paper medium may be sent for pulping once the storage procedure is complete. any transportable or permanently connected medium that may store electronic information.

1. Hard drive
2. CD-ROM
3. DVD-ROM
4. flash media
5. Thumb drive
6. Memory stick
7. iPod
8. Digital camera
9. Removable hard drive
10. Back-up tape
11. PDA (Palm, Windows Mobile, etc)
12. Cell phone

Main Features of Electronic Storage Systems

A document management and storage system, in general, gives your papers a thorough filing system, including storage space and security, making it simpler to find them. Some document management and storage systems also contain a scanning feature that use Optical Character Recognition (OCR) to turn physical documents into electronic, searchable versions. The time it may take to digitize all of the old paper documents will be well spent since you won't have to spend as much time physically searching through filing cabinets. The following are some more crucial elements that are included in the majority of document management and storage systems:

File Organization

You may organize your papers into digital files and folders using electronic document management and storage technologies, and you can recreate your previous physical filing system in a digital format. It demonstrates how software may assist you in switching smoothly from a physical storage system to an electronic one. It lets you build a file hierarchy that is an exact duplicate of the real filing system.

Text Search

Being able to search for a file by putting its name into a search box is one of the key advantages of going paperless and investing in a document management system. With a text-based search function, the system will rapidly find the document you're searching for by scanning the content of every file currently available in your system.

Multiple Users

File storage is not the only function of document management and storage systems. In fact, a smart solution will let you collaborate throughout your organization on papers and data. It will be possible for different users to access, modify, and share files.

Remote Access

The majority of software solutions will establish a backup of your data and papers in the cloud so that you may access them from anywhere, even if you are not in the office. A mobile app is available for several document management and storage systems, allowing you to view your files from tablets and smartphones in addition to desktops. While there are several open-source options for DMS software, one important reason to choose a premium solution for your company is that they are built with regulatory compliance in mind.

Types of Storage Media

The hardware that physically stores information is referred to as storage media.Unlike the storage device, which is often the docking bay for the storage media, this is different. A CD/DVD drive, which you use to insert discs into your computer, or a USB flash drive reader are two examples of storage devices. The physical CD/DVD disc or RAM (Random Access Memory) on your computer are both examples of storage media. Storage media may be internal or external, which means that it can either be physically distinct from the computer and designed to be more transportable (like a hard drive) or it can be hard-wired to the computer (like a USB flash drive). Since internal storage is hard-wired into the desktop or laptop and doesn't need any additional room outside of the computer, it is often speedier. External material, on the other hand, is relatively portable, can be swiftly moved from one computer to another, and is simply locked in a secure location apart from your primary working station. Additionally, these storage media are particularly important due to their non-volatility.Any unsaved data is often deleted from the RAM when a computer is turned off. Or, if the data isn't being utilised, the RAM may remove it while the machine is still on to create place for processes that are relied upon more regularly. On the other hand, storage media can only be destroyed by the user and continues to save data even after the computer is turned off. Because of this, users are more likely to employ storage devices like flash drives and data CDs[5], [6].

Magnetic Hard Drive

Storage typically, there are three types of technology: magnetic, optical, and solid state. Hard drives, floppy discs, and cassette tapes are a few examples of popular magnetic storage devices. Although they don't function with computers, cassette cassettes use the same technology. When data is added, removed, or rewritten, this kind of technology may adjust the polar alignments it uses to store binary code on the magnetic media. The magnet does this by changing the binary code, which is stored on an iron oxide layer within the medium as 1s and 0s, into positive and negative charges, respectively. Laser beams are used in optics, which depend on marking the medium. In this instance, lasers etch lines of data that stand in for the binary information that is being converted. For individuals who desire to reuse the same disc, "rewritable" media has also grown in popularity. Rewritable media depends on altering the medium's reflectivity rather than scarring it. The laser modifies particular areas of the disc's surface reflection when it detects the binary number 1. So that 1s change the reflection and 0s leave the media's reflection as is, data is then divided by the pits between reflectivity, which stand in for the binary number 0. Amplified Spontaneous Emission, or ASE for short, is the result, and it gives the disk's surface a "bouncing-wave" look. SSDs, as they are also known, are hard drives that don't have any moving components like magnetic heads or lasers. They work electrically by storing the binary code as trapped or untapped electrons in the flash memory cells of the device. Since they read or write data using electrical polarity inside a cell rather than electronic motors, these kinds of media are often quicker than the other two. Additionally, this increases their shock resistance, enables them to operate more silently, and decreases media delay.

These storage devices often come in the form of "jump" drives or "thumb" drives, although some computers also incorporate this technology into their hardware. Inside of hard discs are several circular components known as platters. Tracks, sectors, and clusters make up the two sides of these discs. A sector splits tracks into pie-shaped portions, while a cluster is a collection of sectors. The numbering of each cluster, sector, and track aids in the computer's ability to find certain recorded data rapidly. Data may be stored, for instance, to side 2, sector 1, track 5. Because the data is physically stored in indents, a track may be likened to the grooves of a vinyl record. A read/write head, sometimes referred to as a "head," reads and writes data. There is a head on each dish. The heads of a hard disc will align with the same track on every platter when data has to be put there, and they will write the data across each platter. A hard disk's performance may be evaluated using a few different metrics. The search time measurement is the most crucial one. How long it takes for a head to transition from one track to another may be determined by seeking time. The faster the search time, the better since it will provide faster data access.

Random vs Sequential Access

One can assume that all of your data is contained in a single folder and is situated adjacent to one another on the hard disc while thinking about storage solutions. Regarding random access, this is untrue. Your information may be retrieved from any place on the disc using random access. This implies that the data in a single folder may be dispersed over the physical hard disc. Data may be accessed in any sequence because to this sort of storage. Imagine it as your CD player: When your favourite song finishes and you want to hear it again, you just push the play button to do so. Contrary to sequential, it is quick and almost immediate. Sequential access may be compared to a cassette within a cassette player. After using a cassette player with a magnetic tape drive for backup reasons, you must fast advance the tape in order to skip a song or reverse the cassette after a song is finished if you wish to listen to it again. Even though it may appear possible for data to be lost or misplaced in the sea of data while using random access media devices. The computer system, also known as addressable media, gives each file a distinct name when it is generated in order to keep track of all the data.

CDROM-Random Access

A computer may access data in two different ways: randomly and sequentially. Data may be swiftly and effectively accessed from any position on the hard disc thanks to random access. Today, random access is used by most computers since it reduces misunderstanding and saves the user time. Data must be accessed sequentially in order to be accessible. Data stored on magnetic tape or on a disc file are two examples of sequential access. Some users may find this helpful if they are trying to process a series of data components in a certain order on purpose. Users who are looking for a certain file on a disc or tape, however, may find this to be time-consuming since it necessitates skimming through all of the material in a sequential order. The A-Z technique is a good illustration of how random access and sequential access compare. In order to reach point "Z," sequential access would need the user to go via letters A through Z; in contrast, random access allows the user to travel straight to point "Z".

USB Stick, Storage Medium

The storage media, which might be a DVD or memory card, is a component of the storage system where the real data is kept. To read this data, insert this medium into a storage device like a phone or a DVD player. These two components are often found as distinct parts, which makes the storage medium moveable. While some storage devices are inserted into an external connector, others are situated within the system unit. On the storage device, some letters correspond to this and assist the unit recognise them. These letters or words specify their location and intended purpose. For instance, when you insert a USB into the computer's

USB port, "My Computer" will display the USB and display a letter next to it indicating the system unit's intended usage. Primary and secondary memory are found in storage devices. The information is lost when the device is turned off since primary memory is volatile memory. The memory is still there even if the machine is shut off in secondary storage, which is the exact opposite of volatile storage. The issue with these gadgets is that you have to be careful how you handle them, particularly if they contain sensitive information. Important data may be lost due to mishandling or misplacing and, depending on the situation, may not be recoverable.

The Cloud

The usage of a remote storage device that can be accessed online is known as cloud storage, commonly referred to as "The Cloud." Over the last few years, cloud storage has become very popular, and the market for it has expanded significantly to the point that there are now hundreds of businesses that provide a range of cloud storage services. More precisely, whereas other cloud storage platforms store all types of digital data, certain cloud services primarily concentrate on digital photos or email messages. A few services, such as Google Drive, let users store their files in one of the many sizable data centres the company manages. This allows, for instance, numerous people to work together on projects by having access to the same file.A rising number of enterprises are switching to the cloud's storage options as its popularity grows. The application is widely used by enterprises as a software and document backup programme.

Businesses may ensure that their information is secure online by setting a certain time for the computer to automatically move documents over, saving them the time and money it would take to manually backup their data. Even while the cloud's many apps may require a monthly cost, it is a little thing to pay considering the time and convenience it saves you. Making use of Using these tools, anybody may access their papers from anywhere in the globe. A person may now update a paper on their laptop and then access it at work the following day for a presentation, freeing them from being restricted to just one electronic device in a single location.This is just one of the many handy ways the programme may be used to suit your daily requirements. The cloud is tying together electronic gadgets all across the world and easing some of the daily tasks.

Flash Memory

A form of storage device that employs electronic memory is flash memory.Flash memory is a solid-state storage technology, which means that it has many different forms and that "everything is electronic rather than mechanical." Many different devices, including computers, digital cameras, and mobile phones, use flash memory. A specific kind of EEPROM chip is flash memory. Electronically Erasable Programmable Read Only Memory is known as EEPROM. A flash memory chip has a grid of columns and rows, each containing a cell. At each intersection, there are two transistors, and a thin oxide layer separates them.The term "floating gate" refers to one transistor, whereas the term "control gate" refers to the other. Tunnelling is the process by which an electrical charge travels through the columns to the floating gate. The floating gate transistor behaves like an electron cannon as a result of the electrical charge.

The electrons serve as a barrier between the two transistors when they get caught on the opposite side of the thin oxide layer, nearer the control gate transistor. The charge level is monitored using a cell sensor. The flow has a value of 1 if it is greater than the 50% threshold and changes to 0 if it is lower. On the flash memory device, data and information are read in this manner.The "dominant memory type wherever a system requires a significant amount of non-volatile, solid state storage" in modern times is flash memory[7], [8].

Embedded Memory

Embedded memory is a form of flash memory that is gaining popularity owing to its compact, practical size. These sorts of memory may be found in phones, cameras, gaming systems, and even portable gadgets like a GPS in today's culture. Samsung said that they have created the fastest integrated memory in the world in July 2013. These new devices will have interface speeds of 400 MB/s and come in 16, 32, and 64 GB capacities. Users will be better able to multitask and carry out activities like file sharing, surfing, and gaming. Additionally, it cuts down on the time needed to boot up and load programmes. This is a crucial consideration for mobile devices since the physical there isn't much room for more memory or storage. Memory cards are becoming less and less common in the creation of smartphones and other mobile devices. The chip's storage capacity for memory is one of its drawbacks. The cost of the gadget will increase with the size of the chip. The issue that occurs if the equipment malfunctions is another item to think about. Any important information that was saved on it is essentially lost. One benefit of having removable memory is the one just mentioned.

USB flash drive

The best storage and transmission media are USB drives. They are highly practical due to their mobility and ease of usage.They may be used to run portable applications in addition to serving as storage for data.It is possible to create portable versions of certain programmes.Various software programmes are available for usage on any computer. Applications may be converted to portable versions using free software, thereby turning a thumb drive into a portable computer. Storage sizes for USB drives vary from 2 GB to 4 TB. The possibilities for their utilisation are almost unlimited with 4 TB of storage in such a small, portable package.Password protection is an option for USB devices, and some may even be secured with biometric features like a finger print. Security issues with USB drives are a problem. They are portable and may be used to covertly transmit data since they can hold a lot of information. Anyone with access may easily transfer data onto a USB drive, insert it into a computer, and take the drive out of the building. Because they may contain malware that can be launched instantly using AutoPlay (which can be stopped), USB devices provide an extra security concern.

Remote Storage

Remote storage is used to increase disc capacity without the use of hard discs and is accessible over the internet rather than being physically linked to the computer.On your laptop, smartphone, or even another computer, you will be able to access your files anytime you want, from anywhere. The fundamental idea behind cloud storage is this. When you need to view a file, you open it as normal, but Remote Storage gets the data from a media library if it isn't on your local storage. A file's logical size does not change when data is taken from it, but its physical size does.

An online remote storage offers security against system faults like viruses and makes it possible to retrieve lost data from any potential system failures since it is considerably quicker and more dependable than storage media like CDs, DVDs, hard drives, and flash drives. Being honest with not just online storage offers low-cost, simply accessible security for data management and storage for enterprises as well as personal computer users. Many internet businesses do daily, weekly, or monthly automated system backups to a "electronic vault" in order to provide the highest level of security. Additionally, employing remote storage reduces its susceptibility to damage and data loss, in contrast to CDs or DVDs. The online remote storage system is undoubtedly a crucial, but reasonably priced, instrument for ensuring that the enormous volumes of data being kept on devices is still recoverable following a computer failure in today's high-tech culture.

Floppy Disk

Alan Shugart created the floppy disc drive at IBM in 1967.The 5.25-inch disc was originally used on the first IBM Personal Computer in August 1981. The earliest floppy drives utilised an 8-inch disc, which was subsequently known as a "diskette" as it became smaller. In contrast to the stiff container used to house modern 3.5-inch diskettes, the packaging for the 5.25-inch discs was an extremely flexible plastic envelope, earning them the nickname "floppy" discs.Floppy discs are an antiquated, physical kind of external storage that are no longer used. There may still be some banks using this storing method, but any company or individual that is considered computer competent does not save information using this method. Floppy discs' drawbacks include the fact that they are incompatible with any modern device, they have no security, and they have a meagre storage capacity of up to 1.44MB. IBM delivered the last iteration of the floppy disc in 1987.

Holographic Data Storage

Holographic storage is a method of computer storage that makes use of photo-sensitive material and cutting-edge laser beam technology 1,000 DVDs may be stored using this novel storage technique in a 4 square inch storage space. This contrasts with earlier techniques for storing data, such magnetic and optical hard drives, which use a revolving disc or straightforward 2D lasers. Holographic storage, on the other hand, starts with a single laser that is divided into two distinct parts: the signal beam, which transmits data, and the reference beam, which reconstructs the hologram when required. Data for the signal beam is encoded using a spatial light modulator, and then electronic data is converted into binary code. Then, it is organised into a certain pattern of dark and bright pixels (representing zeros and ones), each with more than one million bits. Through the intersection of the signal and reference beams and a 3D refraction carved into the medium, a holographic picture is produced. A secure, quick, dependable, and transportable method of storage is one benefit. The drawbacks include cost and availability. Capacity, and recording fails. UV rays can also erase the data, which makes this method unstable in the long-term. Since the concept is still in its infancy, however, problems are expected to diminish greatly over time[9], [10].

Optical Discs

A flat, circular optical disc known as a polycarbonate substrate is constructed of a particularly durable plastic and used to store data. By covering the disc with several layers, this helps to safeguard it. These discs store data using laser beams, and the data is read from them optically. On any or both sides of the disc, data may be kept. The track, which circles the disc in a single spiral, rotates from the innermost track (or groove) to the outermost track so that the data can be read. The majority of individuals in today's society have already made the transition from VHS to DVD, and now to Blu-ray DVDs. Technology advancements have significantly improved DVD and CD burning and watching capabilities. Unlike VHS and magnetic media, these optical discs don't deteriorate over time. Everyday uses for optical discs include storing and backing up data, as well as transferring data like music, movies, and images.

The data is shown on read-only discs by moulding and stamping so that it can only be read, not overwritten. The majority of CDs for music and software as well as DVDs for movies experience this. A laser is used to represent the data on a CD or DVD that is recordable or rewritable. An example of this would be creating a DVD from an iMovie effort or a music CD. The writing of the data to the optical disc is a complicated operation. Pits are generated on the disc's surface in order to mould or stamp the discs. Lands are the areas on the optical discs that remain unchanged. A 1 is represented by moving from a hole to a piece of land (as was covered in the system unit). Blu-ray discs employ blue-violet lasers, DVDs use red lasers, while CDs use infrared lasers.

These many laser types are utilised to store various quantities of data in a smaller space.The devices that read the discs from CD, DVD, and BD drives are known as optical drives. Blu-ray DVD players have become popular in many homes.However, consumers complain that only BD discs can be played on BD drives, which they find to be inconvenient. Data is also written to the discs using these drives.David Paul Gregg developed optical discs in 1958 and received a patent for them. The first person to record audio digitally on an optical disc was James T. Russell at that point. Later, research physicists from Sony and Phillips created the CDs that are still in use today and can store enormous quantities of data. For the first CD generation, they could support up to 650 Mb of audio storage for 5 minutes.

The initial generation's sole use was for music and computer applications. They were able to create CD videos, but at the time, VHS cassettes were more widely used and cheaper to make. With the aid of an infrared laser, these CDs were read. Later, the second generation, which was utilised for video, could store much more data. The lands and pits could be made smaller so that there would be more room for the data since they were read with a visible laser light. On a typical single disc, 4.7 GB of storage were permitted. A Blu-ray disc is being created for the third generations to provide even more capacity. There are blue-violet lasers used in Blu-ray discs. Even a fourth generation that could store up to a terabyte of data is yet undiscovered.

CDs, DVDs, and BDs

Optical discs that are read-only include CD-ROM, DVD-ROM, and BD-ROM discs. These are CDs or DVDs that have prerecorded content on them and cannot be cleared. This is due to the fact that the pits that are permanently formed into the disc's surface. Additionally, read-only discs for software and video games are available. Write-once discs are another name for recordable optical discs. This indicates that although things may be written to, they cannot be wiped or used again. Discs in this category include CD-R, DVD-R, DVD+R, and BD-R. The underlying standard is what distinguishes DVD-R from DVD+R. Additionally, there are two letters that designate whether a disc is dual layer: DVD-R DL and DVD+R DL. You may eject the DVD right away without needing to wait for the finalised version if you use DVD+R.

Additionally, you are able to record portion of the DVD on a computer and some of it on a television. Additionally, it is completely compatible with all DVD players. Recordable CDs are often used for file backup, music CD creation, and transmitting massive data to other individuals. High-definition multimedia files and even bigger backups that need much more capacity are stored on BD-R discs.Optical discs that can be written to include CD-RW, DVD-RW, and DVD + RW, and BD-RE discs. These allow for writing, erasing, and further writing.These CDs are rewritten using phase change technology. In essence, a metal alloy compound is coated on the rewriteable disc.The disc is then written on using heating and cooling without leaving a permanent mark. These are used to backup files, but because they can be reused several times, they are more practical than recordable optical discs[11], [12].

CONCLUSION

The cornerstone of our digital age has developed as electronic storage technologies, which have had a significant influence on how we handle, store, and use data. We have gone through the complex world of electronic storage throughout this investigation, learning about its development, elements, and many uses in a range of industries. In conclusion, electronic storage systems have developed to handle the constantly growing amounts of digital information in addition to being more effective and economical. They serve as the foundation for the internet, provide people access to personal data solutions, and spur innovation across several sectors. Electronic storage systems create issues with data security, privacy, retrieval, and scalability as they continue to influence our technological environment.

In our continued effort to store, secure, and efficiently use data, it is crucial that we address these issues and take advantage of the benefits they provide. It is becoming more and more obvious that these technologies will stay crucial to our information-driven culture as we negotiate the future of electronic storage. They act as the cornerstone on which our digital world is constructed, guaranteeing that data, the lifeblood of the contemporary day, is not only saved but also exploited to power innovation, knowledge, and advancement.

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CHAPTER 10

ICT INTEGRATIONIN LIBRARIES: DIFFICULTIES AND OPPORTUNITIES

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ABSTRACT:

ICT (information and communication technology) has completely changed how libraries operate and provide services, which has both advantages and disadvantages for libraries all over the globe. The varied nature of ICT use in libraries is explored in this study, along with the challenges libraries face in embracing digital transitions, such as infrastructure concerns, staff training problems, and budgetary issues. The potential that ICT presents are also examined, including better accessibility, greater research skills, and cutting-edge services like digital archives and virtual libraries. The report also examines how libraries are changing in the digital era, highlighting their significance as information hubs, educational institutions, and community centres. We gain insights into the dynamic environment of ICT applications in libraries, its potential to revolutionise information access, and the difficulties libraries must overcome to fully realise its potential in meeting the needs of a wide range of users and advancing knowledge dissemination through the course of this thorough analysis.

KEYWORDS:

ICT, Information access, Opportunities, Virtual Libraries.

INTRODUCTION

Information access, information storage, and information dissemination have all changed substantially as a result of the Information and Communication Technology (ICT) revolution. Libraries are in the forefront of embracing ICT to improve their services and fulfil the changing requirements of patrons in an age marked by digitalization and connectivity. This introduction prepares the reader for a thorough investigation of the challenges and possibilities raised by ICT use in libraries. It emphasises the crucial role libraries play in ensuring that everyone has access to knowledge, underlines the difficulties they face navigating the digital frontier, and emphasises the enormous potential ICT offers to redefine the library's function in the modern age, fostering information accessibility, digital literacy, and community engagement.Information and communication technology (ICT) integration is increasingly necessary for libraries to stay successful and relevant in today's fast-paced, globally linked environment. The possibilities of what libraries may provide to its users have broadened with the introduction of digital resources, online databases, e-books, and multimedia material. But this digital transition also brings with it a unique set of difficulties, from technological difficulties to the need for in-depth worker training. Even Nevertheless, the many chances ICT offers libraries to not only adapt but also prosper in the digital era exceed these challenges. In order to provide improved services and knowledge access to library users, this article will dig into the intricacies of ICT application in libraries, evaluating the challenges that must be overcome and the possible advantages that may be tapped[1], [2].

Morality and ethics are one and the same. Morals are derived from Latin, while ethics is taken from Greek. Both words relate to the highest standards of morality and behaviour. These principles, expressed as codes of behaviour, serve as the standards for determining what is right and wrong. Since ethics and morality are synonymous, they influence our action

and behaviour throughout infancy, adolescence, and maturity. Our actions and behaviour are influenced by what we were taught to be right or bad in every area of life. According to Heynes (1986), ethics is related to what people do. As a result, it necessitates alterations in the person's behaviour and attitude in any situation, both in regard to his surroundings and to himself. He points out that fundamental conceptions of the relative significance of our parts of life are ethics. These impressions always relate to priorities, while standards serve as the framework for the direct assessment of human attitudes and behaviours.

Ethical Issues in Information Technology

Up until recently, the capacity to transfer products and services quickly and precisely was the foundation for corporate success. Information is now the key to successful corporate operations. The definition of information technology is the use of computer hardware, software, telecommunications, and digital electronics for the processing and delivery of data. According to Carbo (2006), in the Annual Review of Information Science and Technology in 1992, the term of "information ethics" was first used to discuss ethical implications for ICT-related problems. This implies that the usage of ICT is motivated by ethical considerations. Therefore, while implementing ICT into their activities, individuals and organisations need to be ethically conscious.

Human relationships have been greatly impacted by ICT. Mobile phones, palmtops, laptops, virtual conferencing, and other ICT tools have improved family relationships while also helping to keep friends and family apart. New friendships and connections have been made possible by ICT in online groups. How sincere is a relationship like that? What does it mean for personal fulfilment? For instance, new occupations like data miners and web counsellors are emerging in the workplace, but these chances are also threatened by issues with unemployment brought on by machines taking the place of people. To handle these workplace and other changes and developments brought about by ICT, society will thus need a broad variety of new laws, regulations, norms, and practises.

DISCUSSION

The following social and ethical issues relating to the usage of ICT must thus be taken into account by society: An award for ICT-related personal and business ethics. Ethical challenges are coming to light more often in our quickly evolving technology world, requiring attention and efforts to be resolved. Information communication technologies (ICTs) are of special relevance to us and the information society. ICT's rapid development and the usage of its enabling technologies have had a significant influence on society, raising difficult ethical issues for both people and corporations. These problems have been taken to a fresh, often confusing level that has had a significant impact on society in many different ways. Invasion of corporate and individual privacy, intellectual property rights, individual and social rights, preservation of values, responsibility for the effects of ICT usage, etc. are some of the urgent concerns brought up by ICT.Important difficulties have been raised in the areas of employment, working conditions, and uniqueness as a result of these concerns. However, there hasn't been much progress achieved in tackling these ICT-related problems and difficulties[3], [4].

Information technology (IT) is essential to business, industry, government, healthcare, education, entertainment, and society as a whole,its advantages to society and the economy barely need to be explained. But just like any other technology, IT has drawbacks and may have a harmful effect on society. In general, it encompasses three basic categories of ethical issues: personal privacy, access rights, and damaging activities. It confronts and produces several challenges relating to ethics. In terms of protecting individual privacy, IT facilitates the massive interchange of data from anybody, anywhere in the globe, at any time.

Due to its massive global transmission, there is a heightened risk of information being disclosed and privacy rights of any persons or organisations being violated. Upholding the confidentiality and integrity of personal data is our task and obligation. This includes taking preventative measures to assure data accuracy and to safeguard it against unauthorised access or unintended disclosure to the wrong people.

Access rights are the second facet of ethical problems in computer systems.The problem of computer security and access rights has swiftly gone from being a low priority for enterprises and government agencies to a high one due to the present popularity of international trade on the Internet. Computer intrusions at locations like NASA and Los Alamos National Laboratories in the US have increased interest in this topic.There have been several reports of computer hackers attempting to gain unauthorised access to systems used by the US military and government.Network connections on the Internet cannot be rendered safe against unauthorised accesses without the application of suitable computer security rules and techniques. A harmful action in the context of computer ethics refers to harm or unfavourable outcomes, such as unintended information loss, unintended property loss, unintended property damage, or unintended environmental effects. This rule forbids the use of computer technology in a manner that endangers other users, the public at large, staff members, or employers. Intentional file and programme alteration or deletion that results in significant resource loss or needless human resource consumption, such as the time and effort needed to rid systems of "computer viruses," are examples of harmful activities. Below, we'll additionally look at several more distinct IT-related ethical problems;

Information and copyright

Education

The Internet has undoubtedly had a significant impact on commerce and business, but what about the institutions that form the basis of any society—those that are concerned with education and the creation of knowledge? Various consequences of the Internet have been felt in this situation, some of which are rather unsettling. There are more computers in classrooms than ever before, yet there is no proof that using them helps students learn the fundamentals of reading, writing, and maths. Moreover, although having access to a wealth of digital material is useful, it is clear that most students today see libraries as outmoded establishments that are better suited for their computer terminals than for their book collections. As professors at all levels of school will testify, students often like reading online for research rather than rummaging through library stacks.

In a similar development, plagiarism has been introduced into the computer age in two different ways via the Internet. First, students may now easily "cut and paste" published materials (such encyclopaedia entries) into their own papers thanks to electronic texts.Second, although it was always possible for students to hire someone to write their papers for them, it is now much simpler to discover and buy anonymous papers on websites and even order original term papers for a set price. Ironically, the Internet both gives and takes.Teachers may now quickly compare their students' papers to databases of electronically submitted ones thanks to their access to these databases. Sources archive. Sometimes a quick web search can reveal the source of a particularly well-crafted phrase[5], [6].

File sharing

The rising understanding of the importance of intellectual property in the digital era has been led by users and students. Napster was created in 1999 by American college student Shawn Fanning, who also launched an ongoing legal struggle over digital rights. Users of the file-sharing platform Napster may exchange digital music files online. The issue was clear: when one legal copy of a song was shared by several individuals, recording corporations were

losing money. Despite being successful in shutting down Napster, the record corporations now have to deal with P2P ("person-to-person") file sharing. As with Napster, there is no central administrator to shut down a P2P network. In an effort to deter the millions of people who regularly used the software, the recording industry initially filed lawsuits against the developers of P2P software and some of its most active usersoften students living on college campuses and having access to high-speed connections for serving music and, later, movie files. Even Nevertheless, more cunning ways of avoiding detection have been developed, despite the fact that certain P2P software developers have been held responsible for damages that the copyright owners have suffered. The music and film industries have developed sophisticated copy protection on their CDs and DVDs as a result of their inability to stop file sharing. In a very contentious episode, Sony Corporation released CDs with copy protection in 2005. This copy protection utilised a unique virus-like code that was hidden on a user's computer. However, this code was also vulnerable to being used by virus authors to take over users' computers.

Hacking

A hacker is someone skilled enough to enter computer systems without authority in order to find security holes.'Hackers' intrigue or 'hack' into a system. Hacking is an option. For a number of motives, such as the desire to undermine a system or the want to comprehend how a system works in order to profit from it.Alternately, there can be a wish to inform individuals that a system needs to be strengthened because it is insecure. Some contend that "hacker ethics" exist as a result of this. Hacking may raise ethical questions. This is due to the fact thatreformed hackers sometimes donate their knowledge to assist corporations in defending themselves against other hackers. As with an unlocked door, hackers cannot merely walk into a system. Instead, a lot of talent is needed. With this ability, hackers may prove that a system is unsafe and needs to be strengthened. It may be claimed that hackers serve a useful purpose in this fashion. Many believe that although hacking may result in certain benefits, it is ultimately not worth it due to the amount of disruption it produces.

Computer crime

Some estimates state that in 2006, the personal information of 73 million Americans was unintentionally revealed, misplaced, or stolen. In one high-profile incident, a computer containing the personal information of more than 26 million active-duty and retired members of the U.S. military was stolen during a break-in at the residence of a Department of Veterans Affairs employee. The computer was subsequently found, with its data seeming to have been unharmed by the burglars, who were evidently unaware of what they had stolen. However, there were worries that millions of other individuals would not be as fortunate. Credit card and Social Security numbers were often among the missing data, which stoked worries that the data may be used to commit massive consumer fraud. More than 200 distinct security breaches at businesses and government organisations were disclosed over the course of an 18-month period in 2005–2006. As a response, Visa and MasterCard-backed credit card issuers imposed stringent new security requirements on businesses that processed credit card transactions in an effort to lessen their susceptibility. There was no way to know whether identity thieves were simply biding their time before using the information to steal money through bank or credit-card accounts, even though it appeared that identity theft had not increased to the level suggested by the volume of personal information that had been compromised as the year came to a close.

Identity thieves who had been apprehended recalled how simple it was for them to profit from stolen data. Thieves generally steal identity information when it is unintentionally exposed or via "phishing" tactics, in which they use email to trick individuals into entering their credit card information or other personal information on a false Web page that seems to

be a legitimate company. The crooks then moved funds from a victim's account to themselves using a stolen credit card information, or they used the victim's name to make purchases. The scale of the stealing attempts was enormous; more than 17,000 phishing assaults were launched in a single month. Were disclosed to volunteer organisations working to stop identity theft. There are many various types of computer crimes, which undoubtedly raises moral dilemmas for society. On computers, several illicit activities including fraud and embezzlement are carried out. This involves, for instance, the creation, duplication, or modification of official documents and visual graphics utilising imaging and desktop publishing. Other moral conundrums include the question of whether copying these data is as wrong as stealing[7], [8].

Malicious Codes

A variety of computer programmes that were written with the purpose of inflicting data loss or harm are examples of malicious code assaults. Malicious code assaults often fall into one of three categories: viruses, trojan horses, or worms.A virus is a piece of malicious software that attaches to another programme and causes it to carry out a specific undesired task on a workstation. As an example, consider a programme that is connected to command.com, the main Windows system interpreter, and which deletes certain files and corrupts all additional instances of command.com that it can locate.A Trojan horse differs from other applications mainly in that it was designed to appear like something else whereas, in reality, it is an assault weapon. A computer programme that launches a straightforward game on a workstation is an example of a Trojan horse. The Trojan horse delivers a duplicate of itself to each address in the user's address book while they are playing the game. The Trojan horse is propagated to the addresses in each address book when the other users download and play the game. In order to spread from one machine to another, viruses often need a delivery method, or vector, such a zip file or another executable programme attached to an email. The crucial distinction between a computer worm and a computer virus is that a virus can only propagate via human contact.

Worms are independent programmes that attack a system and attempt to take advantage of a particular weakness in the target. The worm replicates its programme from the attacking host to the newly vulnerable machine after successfully exploiting the vulnerability to start the cycle all over again.A virus is made up of a collection of instructions that connects to and ingratiates itself with other computer programmes, often those found in the computer's operating system. Most of the time, the altered programmes carry out their intended tasks while also secretly carrying out the commands of the virus. A virus is often made to run when it is placed into memory of a computer. Upon execution, the virus gives instructions to its host programme to transfer the viral code into, or "infect," any number of other programmes and files kept on the computer. The virus may then spread to files and programmes on other computers via magnetic media. Computer networks, discs or other memory storage devices, or online systems. The multiplying viruses often keep going until they obliterate data or make other programme codes useless. When a user switches on his computer, a virus can simply create a lighthearted joke or cryptic message to show on the television monitor. An excessively big computer system may fail and lose vital data in a matter of minutes or hours if a more destructive virus manages to infect it.

Writing and disseminating virus programmes are obviously immoral behaviours; they have very significant repercussions, wreck systems, and temporarily shut down enterprises. One of the most worrying effects of such behaviour is when viruses disrupt an organization's normal operation and, in the worst situations, even result in human death. Occasionally, logic bombs are also detonated.However, there is undoubtedly a large amount of antivirus software available nowadays that aids in addressing this ongoing issue[9], [10].

Ergonomics/health issues

The ergonomics and health of IT workers are many.Hopefully, ethical/responsible employers will take this into account, as should all employers. This covers topics including the need of taking sufficient breaks from computer use and making sure the displays adhere to the rules.Additionally, make sure the chair and computer are positioned correctly for the user and provide foot rests as needed. On these topics, some firms will provide their staff with particular counsel. Many employees may have health issues caused directly by I.T., such as back difficulties, eyestrain and eye infections, and repetitive strain injury (RSI), if such ethical/moral awareness and taking the appropriate action are not there.

Ethical Challenges on Information Technology

Despite how crucial information technology is to our daily lives, it is confronting some significant ethical issues, and it is up to IT professionals and consumers to be prepared for these issues. Most IT specialists and consumers are ill-equipped to handle the problems these new information technologies bring about as more of them appear on the market. One of the main issues confronting information technology is the lack of privacy, security, copyright infringement, and rise in computer crimes. This has encouraged thieves to prey on IT users based on the loopholes these technologies have created. Many companies and organisations run the danger of losing this data because skilled criminals may quickly access it for their own purposes, and information technology speeds up the access and flow of information. Additionally, dishonest personnel may utilize information technology to store their own objectives, which might be detrimental to an organisation. IT is not inherently evil, but how people utilise the tools it provides has created some significant difficulties[11].

CONCLUSION

This thorough analysis's exploration of the integration of information and communication technology (ICT) in libraries shows that it is both a difficult path and a world of limitless potential. Libraries, as the guardians of information, are at a turning point when digital transformation has the potential to change how they function in the contemporary world. In conclusion, the challenges libraries confront in using ICT are manageable. Strategic planning, financial investment, and ongoing learning may be used to overcome issues with infrastructure, employee training, and budgetary limitations.

Libraries have the chance to completely change how information is accessible, stored, and shared as they adjust to the digital age. ICT in libraries offers a plethora of revolutionary prospects. The user experience can be revolutionized and users of libraries may be given more power via improved accessibility, creative research tools, and the development of digital archives and virtual libraries. Libraries can develop into dynamic information hubs, educational institutions, and community centres in this quickly changing environment. Libraries may act as information centres for people navigating the digital age, cultivating digital literacy, encouraging diversity, and bridging the digital gap. Although there are genuine obstacles, there are also significant possibilities. Embracing ICT is important for libraries, but it's also a step towards a better future for information searchers and society as a whole.

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CHAPTER 11

DIFFICULTIES WITH ICT APPLICATION IN NIGERIAN LIBRARIES

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ABSTRACT:

ICT has the potential to completely transform library services in Nigeria by expanding access to information, increasing productivity, and raising the standard of instruction and research. However, there are other obstacles that prevent the full realisation of ICT in Nigerian libraries. This article explores the complex challenges that Nigerian libraries have while implementing ICT solutions. It looks at problems including outdated infrastructure, insufficient financing, technical hurdles, and the digital divide. It also examines the effects of these difficulties on library services and Nigeria's larger educational system. We learn more about the crucial obstacles that need to be removed in order to harness ICT's revolutionary potential in Nigerian libraries and close the information gap in this vibrant and diversified country during the course of this thorough investigation.

KEYWORDS:

Diversified country, Investigation, Infrastructure, Nigeria.

INTRODUCTION

A new age of information access and dissemination has begun with the introduction and integration of Information and Communication Technology (ICT) in libraries. Libraries are essential organisations entrusted with the preservation and sharing of information both in Nigeria and many other areas of the globe. It is noteworthy that ICT has the ability to transform library services by enhancing information accessibility and effectiveness. But there are obstacles specific to Nigeria that stand in the way of realising this promise. This introduction lays the groundwork for a thorough investigation of the obstacles Nigerian libraries must overcome in their quest for successful ICT implementation. In addition to highlighting the value of libraries in promoting learning, research, and development in Nigeria, it also recognises the transformational potential of ICT. It also draws attention to the significant obstacles that must be overcome in order to fully realise the potential of ICT in Nigerian libraries, such as those related to finance, infrastructure, technology literacy, and the digital divide. By doing this, Nigerian libraries may significantly contribute to closing the information divide and increasing the spread of knowledge in this vibrant and varied country. With a rising focus on digitalization across multiple industries, Nigeria has recently seen substantial progress in information and communication technology. While these advancements show promise for libraries, it is important to recognise the difficulties they confront in using ICT to its fullest. A few of the difficult problems that Nigerian libraries face as they work to transition to the digital era include outdated infrastructure, a lack of funding, and technical limitations [1], [2].

A significant barrier to fair ICT use in Nigerian libraries is the digital divide, which includes differences in access to technology and information between urban and rural locations as well as across various socioeconomic categories. To achieve a knowledge-driven society, it is imperative to bridge this gap and guarantee that all Nigerians may benefit from ICT. This essay will dive into these issues and provide a thorough analysis of the many obstacles Nigerian libraries have when trying to successfully integrate ICT solutions. It will clarify how these problems affect library operations, educational facilities, and the larger Nigerian

society. We can map out a future that uses ICT to turn Nigerian libraries into vibrant centres of information and creativity by grasping these intricacies and considering viable solutions. Information services, operations, and information distribution have been merged and expanded thanks to the development of Information Communication Technology (ICT) and the use of computer technology in library operations. Since the world is experiencing a global information revolution in which the library cannot afford to be an actor, libraries have no choice but to participate in the global information economy or risk being left out. Information is significant because it may be used as a resource and has strategic significance in planning and making decisions. Decision-making and information distribution to users will both benefit from the capacity to access data from all areas of the economy[3], [4].

DISCUSSION

The use of ICT in libraries in African nations is fraught with difficulty. In their study on the difficulties in managing information and communication technologies for education in Tanzania, Emmanuel and Alfred (2008) noted that while new technologies have improved library services by offering new ways of gathering, storing, retrieving, and providing information, they have also brought new difficulties and made some of the problems already faced by libraries worse. ICT acquisition, electronic information resource preservation, user training, maintenance and security difficulties, as well as a general lack of stakeholders in libraries are aware of and committed to. At their 2009 study of the ICT infrastructure at university libraries in Karnataka, Walmiki and Ramakrishnegowda discovered that the majority of the libraries lacked enough hardware, software, internet nodes, and bandwidth. To fully take use of the advantages of the digital information environment, the campus LANs were not expanded. In their study on ICT facilities in university libraries in India, Sivakumaren, Geetha, and Jeyaprakash (2011) discovered that computers, printers, scanners, and photocopiers were the most frequently used facilities. The application of ICTs has increased library functions, and users' expectations have grown as a result of technological advancement. The failure of many local library schools to include ICTs into their curriculum has had a significant negative impact on the performance of library workers, according to Jordan (2003), who believed that impediments to proper ICT skills training in developing nations resulted from both a lack of ICT literacy and this. Other obstacles or limitations listed by Ashcroft and Watts (2005) include a lack of technology-savvy library workers, a lack of qualified personnel to set up and maintain computer networks, and inadequate money to educate current staff in ICT. According to Goulding (2000), teaching departments must promote the development of the necessary ICT skills to provide contemporary information services by introducing new skill requirements into curricula. Encourage information specialists from developing nations to spend time studying at libraries in rich nations is another option. Partnership projects between libraries in developed and poor nations may help accomplish this[5], [6].

In their 2010 study of ICT and library operations, Adeleke and Olorunsola discovered that ICT infrastructure posed libraries with the most tool use challenges. According to Shafi-Ullah and Roberts (2010), funding should be allocated for ICT infrastructure in order to support a research culture in higher education institutions. ICT availability was examined by Etebu (2010), who discovered that the situation is not favourable. According to report, there are a number of issues that make it difficult for respondents to use the ICT facilities on the various campuses of Nigerian universities, including power outages, expensive connectivity, a lack of ICT expertise, interconnectivity issues, and outdated technology. Before they can meet the everyday information demands of their many customers, both library administration and information suppliers must overcome the majority of these obstacles. According to the aforementioned conclusion, respondents who utilise ICT resources to acquire their knowledge face a variety of issues.

This result is consistent with who were mentionedand noted infrastructure barriers to internet access as well as unusual issues that are specific to the African environment, such as power outages. Regulatory restrictions on communication technology, costly or unreliable technologies, and poor content are all examples of equipment failure. In their research, Imo and Igbo (2011) noticed that the majority of Nigerian colleges typically replaced their software after five years of usage. This amount of time does not demonstrate sufficient testing of the programme.

The reasons stated were a lack of acceptable feasibility studies (85.71%), insufficient technical support for the programme (100%), defects found (71.43%), and excessive maintenance costs (57.14%).If software utilisation in Nigerian university libraries is to be relevant, two technical issues that need to be effectively addressed are insufficient technical assistance and a lack of appropriate feasibility studies. This is significant because of how quickly technology evolves.When a new piece of software with a different slice of the information world is released, specialists in one piece of software with its associated slice of the world may become outdated, according to Martel's (2003) argument that since technology changes often, jobs are taken on the spot. Users of software who are not sufficiently aware of this risk subscribing to programmes that utilise antiquated technology. This reaction is supported by the survey libraries' ratings of the issues with software usage in libraries, which were inadequate planning and assessment of software prior to purchase (3.86 mean score) and lack of maintenance support for the programme (3.57 mean score). listed the following as some of the difficulties the library had while using ICT:

Lack of adequate finance and cost of ICT facilities:

Libraries in Nigeria are not exempt from the effects of the present economic slump on that country's educational system. For effective automation of library services, a lot of tools and labour are required. The university of Lagos library, like other academic libraries in Nigeria, is underfunded. The Library Development Fund is no longer a reality because universities must rely on the support that Vice-Chancellors can provide with the limited resources available, and even though ICT is applicable to library services, the high cost of ICT equipment prevented most libraries from using it extensively. The majority of library patrons and librarianscannot afford the price of a basic personal computer[7], [8].

Lack of ICT policies/ inability of the government to monitor effectively the policy on information technology:

Most libraries in underdeveloped nations lack a comprehensive ICT policy, which hinders the use of ICTs. Different ICT policies in Nigeria, such as the Nigerian University NET and school-net, are not effectively supervised. Additionally, most libraries in underdeveloped nations, including Nigeria, lack a comprehensive ICT strategy.at their investigation of the difficulties associated with using software at Nigerian university libraries, Imo and Igbo (2011) discovered that more than 75% of the The libraries questioned employed a variety of programmes in their automation effort. The majority of these university libraries switched to different software regimes after leaving.

The Information Navigator Library (TINLIB) management software. In addition, the study revealed that these libraries used a variety of programmes, including TINLIB, GLAS, Alice for Windows, Lib+ (X-Lib), Virtua, E-Lib, SLAM, and CD-ISIS. This shows that, other from the TINLIB software that the National Universities Commission (NUC) supplied to these university libraries, no effort has been made by these libraries to embrace a uniform software platform. The study also revealed that these colleges typically upgraded their software after five years of usage. This amount of time does not demonstrate sufficient testing of the programme.

The reasons stated were a lack of acceptable feasibility studies (85.71%), insufficient technical support for the programme (100%), defects detected (71.43%), and excessive maintenance costs (57.14%)[9], [10]. When a new piece of software with a different slice of the information world is released, specialists in one piece of software with its associated slice of the world may become outdated, according to Martel's (2003) argument that since technology changes often, jobs are taken on the spot. Users of software who are not sufficiently aware of this risk subscribing to programmes that utilise antiquated technology.

This reaction is supported by the survey libraries' ratings of the issues with software usage in libraries, which were inadequate planning and assessment of software prior to purchase (3.86 mean score) and lack of maintenance support for the programme (3.57% mean score). He said that one of the issues with using software in libraries is that librarians sometimes lack the expertise necessary to recognise the software on the market that the respondents disagreed with (mean score of 2.29, which agreed with all others). The two factors with the highest scores, 3.57 each, were inadequate funding for university libraries and a lack of maintenance support for the programme. In a study on the computerization of the Kashim Ibrahim Library (KIL) at the Ahmadu Bellow University, Omoniwa (2001) stated that the major oversight in the project's planning and execution was the lack of a funding back-up for the early tries.

He also mentioned how the lack of funds contributed to the failure of the NUC effort for federal institutions. He also made the argument that the K.I.L project failed since there was no feasibility analysis conducted before beginning computerization. Another issue with ICT use in Nigeria was a lack of educated personnel to handle the automation software in these libraries. According to Nwagwu (2006), the failure rate of ICT projects in the least developed nations is 75% greater than in developed countries, mostly because there is a lack of the necessary knowledge and skills to recognise and manage the long-term risks associated with ICT. Ogunleye (1997) was quite direct in his evaluation of himself.He noted that university libraries lacked the staff necessary to executelibrary computerisation programme which was initiated by NUC in 1995. He did not agree that the development of software in-house is a good enough strategy to sustain software use[11], [12].

CONCLUSION

This thorough study' exploration of the obstacles and problems faced by ICT use in Nigerian libraries highlights the country's intricacies and inequities. ICT has the potential to significantly improve library services and close the information gap, but there are still many challenges in the way of its successful implementation. In conclusion, the daunting hurdles that Nigerian libraries must overcome include concerns with insufficient infrastructure, restricted financing, technical impediments, and the digital divide. These challenges not only prevent ICT from reaching its full potential but also have an effect on the quality and accessibility of library services. It is crucial to understand that these difficulties may be overcome.

Nigerian libraries may overcome these challenges through strategic planning, greater investment in ICT infrastructure, and a dedication to digital inclusion and literacy. Partnerships with governmental organisations, academic institutions, and international organisations may also provide beneficial assistance and funding to boost ICT efforts in libraries. Beyond just being a technical achievement, ICT in Nigerian libraries has the capacity to revolutionise. It has the potential to democratise information access, advance education, and spur innovation in a country that is overflowing with talent and opportunity. Addressing the challenges of ICT application in libraries is a crucial first step towards a better and more digitally inclusive future for all Nigerians as the country moves forward on its path to become a knowledge-driven society.

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CHAPTER 12

A BRIEF DISCUSSION ON ELECTRONIC LIBRARIES

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ABSTRACT:

The sharing and preservation of knowledge has undergone a substantial paradigm change because to electronic libraries, often known as e-libraries or digital libraries. This essay analyses the diverse world of electronic libraries, looking at its technical foundations, important characteristics, historical development, and effect on information accessibility. It explores the many types of electronic libraries from digital archives to online directoriesand how they have changed how users' access and engage with information sources. The research also examines the benefits and drawbacks of electronic libraries, including concerns about copyright, digital preservation, and information security. Through this thorough examination, we learn more about the revolutionary potential of electronic libraries to democratise knowledge access, advance research, and reshape the information and educational environment in the digital era.

KEYWORDS:

Digital Era, Electronic, Libraries, Technical Underpinnings.

INTRODUCTION

The idea of libraries has undergone a significant transition in the digital era, when knowledge is plentiful and simple to obtain. Electronic libraries, usually referred to as e-libraries or digital libraries, have become active and cutting-edge repositories for the archiving, retrieval, and sharing of information. In terms of information management and access, these digital repositories mark a substantial change from conventional brick-and-mortar libraries. They bring both potential and difficulties. This introduction lays the groundwork for a thorough investigation of electronic libraries, emphasising their historical development, technical underpinnings, and influence on the information and educational landscapes. The way people engage with information resources has been revolutionized by electronic libraries, which provide unmatched accessibility and ease. However, its widespread use also poses issues with data security, copyright, and digital preservation.

We will explore the different forms that electronic libraries take, their influence on research and education, and the benefits they provide in terms of democratising access to information as we go further into the field. We shall also manage the difficulties and complexity presented by this digital frontier. We acquire insights into electronic libraries' transformational potential and their role in improving the distribution and preservation of information in the digital era by comprehending their multidimensional character.The manner that knowledge is kept, accessed, and shared in the modern world has undergone a radical change thanks to electronic libraries. These libraries have expanded beyond the physical limitations of conventional brick-and-mortar institutions thanks to the development of the internet and digital technology, creating a huge and linked universe of information. With just a few clicks, users may now quickly and easily access a wide range of informational materials, including books, academic papers, and multimedia content [1], [2].

The landscape of electronic libraries is varied, spanning many different forms and varieties, each of which serves certain user requirements. Electronic libraries have been welcomed by academic institutions, public libraries, government organisations, and cultural organisations as a way to improve learning, research, and public involvement. A worldwide audience may now access information thanks to the remarkable ease that the digital revolution has brought forth.

However, as we go farther into the realm of electronic libraries, we must face difficulties with data security, concerns with copyright, and the long-term preservation of digital content. These difficulties are intricate and need to be carefully taken into account in order to maximise the advantages of electronic libraries while minimising any possible hazards.We will dive into the complex world of electronic libraries in this thorough investigation, illuminating their transformational potential, their function in democratising access to knowledge, and the changing face of information management in the digital era[3], [4].

DISCUSSION

An electronic library, in the words of E.A. Fox, is "a new means of carrying out the duties of libraries, comprising new forms of information resources, new techniques to categorization and cataloguing, intense use of substantial changes in intellectual, organisational, and electronic practises, as well as electronic systems and networks.

Management of E-Library

A user-based library service, the electronic library offers consumers a full electronic connection to the information they need. However, managing an electronic library is significantly unlike from managing a conventional library."The fundamental concepts of customer focused management are not profoundly changed, but factors such as distance from users, specific product/service delivery mechanisms, technology, and organisation must be planned and managed differently." Managers of electronic library services encounter a variety of challenges, but the three biggest ones are cost recovery, copyright-related issues, and training. In the current electronic age, librarians must find a means to raise more money or charge users to meet the ongoing expenditures of the equipment required to operate the electronic library.

While copyright issues are addressed, no copied content may be added to an electronic library. Managers of libraries must constantly work to fully train their employees, which costs both money and time. However, if they are successful in making this adjustment, it may end up being the most crucial factor in ensuring the success of an electronic library. Managers of electronic libraries need to reconsider their approaches and make the necessary adjustments to their conventional management techniques since these issues must be investigated at all costs. Managers must employ cutting-edge tools and cutting-edge technology in order to bring about this transition, handle these issues with other issues, and administer electronic libraries effectively[5], [6].

Digital Library

The way people and institutions operate in modern society has altered as a result of information and communication technology, or ICT as it is more often known. Academic libraries also fall under this. Academic libraries are those that are created and kept up at significant educational institutions in order to satisfy the informational demands of the library's many patrons. In colleges and universities, academic libraries support the teaching, learning, and research activities.The rise of information technology and the Internet has an impact on these libraries. Nowadays, academic libraries really run on computer networks and the Internet to let users access and utilise material from all over the world.

Users are able to utilise the most pertinent and up-to-date information as well as broaden their expertise thanks to this.In this day and age, digital information is the most significant kind of information. Digital information must be kept up to date in a way that both fits user demands and allows for social context interpretation. This places a lot of duty on those who produce digital content, and they must make sure that the information they disseminate is always accurate, current, and relevant. In order for digital information to be utilised in the best possible way, it must also be assured that the appropriate digital resources and methods are made accessible.

To support the teaching and learning processes, academic libraries must ensure that the digital content they provide can be accessed and used appropriately. The integration of digital material must be done in a way that makes it possible for students to learn effectively and for instructors to teach more effectively. To do this, it is crucial that professors and students be made aware of the numerous digital resources available to them and how to utilise them to find the most relevant online data.The phrase "digital library" is also related to the development of digital information. To put it simply, a digital library is a library that manages and gives access to digital materials and information. An online database of digital artefacts is referred to as a "digital library," "digital repository," or "digital collection." Digital material and information in a variety of formats are referred to as digital objects. In addition to storing digital material and information, digital libraries also provide tools for properly categorising, indexing, and retrieving such data. Academic libraries now operate and function differently thanks to digital libraries. In reality, the way information is handled, disseminated, accessed, and preserved in academic libraries has altered thanks to digital libraries.

A digital library is a broad phrase that covers several features and may have different meanings to various individuals. For kids, a digital library may be a collection of digital materials, databases, and learning resources. Resources accessible via a computer network. On the other hand, a businessman may refer to a digital library as a collection of information found on a portal, such as vital business news, stock and share prices, budgetary data, etc. To put it simply, a digital library is a collection of digitalized materials that have been categorised for information consumers with a variety of requirements and backgrounds.Digital libraries were described as "a coordinated collection of services, which are based on collections of materials, some of which may not be directly under the control of the organisation providing a service in which they play a role" by the Stanford Digital Library study team.A digital library, according to E.A. Fox, can be described as a "New way of carrying out the functions of libraries" that includes "new types of information resources, new approaches to classification and cataloguing, intensive use of electronic systems and networks, and dramatic shifts in intellectual, organisational, and electronic practise."'Digital Libraries are organisations that provide the resources, including the specialised staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and affordably available for use by a defined community or set of communities,' the Digital Library Federation states[7], [8].

Virtual Library

Academic libraries' operations and ability to satisfy the information demands of varied users have changed significantly as a result of the growth of information technology. Users' information demands are evolving along with the expansion of information.For instance, today's kids benefit more from audio-visual information while learning topics. Libraries have modified how they are set up and run in order to better meet the evolving and dynamic demands of its users. Using information technology, what are known as virtual libraries have been created?

Information is saved digitally in virtual libraries, which are more akin to digital repositories. In actuality, a virtual library enables anybody with a computer and a network connection to a library to access data from any library. With a virtual library, a person may access information not only via a particular library network, but also over the Internet, providing access to a global collection of knowledge. In other words, a virtual library opens doors to a plethora of knowledge sources that a person may not otherwise have access to due to physical limitations.

A virtual library is described by Kaliammal as "an information system targeted towards a specific community, where content from various sources is collected and managed, content is structured and enriched with metadata, and a set of services is offered that makes the content available to a user community via a communication network, typically the Internet."In contrast to conventional textbook formats, knowledge may be found in virtual libraries in a variety of formats. Indeed, information is stored in virtual libraries in the form of text, audio, video, photos, 3D objects, and multimedia content. One can always have access to world material thanks to virtual libraries. Users who are not physically present in the library may access any information from anywhere thanks to virtual libraries. Users will find it more convenient as a result of being able to swiftly and readily retrieve relevant information.

Advantages of Electronic Libraries

In the digital era, electronic libraries provide a wide range of benefits. Their main advantage is accessibility since it frees consumers from location-based restrictions and gives them access to a variety of information resources from the comfort of their own homes. Research and learning are more productive because to this convenience, which also extends to the speedy search and availability to resources. Additionally, electronic libraries are available to people all over the globe because to their ability to cross geographic barriers. Digital resources may be scaled up to accommodate large collections that serve a variety of requirements and interests. Electronic libraries also make it easier to digitise and preserve rare and delicate resources, guaranteeing their durability and accessibility for future generations. In general, electronic libraries provide people unparalleled access to information, enabling more inclusive and effective learning and research in our linked society.

Electronic libraries, also known as e-libraries or digital libraries, have become effective tools in the era of the internet, providing a host of benefits that have completely changed how information is accessed, stored, and shared. These benefits go well beyond simple convenience; they influence how information is disseminated, researched, and educated. In this article, we'll examine the many advantages of electronic libraries and show how they're changing the way that knowledge is managed and made accessible.

Electronic libraries, first and foremost, provide unmatched accessibility to a plethora of information resources. With an internet connection, users may access e-libraries from almost anywhere, removing the limitations of physical location and putting a world of information at their fingertips. This accessibility is especially important in our connected, fast-paced society, where quick access to information may significantly impact learning, research, and decision-making. Another characteristic of electronic libraries is convenience. The days of laboriously sifting through actual piles of books or magazines are long gone. Users may quickly access a wealth of information, search for particular items, and obtain pertinent papers with just a few keystrokes. This effectiveness not only saves time, but also gives users the tools they need to maximise their efforts in learning and research.

One characteristic of electronic libraries is their global reach. E-library are not constrained by geographical or physical limitations as conventional libraries are. A global community of learners and researchers is fostered by the ability of users from different parts of the globe to access the same materials.

The expansion of cooperation and idea exchange on a worldwide scale is made possible by this global reach, which advances knowledge. One important benefit of electronic libraries is their scalability. They may hold huge digital resource collections, accommodating a constantly growing corpus of information. Libraries may expand and change over time to satisfy the changing requirements and interests of their users because to this scalability. Electronic libraries may accommodate a wide range of user needs, whether they are related to academic study, professional growth, or personal inquiry.

Another significant benefit of e-libraries is preservation. Rare and delicate items are preserved digitally, ensuring their accessibility for future generations. Electronic libraries may digitise and conserve ancient manuscripts, artworks, and documents, maintaining them in their original form while making them available to a worldwide audience. This is particularly important in the context of cultural heritage preservation. Electronic libraries also include cutting-edge organisation and search tools that improve user experience. Advanced search algorithms may be used by users to locate particular information within enormous collections, enabling focused and effective study. Furthermore, the use of metadata and classification systems facilitates the organisation and retrieval of items, enabling users to easily browse the library's resources.

Electronic libraries get a dynamic dimension via interactivity and multimedia features. Users' learning experiences may be enhanced by engaging with multimedia material, such as movies, interactive simulations, and virtual tours. In educational settings, where visual and interactive materials may improve understanding and retention, these elements are especially beneficial. Electronic libraries are dynamic centres of knowledge and creativity rather than just information stores.

Our capacity to acquire information, study, and do research has changed as a result of their benefits in terms of accessibility, ease, global reach, scalability, preservation, enhanced search capabilities, interaction, and multimedia material. Electronic libraries continue to be crucial in democratising access to information, enabling inclusive learning settings, and expanding the boundaries of human understanding as we traverse the digital era. They are more than just a convenience; they are a driving force behind advancements in research, education, and information sharing[9], [10].

Disadvantages of Electronic Libraries

Electronic libraries provide many benefits, but they also have certain drawbacks and difficulties. The digital gap, where not everyone has equal access to the internet and digital gadgets, resulting in differences in information access, is one big negative. Electronic libraries may sometimes have technological difficulties and downtime, which can impair access to materials. The digital format also gives rise to questions concerning the long-term preservation of materials and possible problems with digital obsolescence. Certain items' accessibility may be hampered by licencing and copyright issues, and the collection and analysis of user data may raise privacy issues.

Finally, users may find it difficult to sort through and assess the reliability of sources due to the overwhelming amount of material that is accessible in electronic libraries. These drawbacks emphasise the need for careful thought and continuing work to minimise the problems with electronic libraries while maximising their advantages.While electronic libraries provide many benefits, there are also a number of drawbacks and difficulties that need to be recognised and resolved. These issues highlight the challenges involved in the digital transformation of library services and information access, even if they are not insurmountable.

The digital divide is one of the biggest drawbacks of electronic libraries. There are discrepancies in access to information since not everyone has equal access to the internet and digital devices. This gap might be especially obvious in areas with poor internet access or wide socioeconomic inequality.

As a result, those without access to the required technology may be denied access to the richness of information and resources found in electronic libraries, reinforcing already-existing disparities. Another problem is downtime and technical difficulties. Technical hiccups or system breakdowns might prevent users from accessing crucial information sources in electronic libraries, which are dependent on intricate technological infrastructures. For those who rely on constant access to knowledge, including researchers, students, and the general public, such interruptions may be upsetting.

The world of electronic libraries is likewise plagued by significant preservation issues. While digital resources have the benefits of being portable and easily accessible, they also pose concerns regarding the long-term preservation of digital assets. If digital content is not frequently updated and converted to new forms, digital formats might become out-of-date and make things unavailable. For electronic libraries, maintaining the digital preservation of priceless information is a constant issue. The accessibility of items in electronic libraries is severely constrained by copyright and licencing issues. Copyright limitations are simpler to implement in the digital world, possibly restricting the spread of certain content. For both library staff and customers, navigating the nuances of copyright law, licencing agreements, and fair use guidelines may be challenging and time-consuming. Privacy issues are still another significant disadvantage. To enhance services and personalise suggestions, electronic libraries often gather user information, such as search queries and reading preferences. However, concerns regarding data security and privacy are raised by the gathering and analysis of user data. Users can feel uneasy about how much of their online behaviour is monitored and analysed, which might lead to conflict between the need for individualised services and the right to privacy. It might be difficult to handle the sheer amount of knowledge accessible in electronic libraries. Despite the ease with which consumers may acquire huge amounts of information in the digital age, doing so and determining the reliability of sources can be difficult. Information overload caused by the democratisation of knowledge may sometimes make it difficult for users to distinguish between trustworthy, high-quality sources and shadier ones. However revolutionary, electronic libraries are not without their drawbacks and difficulties. A multifaceted strategy is needed to address these problems, one that includes work to close the digital divide, secure the long-term preservation of digital content, handle copyright challenges, safeguard user privacy, and provide information curation and assessment methodologies. Electronic libraries may continue to develop as useful tools that provide access to knowledge while preserving the ideals of fairness, privacy, and information quality by identifying and actively attempting to alleviate these difficulties [11], [12].

CONCLUSION

As thoroughly examined in this paper, electronic libraries are a game-changing force in the field of information and knowledge management. These digital repositories have marked a dramatic divergence from conventional library models in the way we access, store, and interact with information resources. Electronic libraries have democratised access to knowledge by removing obstacles in the way of information and enabling it to be easily accessed by a large audience worldwide. They have provided unmatched convenience for researchers, students, and the general public, allowing study and discovery from almost anywhere with an internet connection However, the growth of electronic libraries also carries with it some difficulties, such as problems with copyright, data security, and digital preservation. To maintain the long-term viability and integrity of digital information

resources, these difficulties must be properly addressed.Electronic libraries will continue to develop as the digital era goes on, changing the information and educational environment. They play a crucial role in promoting science, encouraging diversity, and protecting cultural heritage. We may better harness their revolutionary potential while addressing the issues that occur in this dynamic and linked informational environment by recognising the multidimensional nature of electronic libraries.

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CHAPTER 13

COMPREHENSIVE REVIEW OF LIBRARY MATERIALS PRESERVATION

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ABSTRACT:

Preservation of library resources is a vital and complex task that is essential to preserving societies' intellectual and cultural history. In-depth historical analysis, discussion of fundamental ideas, approaches, and an examination of the always changing difficulties related to the preservation of books, manuscripts, archival records, and other library collections are all covered in this paper's exploration of the complex world of library materials preservation. Given their relevance for study, education, and culture, it emphasises how crucial it is to preserve these artefacts for future generations. The research also looks at contemporary preservation methods, such as digitisation and restoration, as well as the moral and legal issues that support preservation initiatives. We learn more about the intricate and important topic of library materials preservation and its ongoing significance in the era of digital change thanks to this thorough examination.

KEYWORDS:

Component,Digital change, Library, Materials, Preservation.

INTRODUCTION

An essential component of library science and cultural heritage care is the preservation of library resources. It reflects the dedication to safeguarding the survival of priceless collections of books, manuscripts, records, and other resources that serve as the foundation of our intellectual, educational, and cultural history. Beyond their physical preservation, these items serve as a symbol of our shared need to protect the past for the benefit of current and future generations. This introduction provides as a starting point for a thorough examination of the preservation of library resources, stressing its historical relevance, guiding principles, and the changing range of issues and approaches. In light of their relevance for research, education, and culture, it emphasises how crucial it is to preserve library resources. Additionally, it acknowledges that the principles of preservation go beyond the physical world to include digital collections and born-digital artefacts in an age of digital transition. The complexities of conservation procedures, preservation ethics, legal issues, and the dynamic interaction between tradition and innovation will all be revealed as we explore further into the realm of library materials preservation. In the conclusion, this investigation of library materials preservation will highlight the crucial part it plays in ensuring that our intellectual and cultural history persists, changes with the times, and flourishes in spite of advancements in technology.The preserving of priceless collections that serve as the foundation of our cultural, educational, and intellectual history is a critical task that transcends the boundaries of actual geography and time. This multidimensional profession has a strong dedication to making sure that the past continues to reverberate in the present and enlighten the way to the future; it goes beyond just safeguarding ageing books, manuscripts, and papers [1], [2].

The preservation of library resources is fundamentally a demonstration of the value of the written word and the physical artefacts that represent human knowledge, creativity, and collective memory. These sometimes delicate and priceless resources serve as a testament to the writers' creativity, the historical record of communities, and the wisdom of earlier civilizations. Whether they are ancient scrolls, mediaeval manuscripts, or contemporary printed books, these artefacts are windows into the past and provide understanding of humankind's intellectual, cultural, and scientific advancements.

A collection of principles that have developed over the course of centuries serve as the foundation for the preservation of library items. These suggestions include preventative actions including environmental management, handling best practises, and appropriate storage to minimise degradation. Repair, restoration, binding, and other conservation processes work to return materials to their original state. Additionally, digitising library collections has become a crucial component of preservation efforts, enabling wider access and minimising damage to tangible objects. The preservation of library resources nowadays includes both born-digital and digital collections in addition to the physical environment. There are many intricate factors to take into account while preserving digital assets, such as data transfer, file format standards, and long-term access plans. The objective is to maintain the usefulness and accessibility of digital resources in a fast-changing technological environment.

The preservation of library items must also take ethical issues into account. Choosing which items to prioritise for preservation raises ethical issues, particularly when resources are few. Professionals working in preservation must make decisions that strike a balance between historical importance, cultural variety, and fair access. Respecting the rights and sensibilities of communities where specific items come from is another aspect of ethical management of cultural heritage. The issue of preserving library items is further complicated by legal concerns. The access to, reproduction of, and distribution of works are governed by copyright and intellectual property regulations. It is a constant struggle to strike a balance between the need of providing access to cultural heritage resources and the requirement of defending the rights of copyright holders.

The area of library materials preservation is one that is always evolving in response to new technological developments and shifting social mores. The scope of preservation activities has been broadened by the introduction of digital preservation technologies, collaborative projects, and open-access repositories. However, problems still exist, such as the need for continual study to create best practises and financing and resource restrictions. The preservation of library items is a noble and challenging endeavour that cuts across both the physical and digital spheres. It represents our dedication to preserving humanity's intellectual and cultural legacy for current and next generations. It illustrates the significant influence that written information and historical artefacts have had on how we see the world. Our rich tapestry of human accomplishment must persist and continue to inspire us as we traverse an age of digital revolution, and the ideas and practises of library materials preservation serve as a link between the past, present, and future. Preservation of library resources is a dynamic area that changes in response to new technology, team projects, and open-access paradigms. Despite ongoing difficulties, such as resource shortages and financial restrictions, preservationists continue to develop and improve their methods. The preservation of library items demonstrates our dedication to the worth of human knowledge and culture. It serves as a link between the past, the present, and the future, guaranteeing that future generations will continue to be inspired, educated, and enriched by the riches housed in libraries. The concepts and practises of preservation are as pertinent as ever as we negotiate the intricacies of the digital era, acting as a beacon of continuity, resiliency, and respect for our common past[3], [4].

DISCUSSION

An active preservation programme at a library promotes respect for the institution and its holdings, reduces the loss of items due to negligence or carelessness, and employs preventative and remedial efforts to save resources.Any action involving the introduction of library resources into collections (selection, acquisition, and cataloguing) and handling by library employees and users must take preservation into consideration. The staff's knowledge of and adherence to excellent preservation practises will play a significant role in this. All staff members must take an active role in the preservation programme and exercise leadership. A library archivist is in charge of maintaining and converting the items in a library.Documents are acquired for a library after thorough examination and analysis to ensure that they are relevant to the users and consistent with the beliefs and goals of the parent organisation. Given the time and effort required to get documents, reasonable precautions should be taken to ensure their greatest usefulness. Every reader has a book, according to Ranganathan's Second and Third Laws of Library Services, and every book has a reader.

Storage and Care

We should be aware that non-book materials and rare collections need different kinds of shelving than books and cannot be housed in the same manner. Shelves with glass doors are required for rare collections to allow for closed or limited access. For instance, palm leaf manuscripts must be spread out across the shelves since they cannot be stored in a vertical manner. Additionally, air conditioning will assist assure good maintenance and promote conservation in these areas. Contrarily, sound recordings like phonograph records need to be stored vertically, thus box-shaped wooden shelves would be the ideal option. Maps and microfilms would need special holders, while films would require container boxes. The use of the suitable kinds of shelves for the various items is necessary for optimum maintenance, but their position should also be clearly designated.

The library is in charge of looking after all the items in its holdings. In order to protect against the loss of these materials and to assist extend their lifespan, proper management is crucial. When we say "lost," we include factors like weather changes, direct light, dust and grime, different kinds of insects, and people (like readers).The climatic environment, as well as rapid changes in it, may greatly contribute to the devastation of library resources. A library has to be aware of a number of conditions, including temperature and humidity, constant rain, extended dry spells, and other natural fluctuations. There are currently methods to stop or reverse the impacts of nature thanks to advances in contemporary science. Avoid circumstances that might shorten the material's lifespan, such as exposing a book to bright sunlight, which could weaken the paper's texture and harm the binding. The effects of sunshine may also be detrimental to audiovisual content. Making the necessary preparations will ensure that no library books are exposed to direct sunlight. Additionally detrimental to the physical condition of library resources are moisture and humidity. Moist, wet environments are ideal for insects. Rain is the primary cause of moist and wet environments, therefore as a precaution, make sure the library is well aired or even air-conditioned.

Regular dusting and cleaning can help lessen the negative impacts of dirt and dust. A library may need to use hoover cleaning sometimes.To preserve library resources from insects and parasites like bookworms, silverfish and other insects, fungi, etc., sound preventative methods should be strictly adhered to. specific collections, rare books, manuscripts, and delicate items need specific preservation care in addition to being stored away from the usual collections. For instance, the staff of the Scientific Research Laboratory of the Lenin State Library has been effectively employing pentachlorophenol sodium salt as a fungicide and bactericidal equipment to clean the air in stack rooms.

The most efficient, secure, and practical pesticide for libraries, according to their advice, is DDT, which may be applied in powder, suspension, or solution form depending on the bug population in the stack room[5], [6]. Humans are also capable of losing or damaging books and other reading materials at the library. Users often lose, damage, and even steal library items. Libraries must take the necessary safeguards to stop such crimes from occurring. According to A. K. Sharma, "generally, it is observed that readers who are unable to copy the graphs, art plates, and other illustrations are tempted to take them away even against their conscience." Therefore, this wrongdoing may be prevented if a reprographic service is offered.

Additional safety measures include being vigilant and screening all visitors to the library, keeping an eye on dubious readers, not allowing personal items inside, locking up pocket-sized and other similar-sized books, making the library's windows and doors theft- and rat-proof, and protecting books from being taken out of the library with a net wire made of steel meshes.Additionally, Sharma states that "only one door should be kept open for entrance and another for exit." This is not recommended, however, since there should only ever be one access and exit point, and that should be at the main door.

Books are utilized often in libraries, which results in significant wear and tear. In order to maintain the collection, some fixes, repairing, and binding may be needed, thus the volumes will need to be attended to right away. Smaller libraries rely on outside assistance to handle the legally obligatory obligations.However, bigger libraries often set up their own binding division with a qualified staff to handle the needs for binding. Inspection of the library stack regions must be done often. The librarian and the circulation team should perform this to identify any documents that need binding, mending, or repair. The loss of books is a significant problem in libraries, especially in open access libraries. To prevent them from being picked up by other users, some people intentionally try to conceal books. The incorrect shelf is often chosen by negligent library personnel while stacking volumes. Books should always be kept in their proper locations. Only then will they be simple to find and useful to many of people.

Examining books and properly arranging them on their assigned shelves are activities that go by a variety of names. Some of the names are "Shelf tidying," "Shelf checking," "Shelf reading," And "Revising shelves," which is also known as "Reading shelves." Ranganathan proposes the usage of the word "Shelf rectification" to describe the process of reestablishing order among the volumes.The process of accurately reading each shelf and placing all the misplaced volumes back in their appropriate places is known as shelf rectification[7], [8].

Collection Evaluation

Evaluation is defined as "an attempt to determine either the relative or intrinsic worth of something in terms other than monetary terms" by Webster's Seventh New Collegiate Dictionary. Evaluation is thought of as an essential component of a library and its management. Document evaluation is a crucial task for a library and a need for the collection development strategy. The only way to raise the quality of services offered by a library is to properly evaluate its collection.One method of implementing assessment is via surveys, which a library may do internally or contract out to an outside consultant. These surveys may be brief or in-depth, covering topics like book collections, technical services, reader services, library use, staff, administrative structure, cooperative activities, financial needs, barriers to library development, operation of special services, and more. All these categories may be covered by a thorough survey. However, even a small survey can need to cover a number of relevant topics. The collection assessment may include quantitative metrics like the suitability of the papers.

However, it is more crucial to focus on qualitative indicators like the suitability of the collection and range of the items acquired. The work of evaluating the papers' quality and suitability may be assisted by academic staff, researchers, and even students.

Standard bibliographies

General and specialized bibliographies may be used as guidelines. In addition, checklists of chosen journals and reference books might be used.Questionnaire surveys to gather faculty observations may be used to determine if the collection contains enough and appropriate information for class lecture preparations, individual research requirements, and student support. In a similar vein, polls asking academics to assess the stock's utility may be conducted.

Analyzing borrower data, interlibrary loan borrowings, and records of all requests made to the library by users for books that were not in the library may also offer information about the collections.One may do a detailed physical inspection of the book shelves in a small library. This kind of examination may reveal inconsistencies, such as gaps in periodical sets, an excessive number of copies of certain titles, a significant amount of outdated materials, and other aspects of the book inventories. These kinds of differences won't be apparent with a cursory glance at the library catalogue.

There is no use in conducting an assessment if nothing is done with the results. A corrective action must be taken after each assessment exercise in order to increase the collection and address any disparities. A library's acquisition strategy and financial capabilities will influence the shape and character of the action it will take.Finally, a thorough and organised exercise of collection evaluation may be used to highlight the collection's strengths and weaknesses. In order to strengthen the long-term objectives of the collection development strategy and expand the collection, the results of the assessment exercise may be employed. If required, this may call for the library's acquisition and weeding out policies to be redefined[9], [10].

CONCLUSION

Preservation of library resources is a noble and important task that is crucial to protecting cultural assets and ensuring the survival of human knowledge. We have learned to comprehend the historical relevance, guiding principles, changing problems, and dynamic interaction between tradition and innovation as a result of our investigation of this multidimensional topic. In its purest form, the preservation of library resources is a declaration of the importance of books and physical artefacts. It is a pledge to keep the past accessible in the present and to make sure it keeps illuminating the way to the future.

The collections kept in libraries, which range from old scrolls to modern digital archives, are more than just artefacts from the past; they are active reminders of the creativity, intelligence, and advancement of mankind. Preservation specialists put forth a lot of effort to protect these items from the ravages of time and technological advancement, guided by the concepts of preventative care, conservation, digitisation, and ethical stewardship. Their efforts go beyond the preservation of physical artefacts to include the intricate field of digital preservation, ensuring that born-digital and digitised content endures and is still available in a constantly changing digital environment.

The decisions taken in preservation are supported by ethical concerns, which balance the importance of the past with cultural variety and fair access. The need to strike a careful balance between the preservation of rights and the need of granting access to cultural heritage assets is necessitated by legal complications, notably in the area of copyright and intellectual property.

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