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IMPACTS OF INFORMATION COMMUNICATION TECHNOLOGY ON INFORMATION FORMAT, STORAGE, ACCESS, AND DELIVERY: A STUDY FROM LIBRARY POINT OF VIEW

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Abstract: The word 'Library' is derived from the Latin word 'Librarium', meaning 'a book place', which originates from the term 'Liber', meaning 'a book'. In the present era, library services heavily depend upon Information and Communication Technology (ICT). A library is the heart of any academic institution, and library resources are closely interlinked with the higher education system. A library is an institution that exists to serve information to users. Libraries and librarians play a crucial role in supporting teaching, learning, research, and innovation, as well as developing the higher education system from various perspectives. In this regard, libraries hold different types of information resources such as books, manuscripts, pamphlets, archives, newspapers, magazines, journals, periodicals, patents, trade literature, standards and specifications, research monographs, bibliographies, indexes, maps, atlases, games and models, audio-visuals, pictures, charts, CDs, video cassettes, dissertations, and Ph.D. theses. Libraries stimulate users to obtain, evaluate, and recognize knowledge and familiarize themselves with current trends for further education and learning new disciplines. Libraries provide ample scope and opportunity for users to read from a wide variety of resources. Therefore, it is essential to discuss how library books and other resources can be effectively communicated through Information and Communication Technology to support the higher education system and societal development.

Information technology is a branch of technology. Today, library operations—mainly collection, storage, processing, and dissemination of information—are performed with the help of computers and related communication technologies. It includes a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information, encompassing computers, the internet, broadcasting technologies (radio and television), and telephony. In digital technology, information is translated into binary format (zero or one), where each bit represents two distinct amplitudes, whereas in analog technology, information is translated into electric pulses of varying amplitude. This paper discusses information, communication, information technology, objectives of the study, statement of the problem, scope and coverage, methodology, literature review, development of ICT, impact of ICT on society, application of ICT in libraries, advantages of ICT, information format, information storage, information access, information delivery, benefits and limitations of digital information delivery, the role of librarians, suggestions, conclusion, and bibliographical references.

Index Terms - ICT, Application of ICT in Libraries, Information Format, Information Storage, Information Access, Information Delivery, Library Service, Library Automation.

I. INTRODUCTION

Information and communication technologies are growing at a tremendous speed; the knowledge society is becoming more complex, competitive, and dependent on technological changes and the information explosion. The impact of digital resources in the teaching-learning environment has influenced every facet of Library and Information Services, providing new opportunities and challenges for library professionals to participate in the knowledge-based society, including electronic publishing, internet-based information services, and web-based digital resources. The advent of digital resources can make finding high-quality resources for present users a daunting, if not sometimes impossible, task. Digital libraries are important centers for the collection and organization of digital resources.

The impact of Information Technology across all fields of Humanities, Science, Technology, Social Science, and Interdisciplinary studies is invaluable in the 21st century. In the present era, user needs are also changing due to the increase in

digital information, which is available in different formats. Teachers and librarians have important roles in motivating users toward the library so that they can obtain their required information in their preferred format.

II. DEFINITIONS OF THE TERMS

a) Information

Information is a human idea and thought. Humans are the only living entities who possess knowledge and transmit it to the next generation. Necessity creates invention; when there is a need in society, it drives research and investigation. New ideas, concepts, and facts emerge in the human mind, which is called information. In other words, it arises when things and ideas interact between the knower and the known.

The word 'Information' is used to define various meanings such as knowledge, understanding, messages, and data. Libraries or information centers are mostly concerned with published information contained in the form of books, microfilms, magnetic devices, and digital media.

b) Communication

The English word 'Communication' is derived from the Latin noun 'communis' and the Latin verb 'communicare', which means 'to make common'. Communication, in its simplest sense, involves two or more persons coming together to share, dialogue, commune, or gather for a festival or family event. Dreaming, talking with someone, arguing in a discussion, speaking in public, reading a newspaper, and watching TV are all different kinds of communication that we engage in every day. Communication is thus not merely an act or process, but a form of social and cultural togetherness. Communication can occur with oneself, nature, and the people in our environment, involving interchange, transaction, dialogue, sharing, and commonness.

c) Information Technology

The present world is driven by Information Technology. Information Technology refers to a variety of technological applications in the process of communicating information. It is used as a collective term for the whole spectrum of technologies providing the means to acquire, store, transmit, retrieve, and process information. Thus, information technology is a generic term used for all activities connected with computer-based processing, storage, and transfer of information.

According to the ALA Glossary, Information Technology is "the application of computer and other technologies to the acquisition, organization, storage, retrieval and dissemination of information." Somerville states that "Information Technology has resulted from a convergence of computing technology and communication technology." According to Webster's New Encyclopedia, information technology is the collective term for the various technologies involved in the processing and transmission of information, including computer technology, communication technology, multimedia technology, optical technology, networking, and barcode device technology.

III. OBJECTIVES OF THE STUDY

The aim of this paper is to examine ICT applications in libraries. The objectives of this study are as follows:

- To identify the problems of library collections and services.
- To present the scenario of the library's role in the higher education system and to find the importance, social view, and changing view of library services.
- To establish proper communication between library resources, users, and library staff.
- To identify, select, and procure course-related resources to support the higher education system.

IV. STATEMENT OF THE PROBLEM

In the present era, drastic changes in education and higher education processes have occurred due to e-learning and technology-based resources. Consequently, library services are transitioning from traditional to digital resources to support the teaching-learning process, which can create a significant gap between library resources, users, and library staff. If any of these components is not functioning properly or lacks adequate electronic gadgets, it creates a barrier to proper library services. Therefore, it is essential to address the gap between library resources, users, and library staff for the development of library services and research activities.

V. SCOPE AND COVERAGE OF THE STUDY

This study mainly covers the application of Information and Communication Technology in the library's role for developing the higher education system and research activities from a practical point of view. It is also described in relation to library resources and ICT. The language of coverage is English only.

VI. METHODOLOGY

Before writing this article, the researcher studied various books and articles and collected extensive information regarding Information and Communication Technology, libraries as resource centers, higher education, and the roles of libraries and librarians. The work is mainly based on practical issues in the study of library resources and services closely related to the development of ICT. The researcher followed a qualitative research and descriptive method to discuss this study.

VII. LITERATURE REVIEW

Ontario School Library Association (2010) [1] deals with learning school libraries and the emergence of the learning commons, explaining complex change, learning to learn, from information to knowledge creation, and transition.

Oakleaf, M. (2011) [2] defined the value of the library in the teaching and learning process, explaining the teaching and learning role of the academic library, its impact on student achievement, student experience, perception of quality, faculty-librarian collaboration, cooperative curriculum, and assessment design.

Central Board of Secondary Education (2013) [3] presented the library as a resource center in detail, discussing ways to improve students' library skills such as promoting reading habits, classroom libraries, library programs and projects, book seminars, book fairs, book weeks, book reviews, book exhibitions, and book clubs.

Bonn, M. and Furlough, M. (2015) [4] observed that academic libraries act as scholarly publishers, pointing out why, how, and what libraries publish.

Chaudhari, B. H. (2017) [5] described the role of libraries in higher education, the role of different commissions for library development, and the application of technology in libraries, following Dr. S. R. Ranganathan's Five Laws of Library Science.

Mahwasame, N. P. (2019) [6] emphasized the conceptual roles of the library, its role in student learning and academic performance, how libraries benefit children and young adults, and the relevance of language and easy access to library collections.

Upeneja, S. K. (2020) [7] depicted the contribution of library professionals and libraries to Open Educational Resources (OER) in the Indian scenario, noting that OER are teaching and learning content in the public domain that are free to use and reuse.

VIII. DEVELOPMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

The post-industrial period has brought considerable advances and innovations in technology, resulting in the emergence of many new interdisciplinary fields. Information technology is one of them. It is a comprehensive term describing the whole range of processes for the acquisition, storage, transmission, retrieval, and processing of vocal, pictorial, textual, and numeric information. Such processes may be mechanical, chemical, biochemical, electronic, or microelectronic.

More recently, the telephone, radio, television, satellite transmission, the computer, and the microprocessor represent distinct qualitative changes in information technology. Thus, the facilities required to capture, store, manipulate, and distribute data and information can broadly be called information technology. Contrary to popular misconception, IT is not just computers, although they form a major part of it.

IX. IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON SOCIETY

The impact of Information and Communication Technology is felt in all walks of life. Computers are now used in almost all spheres, such as education and training, science and technology, recreation and entertainment, business and industry, government and corporations, communications and transport, publishing and database creation, libraries and information retrieval, and personal record keeping.

Information Technology is applied in four primary ways in libraries:

- Library Automation
- Information Storage and Retrieval
- Office Automation
- Resource Sharing Networks

X. APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN LIBRARIES

Information and Communication Technology is applied in almost all areas of human activity, including science, commerce, medicine, education, entertainment, libraries, sports, tourism, agriculture, and research and development. In libraries, IT is applied for the following functions:

- Computer Technology: Library Management, Database Creation and Development.
- Telecommunication Technology: Library Networking, Information Networking.
- Reprography Technology: Photography, Microfilming, Audio/Video.
- Storage Technology: CDs, Floppies, DVDs, etc.
- Library Technology: Classification, Cataloguing, Current Awareness, Selective Dissemination of Information (SDI), Reference Service, Resource Sharing, Technical Writing.

XI. ADVANTAGES OF INFORMATION AND COMMUNICATION TECHNOLOGY

A variety of advantages can be derived from the appropriate use of Information Technology. The benefits include:

- Helps avoid duplication of effort and work in library operations.
- Facilitates cooperation and resource sharing through library networks.
- Helps introduce new services and improve existing services.
- Allows integration of various library operations and executes repetitive tasks.
- Facilitates faster information communication.
- Helps increase the morale and motivation of library staff.
- Facilitates easy and wider access to all kinds of information sources.
- Helps increase efficiency and effectiveness in library operations.
- Saves time, space, energy, and resources.
- Improves the productivity and image of the library.

XII. INFORMATION FORMAT

With the development of information technology, more library users are using digital technologies and accessing global information resources via the web. A large number of formats have been developed for the storage and access of information, some of which are described below:

- Bibliographic Format: To facilitate the exchange of catalogue data between libraries in machine-readable form, standard bibliographic formats are essential. The two main types are U.S. MARC format and Common Communication Format (CCF).
- MARC Format: In 1966, the Library of Congress (USA), in its MARC pilot project, made LC cataloguing data available in machine-readable form. The MARC structure consists of three major segments: (i) Leader, (ii) Directory, and (iii) Variable Field.
- Common Communication Format (CCF): UNESCO, as part of its General Information Program (PGI), developed CCF in 1984 as a standard for bibliographic records in machine-readable form for both library and non-library agencies, following ISO 2709.
- Image File Format: JPG, TIF, PNG, and GIF are the most common image file formats used for cameras, printing, scanning, and internet applications.
- DOC/DOCX (.doc/.docx) File Format: The DOC/DOCX file format is a document format used by Microsoft Word and most word processing software, capable of containing formatted text, images, tables, graphs, charts, page formatting, and print settings.
- PDF Format: Portable Document Format (PDF) is widely used for presenting documents consistently across different platforms.

XIII. INFORMATION STORAGE

Memory is a part of the microcomputer that holds data and instructions for processing. Memory is also known as storage, and its function is to store coded information from input devices or connected computers. Stored information may be used immediately or kept for later reference by the CPU. Memory is classified into two categories:

- Primary or Main Memory: This is the fastest memory in a digital computer, directly accessed by the CPU. It is further classified into Random Access Memory (RAM) and Read Only Memory (ROM).
- Auxiliary or Secondary Memory: This memory is used to store the operating system, compilers, assemblers, application programs, and data files. It is not read directly by the CPU; information must first be transferred to primary memory. Examples of external storage devices include punched cards, magnetic disc drums, magnetic tape, floppy discs, microfilm, and optical storage discs.

XIV. INFORMATION ACCESS

In the present era, user needs are increasingly demanding due to the development of Information and Communication Technology. On a screen, users can access information easily from various perspectives, including physical, social, economic, and political viewpoints, as well as through research reports, conference proceedings, journals, periodicals, and e-books.

A true digital library not only requires an organized collection of online digitized content, but also requires that the content be accessed and distributed as widely as possible to legitimate users around the globe. Distribution means allowing access to authenticated members of the subscribing organization regardless of their physical location. Server-side software is now available to configure servers to distribute information with or without rights management.

XV. INFORMATION DELIVERY

Digital information can be easily delivered by digital tools such as the internet, World Wide Web, electronic mailing lists, and wide area networks. In the past, information was delivered through newspapers, radio, television, telephone, and fax. Today, the internet is highly successful in delivering digital information in a faster and cheaper way.

Another characteristic of digital information delivery is the time it takes to transfer information. Whereas intercontinental mail by sailing ship took months and airmail took days, increased bandwidth and reduced transmission times now make it possible to deliver written messages, pictures, graphs, voice, and video across the world instantaneously. As costs and hassles have decreased due to the internet, the volume and nature of communication have increased significantly.

XVI. BENEFITS OF INFORMATION DELIVERY

Information delivery in digital form has several benefits:

- Information can be sent to many sites simultaneously.
- Timely availability of information makes decision-making fast and easy.
- Large files can be sent at high speed.
- Information can be transmitted to unlimited sites at a reduced cost.
- Both text and images can be transmitted easily.
- Information can be accessed globally without any geographical barriers.

XVII. LIMITATIONS OF DIGITAL INFORMATION DELIVERY

Digital information delivery, however, has certain limitations:

- Records, documents, and data can accumulate to an extent that becomes difficult to control.
- Records, documents, and data can be damaged due to oversight.
- Records and documents are vulnerable to unauthorized tampering.

- Long-term preservation of created digital data can be difficult.

XVIII. ROLE OF THE LIBRARIANS AND SUGGESTIONS

To achieve these objectives, college librarians need to:

- Promote reading habits and motivate users through ICT as well as hard-copy documents.
- Help users plan, locate, and retrieve relevant information and critically evaluate the process.
- Provide users with equal access to all library resources.
- Arrange high-quality customer service organized on modern lines.
- Understand user needs and study habits, and stay familiar with popular books and resources.
- Arrange reading sessions of popular books and magazines, as well as talks by noted authors.
- Make the library inviting and pleasant with comfortable furniture.
- Foster coordination between the librarian, faculty members, and library users.
- Ensure library, institutional, and government authorities provide funds for collection development and library services.
- Draft user-friendly library rules and sign Memoranda of Understanding (MoUs) with other libraries for mutual cooperation.
- Protect physical books from sunlight, water, insects, fungus, bacteria, and heat.

XIX. CONCLUSION

Information and Communication Technology is closely related to the development of society in day-to-day life. Without Information Technology, modern society cannot be well organized. In the present era, ICT is the primary information delivery process for the common person. Anyone seeking daily life information regarding education, food, health, or political institutions can easily obtain it via mobile or internet search. In this way, ICT helps everyone contribute to the development of our future society.

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XXI. BIBLIOGRAPHICAL REFERENCES

[1] Ontario School Library Association, "Together for Learning: School Libraries and the Emergence of the Learning Commons," Toronto: OSLA, 2010.

[2] M. Oakleaf, "The Value of Academic Libraries: A Comprehensive Research Review and Report," Chicago: Association of College and Research Libraries, 2011.

[3] Central Board of Secondary Education, "Library as a Resource Centre," New Delhi: CBSE, Shiksha Sadan, 2013.

[4] M. Bonn and M. Furlough, "Getting the Word Out: Academic Libraries as Scholarly Publishers," Chicago: Association of College and Research Libraries, 2015.

[5] B. H. Chaudhari, "The role of library in higher education," Scholarly Research Journal for Humanity Science and English Language, Mysore, 2017.

[6] N. P. Mahwasame, "An overview of the roles and benefits of libraries," UK: Cambridge Scholars Publishing, 2019.

[7] S. K. Upeneja, "Contribution of library professionals and libraries in open educational resources in Indian scenario," 2020.

[8] E. Balagurusamy, "Fundamentals of Computers," Chennai: McGraw Hill, 2023.

[9] B. M. Dasgupta (Ed.), "Samsad English-Bengali Dictionary," Kolkata: Sahitya Samsad, 2006.

[10] G. P. Ghosh (Ed.), "Everyman's Dictionary [English-Bengali]," Kolkata: Ramkrishna Pustakalaya, 2012.

[11] C. R. Kothari, "Research Methodology: Methods and Techniques," New Delhi: Wiley Eastern, 2004.

[12] A. K. Mukhopadhyay and A. Das, "Introduction to Information Technology and its Business Application," Kolkata: Kalimata Pustakalaya, 2005.

[13] S. V. R. Prabhakar, "Best Practices Adopted in Academic Libraries and Information Centers," Delhi: Research India Publication, 2017.

[14] V. Rajaraman, "Introduction to Information Technology," Delhi: PHI Learning, 2022.

[15] B. Ram and S. Kumar, "Computer Fundamentals: Architecture and Organization," New Delhi: New Age International, 2021.

[16] P. K. Sinha and P. Sinha, "Computer Fundamentals: Concepts, Systems and Applications," New Delhi: BPB Publications, 2021.