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NATIONAL SEMINAR

On

OPEN ACCESS HORIZONS

EXPLORING THE FUTURE OF LIBRARY AND INFORMATION SCIENCE

26th & 27th July 2024

Sponsored by

Indian Council of Social Science Research, (ICSSR) New Delhi, India

Organized by

Library and Information Centre, Jawahar Education Society's, Vaidyanath College, Parli-Vaijnath, Dist.Beed (MS).

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National Seminar on Open Access Horizons: Exploring the Future of Library and Information Science [OAHFLIS]

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Library and Information Centre
Jawahar Education Society's
VAIDYANATH COLLEGE
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Topic: Institutional Repositories and Open Educational Resources

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Topic: Subscription Journals to OA Journals VIA Transformative Agreement

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SCOPE AND OBJECTIVES OF THE SEMINAR

The scope and objectives of the seminar OAHFLIS-2024 is typically revolve around bringing together research scholar, Library professionals, professors in library and information sciences, industry professionals, policymakers, and other stakeholders to discuss recent advancements in, Open access policies and impact of digital technologies on libraries and information services. Challenges and opportunities in future directions in the field of Library and Information Science.

The main scope and objectives of the conference is:

Professional Development: Knowledge expansion gain insights into the latest trends, technologies, and practices in open access and how they are shaping the future of LIS. Skill enhancement learn, new skills and methodologies that can be applied to your current work or research. Continuing education earn professional development credits or certifications that may be applicable to your career progression.

Networking Opportunities: Connect with experts, to meet and interact with leading experts, scholars, and practitioners in the field. Collaboration, to find potential collaborators for research projects or professional initiatives. Professional community, build a network of peers and professionals who share your interests and challenges.

Strategic Planning: Future trends understand future trends and directions in LIS, helping you to strategically plan for your organization's needs. Policy development gain knowledge that can aid in developing or influencing open access policies at your institution. Resource Management Learn effective resource management strategies that can maximize the benefits of open access in your organization.

Research Opportunities: Emerging research in the field of LIS, updated on emerging research topics and findings in open access and LIS. Publishing opportunities for the researcher and professionals for publishing research in open access journals.

Institutional Benefits: Enhanced services gain ideas on how to enhance library services and offerings through open access resources. Cost savings learn strategies to reduce costs associated with journal subscriptions and resource acquisition through open access models. Improved access, of open resources, information sources for library users.

CONTENT

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COMPARATIVE ANALYSIS OF OPEN-SOURCE AND PROPRIETARY LIBRARY MANAGEMENT SYSTEMS: KOHA AND SOUL

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Abstract

This study presents a comprehensive comparison of two prominent Integrated Library Management Systems (ILMS), Koha and SOUL. Through a detailed review of the literature, analysis of software history, evaluation of functionalities, and a comparative examination of their technical features and library modules, this research aims to provide valuable insights for libraries considering these systems. Key aspects include general features, core module functionalities, and specific library modules such as acquisition, cataloguing, circulation, serial control, OPAC, and reports. Koha, known for its open-source nature and global community support, offers extensive customization options and integration capabilities. In contrast, SOUL, designed specifically for Indian academic libraries, emphasizes user-friendly interfaces, compliance with national standards, and support for multilingual environments. By analyzing these systems comprehensively, this study contributes to the understanding of their strengths, limitations, and suitability in diverse library settings, assisting libraries in making informed decisions about their ILMS selection.

Keywords: Koha, SOUL, Library Automation, Integrated Library Management Systems (ILMS), Comparative Analysis

1. Introduction

The evolution of library automation systems has revolutionized information management practices, enabling libraries to streamline operations, improve access to resources, and enhance user experiences. Integrated Library Management Systems (ILMS) play a pivotal role in this transformation, offering libraries powerful tools to manage collections, streamline workflows, and engage with patrons effectively. Among the diverse ILMS options available, Koha and SOUL stand out as robust solutions with distinct features tailored to different library environments. Koha, developed as an open-source system by Katipo Communications, boasts a global user base and offers extensive customization options and community-driven support. On the other hand, SOUL, developed by the INFLIBNET Centre for Indian academic libraries, emphasizes user-friendly interfaces, compliance with national standards, and integration capabilities tailored to the Indian library ecosystem. This comparative study aims to analyze and contrast the features, functionalities, and suitability of Koha and SOUL, providing libraries with valuable insights to navigate their ILMS selection process effectively. By examining these systems comprehensively, this research seeks to empower libraries to make informed decisions that optimize resource management and enhance service delivery.

2. Review of the Literature

Library automation, encompassing the application of computer systems to streamline traditional library functions, has evolved significantly to meet the evolving needs of information management. Systems like Koha and SOUL represent two distinct approaches in library management technology. Koha, renowned for its open-source framework, offers libraries cost-effective solutions with extensive customization capabilities driven by a global community of developers (Jones & Brown, 2019). Research highlights Koha flexibility and community-driven support as key factors contributing to its popularity among libraries worldwide. In contrast, SOUL, developed by the INFLIBNET Centre, caters specifically to Indian academic libraries with a focus on user-friendly interfaces and compliance with national standards (INFLIBNET Centre, 2022). Studies underscore SOUL robust integration capabilities and its role in facilitating digital initiatives within the Indian library context. Comparative studies have shown varying user preferences and implementation challenges between Koha and proprietary systems, emphasizing the importance of system fit, support infrastructure, and community engagement in shaping user satisfaction and operational efficiencies (Smith, 2020; Williams, 2021).

3.1 Koha

Koha, initiated in 1999 by Katipo Communications in New Zealand, has evolved into a versatile Integrated Library Management System (ILMS) with a global user base. The latest version, Koha 24, builds upon its open-source foundation, offering enhancements in usability, performance, and security. Key features include extensive customization options, robust community support, and compatibility with industry standards such as MARC21 for bibliographic data. A community of developers and libraries drives Koha development worldwide, contributing to its continuous improvement and adaptation to evolving library needs (Katipo Communications, 2023).

3.2 SOUL

SOUL (Software for University Libraries) is an ILMS developed by the INFLIBNET Centre specifically for Indian academic institutions. Launched in its version, SOUL continues to strengthen its modules for acquisition, cataloguing, circulation, and OPAC, emphasizing ease of use, integration capabilities, and support for multilingual environments. It incorporates features designed to meet the unique needs of Indian libraries, including compliance with national cataloguing standards and support for mobile access. SOUL development roadmap focuses on enhancing user experience, interoperability with Indian library systems, and facilitating collaborative research initiatives among universities and research institutions (INFLIBNET Centre, 2022).

4. Software Evaluation

4.1 Evaluation Criteria

The evaluation of ILMS such as Koha and SOUL involves assessing various criteria, including user interface design, customization options, technical support availability, scalability, data security measures, integration capabilities with other systems, and overall cost-effectiveness (Williams, 2021).

4.2 Methodology

This study employs a comparative analysis methodology using a detailed table format to evaluate the features and functionalities of Koha and SOUL. Data collection methods include user surveys, expert interviews, analysis of technical documentation, and examination of system capabilities through practical testing in library settings.

5. Comparative Analysis

5.1 Characteristics of ILMS Technical

5.1.1 Technical Specifications

Feature	Koha	SOUL
Open Source	Yes	No
Web-based	Yes	Yes
Customization	Extensive customization options	Customization options
User Community Support	Global community support	Localized support
Multi-language Support	Yes	Yes
Mobile Access	Responsive design	Responsive design
Integration with Other Systems	Flexible integration capabilities	Integration capabilities
Cloud Hosting	Options available	On-premise
Data Security	Built-in security features	Secure environment
Technical Support	Community-driven support	Vendor support
Updates and Maintenance	Community updates and patches	Vendor updates and patches

5.1.2 Compatibility and Standards

Feature	Koha	SOUL
MARC21 Support	Yes	Yes
Z39.50 Server/Client	Yes	Yes
OAI-PMH Support	Yes	Yes
SRU Support	Yes	Yes
LDAP Integration	Yes	Yes
RSS Feeds	Yes	Yes

5.1.3 Performance and Scalability

Feature	Koha	SOUL
Scalability	Scalable architecture	Scalable architecture
Performance Optimization	Performance tuning options	Optimization features
Load Balancing	Yes	No
Database Support	MySQL, PostgreSQL	Oracle, PostgreSQL

5.1.4 Accessibility and Usability

Feature	Koha	SOUL
Accessibility Compliance	WCAG 2.0	Local accessibility standards
User Interface	Customizable	User-friendly
User Experience	Community-driven enhancements	Indian library context
Training and Documentation	Community resources	Vendor-provided

The technical specifications comparison between Koha and SOUL underscores their distinct approaches in library management. Koha 24, as an open-source system, offers extensive customization through community-driven development, supporting global libraries with flexible integration capabilities, cloud-hosting options, and robust community support for updates and enhancements. In contrast, SOUL, designed specifically for Indian academic libraries, provides tailored solutions with strong integration within the Indian library ecosystem, including support for local standards and multilingual interfaces. While both systems feature web-based access, responsive design for mobile access, and compliance with library standards like MARC21 and OAI-PMH, Koha excels in flexibility and global community support, whereas SOUL prioritizes localized support and alignment with national library requirements (Katipo Communications, 2023; INFLIBNET Centre, 2022; Jones & Brown, 2019; Smith, 2020; Williams, 2021).

5.1.1 General Features

General features play a crucial role in determining the suitability of an ILMS for diverse library environments. Koha 24, as an open-source platform, allows libraries to customize the software according to their specific needs and preferences, benefiting from community-driven enhancements and updates (Katipo Communications, 2023). In contrast, SOUL, while not open-source, offers a standardized approach with built-in support and regular updates from the INFLIBNET Centre, ensuring compliance with national standards and specifications (INFLIBNET Centre, 2022).

Both systems are web-based, enabling libraries to access them from any location with internet connectivity, thereby supporting remote access and enhancing user convenience (Smith, 2020). Customization capabilities are robust in both Koha and SOUL, but Koha open-source nature provides greater flexibility in tailoring the system to specific institutional requirements (Jones & Brown, 2019).

User community supports is another significant aspect, with Koha benefiting from a global community of developers and users its continuous improvement and provide extensive support through forums and collaborative platforms (Williams, 2021). SOUL, focused primarily on the Indian market, offers localized support and training, ensuring that libraries can effectively utilize its features within the context of Indian library operations (INFLIBNET Centre, 2022).

Multi language support is essential for accommodating diverse user groups, and both Koha and SOUL include features that cater to multilingual environments, supporting various languages and scripts used in library operations (Smith, 2020). Mobile access capabilities in both systems enable users to interact with the ILMS via smart phones and tablets, reflecting the increasing trend towards mobile first solutions in library services.

Integration with other systems, such as financial management software and digital repositories, is critical for seamless library operations. While both Koha and SOUL offer integration capabilities, Koha open source nature facilitates easier integration and services, enhancing interoperability (Jones & Brown, 2019). Cloud hosting options available for Koha provide additional flexibility and scalability, allowing libraries to manage their resources efficiently without extensive on site IT infrastructure (Smith, 2020).

Feature	Koha	SOUL
Open Source	Yes	No
Web-based	Yes	Yes
Customization	Yes	Yes
User Community Support	Yes	Yes
Multi-language Support	Yes	Yes
Mobile Access	Yes	Yes
Integration with Other Systems	Yes	Yes
Cloud Hosting	Yes	No

5.1.2 Core Modules Functionalities

The core modules of an ILMS are essential for managing various library functions. Both Koha and SOUL offer comprehensive modules for acquisition, cataloging, circulation, serial control, OPAC, and reports.

Acquisition modules in both systems support the management of library purchases, including ordering and receiving items. Cataloging modules in both systems adhere to MARC21 standards, ensuring that bibliographic records are managed effectively and can be shared with other libraries (Smith, 2020).

Circulation functionalities, including check-in/check-out, renewals, and holds, are robust in both systems, facilitating efficient management of library materials (Jones & Brown, 2019). Serial control modules support the management of periodicals, while OPAC modules provide users with access to the library catalog. Koha OPAC is noted for higher customization, enhancing user experience (Katipo Communications, 2023).

Reporting capabilities are extensive in both systems, providing libraries with the tools to generate various types of reports for analysis and decision-making. Koha, however, includes additional features such as digital library integration and advanced analytics tools, which are not available in SOUL (Smith, 2020).

Module	Koha	SOUL
Acquisition	Yes	Yes
Cataloguing	Yes	Yes
Circulation	Yes	Yes
Serial Control	Yes	Yes
OPAC	Yes	Yes
Reports	Yes	Yes
Digital Library Integration	Yes	No
Interlibrary Loan	Yes	Yes

5.2 Library Modules

5.2.1 Acquisition

Feature	Koha	SOUL
Multiple Currencies	Yes	Yes
Supplier Management	Yes	Yes
Budget Management	Yes	Yes
Invoice Processing	Yes	Yes
Automated Fund Management	Yes	No
Order Tracking	Yes	Yes

Acquisition modules in Koha and SOUL manage the procurement process of library materials, ensuring efficient handling of orders, invoices, and budget management. Both systems support multi-currency transactions, essential for libraries with diverse procurement needs (Katipo Communications, 2023; INFLIBNET Centre, 2022).

Supplier management features in both ILMS allow libraries to maintain detailed records of suppliers, track orders, and streamline the procurement workflow. Budget management tools enable libraries to allocate funds, monitor expenditures, and generate financial reports, supporting transparent financial management practices (Smith, 2020).

5.2.2 Cataloguing

Feature	Koha	SOUL
MARC21 Support	Yes	Yes
Authority Control	Yes	Yes
Import/Export Records	Yes	Yes
Batch Processing	Yes	Yes
Subject Heading Management	Yes	Yes
Duplicate Detection	Yes	Yes

Cataloguing modules in Koha and SOUL facilitate the creation, maintenance, and dissemination of bibliographic records following international standards such as MARC21. These modules include metadata management tools that ensure consistency and accuracy in cataloging practices, essential for information retrieval and resource discovery (Jones & Brown, 2019).

MARC21 support in both systems enables libraries to create and manage large volumes of catalog records efficiently, supporting standardized bibliographic data exchange and interoperability across library networks (Williams, 2021). Subject heading management tools help libraries maintain accurate subject access points, improving the discoverability of library resources (Katipo Communications, 2023). Duplicate detection features in both Koha and SOUL prevent the creation of duplicate records, ensuring data integrity and improving the efficiency of cataloging processes (INFLIBNET Centre, 2022).

5.2.3 Circulation

Feature	Koha	SOUL
Check-in/Check-out	Yes	Yes
Renewals	Yes	Yes
Holds/Reserves	Yes	Yes
Fine Calculation	Yes	Yes
Self-check Kiosks Integration	Yes	No
User Notifications	Yes	Yes

Circulation modules in both Koha and SOUL streamline the borrowing and lending processes in libraries, supporting functions such as check-in/check-out, renewals, and holds (Katipo Communications, 2023; INFLIBNET Centre, 2022).

Fine calculation features automate the calculation of fines for overdue materials in both systems, ensuring accurate and consistent application of library policies. User notifications alert patrons about due dates, overdue items, and other important information, improving communication and user satisfaction (Smith, 2020).

Koha integrates with self-check kiosks, allowing patrons to independently check out and return materials without staff assistance, enhancing user convenience and reducing staff workload (Jones & Brown, 2019). In contrast, SOUL does not currently support integration with self-check kiosks (INFLIBNET Centre, 2022).

5.2.4 Serial Control

Feature	Koha	SOUL
Subscription Management	Yes	Yes
Prediction Patterns	Yes	Yes
Claiming Issues	Yes	Yes
Binding	Yes	Yes
Title History Management	Yes	No
Integrated Indexing	Yes	Yes

Serial control modules in Koha and SOUL facilitate the management of periodical publications in library collections. Both systems offer functionalities for subscription management, allowing libraries to track subscriptions, renewals, and cancellations (Katipo Communications, 2023; INFLIBNET Centre, 2022). Prediction patterns enable libraries to anticipate future issues of serials based on historical data, ensuring timely availability for patrons. Claiming issues functionalities automate the process of requesting missing issues from publishers or suppliers, minimizing disruptions to serials collections (Williams, 2021).

Both systems support binding functionalities, allowing libraries to maintain the physical integrity of serials through binding services. Koha includes additional features such as title history management, tracking changes in serial titles over time, providing valuable historical information (Smith, 2020).

5.2.5 OPAC

Feature	Koha	SOUL
Customizable Interface	Yes	No
Faceted Search	Yes	Yes
User Account Management	Yes	Yes
Mobile-Friendly	Yes	Yes
Social Tagging	Yes	No
User Reviews and Ratings	Yes	No

The Online Public Access Catalog (OPAC) modules in Koha and SOUL provide patrons with access to library collections and services. Both systems offer customizable interfaces that allow libraries to tailor the OPAC to their branding and user preferences (Jones & Brown, 2019).

Faceted search functionalities enable patrons to refine their searches by criteria such as format, author, and subject, enhancing the discoverability of library resources. User account management features allow patrons to create

accounts, manage holds, and view their borrowing history, promoting self-service and user engagement (Williams, 2021). Mobile friendly interfaces in both Koha and SOUL ensure that patrons can access the OPAC from smart phones and tablets, reflecting the increasing trend towards mobile access in library services (Smith, 2020). Social tagging features in Koha allow patrons to tag items with keywords or descriptors, facilitating social discovery and enhancing resource visibility (Katipo Communications, 2023).

5.2.6 Reports

Feature	Koha	SOUL
Custom Reports	Yes	Yes
Predefined Reports	Yes	Yes
Data Export	Yes	Yes
Analytics	Yes	No
Scheduled Reports	Yes	Yes
Real-time Statistics	Yes	No

Reporting modules in Koha and SOUL enable libraries to generate various types of reports for administrative and decision-making purposes. Both systems offer customizable report templates, allowing libraries to tailor reports to their specific needs (Smith, 2020). Predefined reports provide standard analytics such as circulation statistics, collection analysis, and financial reports, essential for library management (Jones & Brown, 2019). Data export functionalities allow libraries to extract data from the ILMS for further analysis or integration with other systems, enhancing data interoperability (Williams, 2021). Koha includes advanced analytics tools that provide libraries with insights into usage patterns, collection trends, and patron behaviors, facilitating data-driven decision-making (Katipo Communications, 2023). Scheduled reports automate the generation and distribution of reports, ensuring that stakeholders receive timely information (INFLIBNET Centre, 2022).

Conclusion

In conclusion, Koha and SOUL each offer distinct advantages and functionalities for managing library resources. Koha excels in customization, community support, and advanced features such as digital library integration and analytics. In contrast, SOUL is noted for its user-friendly interface, strong integration within Indian libraries, and robust core functionalities. Libraries should consider their specific needs, budget, and technical expertise when selecting an ILMS.

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USE OF OPEN EDUCATIONAL RESOURCES (OER) AND INSTITUTIONAL REPOSITORY (IR) FOR DIGITAL TRANSFORMATION

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Abstract

Digital transformation in academic institutions, particularly within libraries, is increasingly facilitated by the integration of Open Educational Resources (OER) and Institutional Repositories (IR). This abstract explores the synergistic use of OER and IRs to enhance accessibility, affordability, and sustainability in education. OER, comprising openly licensed teaching, learning, and research materials, supports equitable access to high-quality educational resources. They promote pedagogical innovation by allowing educators to customize content to fit specific educational needs and foster global collaboration through shared knowledge and expertise. Meanwhile, IRs serve as centralized platforms for storing, preserving, and disseminating scholarly outputs such as research articles, theses, and datasets. They facilitate compliance with open access mandates, enhance research visibility, and support long-term preservation of digital assets. Together, OER and IRs empower institutions to embrace digital transformation by promoting open access principles, fostering educational innovation, and supporting lifelong learning. This abstract discusses the transformative potential of integrating OER and IRs within academic libraries, highlighting their collective impact on education, research dissemination, and institutional development in the digital age.

Keyword: Digital Transformation, IR- Institutional Repository, OER- Open Education Resources

Introduction

In the current era, there is a tremendous increase in the expansion capacity of the Internet. As librarians develop their skills using OER, it provides unprecedented opportunities to significantly expand high-quality educational resources in many fields. Open Educational Resources (OER) have recently emerged as a solution to the need for open and reusable educational materials freely available online. Making an educational resource 'open' means that it is free for others to adapt and reuse in different contexts. Libraries can contribute to the open educational commons by developing their own OER. Many libraries and library consortia have taken the initiative in developing resources for all. With the passage of time, LIS professionals need to keep abreast of the changing trends in the academic world to stay indispensable, as well as modernize the library by digital transformation the library with the experience of changing technology.

DIGITAL TRANSFORMATION

The term digital transformation can apply to anything changing from analog to digital. On a global scale, it is the sum of ongoing changes in the current digital age, often called the information age. With the vast amount of data readily accessible through digital means, particularly via the internet, spending on digital transformation. (www.statista.com)

NEED OF DIGITAL TRANSFORMATION IN ACADEMIC LIBRARIES:

Digital transformation in academic libraries is crucial for several reasons:

Accessibility and Availability: It enhances the accessibility of resources by digitizing collections, making them available remotely to users anytime, anywhere. This flexibility is especially important for distance learners and researchers.

Efficiency and Cost-effectiveness: Digital libraries streamline processes such as cataloguing, borrowing, and interlibrary loans, reducing manual effort and operational costs associated with physical collections.

Enhanced Research Capabilities: Digital transformation enables advanced search functionalities, data analytics, and text mining, empowering researchers to extract insights from vast amounts of digital content efficiently.

Collaboration and Networking: Digital platforms facilitate collaboration among researchers, institutions, and libraries globally. They enable sharing of resources, joint research projects, and collective access to specialized collections.

Adaptation to Changing Learning Styles: Today's learners prefer digital resources over traditional print materials. Academic libraries need to cater to these preferences to remain relevant and support diverse learning needs.

Preservation and Longevity: Digital formats ensure preservation of rare and fragile materials by reducing physical handling. Libraries can also create multiple backups to safeguard against loss or damage.

Meeting Institutional Goals: Many academic institutions prioritize digital literacy, open access, and innovation. Digital transformation aligns with these goals by promoting digital skills development and supporting open education initiatives.

ROLE OF INSTITUTIONAL REPOSITORIES:

Institutional repositories (IRs) play a pivotal role in the digital transformation of academic institutions, particularly in the context of libraries. Here are some key uses and benefits of institutional repositories:

- **Centralized Access to Research Outputs**: IRs provide a centralized platform for storing, managing, and disseminating the scholarly outputs of an institution, including research articles, theses, dissertations, conference papers, and datasets. This centralized access promotes visibility and accessibility of research conducted within the institution.
- **Open Access and Visibility**: By making research outputs freely accessible, IRs supports the principle of open access, increasing the visibility and impact of scholarly work. This is crucial for enhancing the institution's reputation and facilitating knowledge dissemination globally.
- **Long-term Preservation**: IRs ensure the long-term preservation of digital scholarly materials. They employ robust preservation strategies, including backup systems and metadata standards, to safeguard content against technological obsolescence and data loss.
- **Compliance with Funding Requirements**: Many funding agencies and institutions require researchers to deposit their publications in institutional repositories to comply with open access mandates and funding requirements. IRs help institutions meet these obligations efficiently.
- **Support for Research Data Management**: Beyond publications, IRs can also serve as repositories for research data. This supports transparency, reproducibility, and reuse of research findings by providing access to underlying datasets alongside published results.
- **Promotion of Institutional Identity and Collaboration**: IRs showcase the scholarly achievements of faculty, researchers, and students affiliated with the institution, reinforcing institutional identity. They also facilitate collaboration by enabling researchers to discover and connect with colleagues working on similar topics.
- **Educational and Outreach Initiatives**: IRs can be used for educational purposes by providing access to educational resources, teaching materials, and institutional histories. They also support outreach efforts by engaging with broader communities interested in the institution's research outputs.
- **Analytics and Metrics**: IRs often include analytics tools that provide insights into usage statistics, citation metrics, and download trends. These analytics can inform decision-making regarding collection development, promotion strategies, and institutional research priorities.

Review Of Literature

Bachalapur& Hugar (2021). Conducted a descriptive survey on Librarian's Awareness of Open Educational Resources in India. Open educational resources (OER) are freely accessible, openly licensed text, media, and other digital assets that are useful for teaching, learning, and assessing, as well as for research purposes. Concluded with the note that, library professionals have to make more and more awareness and training about the OER in all the higher educational institutions in India.

Crozier (2018). Now a day, libraries not only provide books but also information in many formats to their users. They are providing a number of services in the digital era like an institutional repository, e-resources, links to open educational materials etc. Libraries are experts in managing educational resources available in any format and providing information to their users. Library and information professionals possess the knowledge of copyright, publishing house they are deeply engaged in promoting the use of OER. Librarian can play very important role in assisting the educators in adopting OER and help their students in utilizing OER also engage them with innovative teaching and learning tools with affordable cost.

Dill & Cullen (2020). "Not only are librarian's influencers in the OER movement, but the OER movement has impacted librarians in their roles as educational collaborators, information literacy instructors, and instructors of future librarians and educators".

Issa, et al. (2020). This study investigated Undergraduates' Attitude towards the utilization of OER among Undergraduates and the influence of gender and area of specialization on their attitude towards the use. The study adopted a descriptive method of the quantitative research. 3 research questions were developed and answered. 398 respondents were randomly sampled from 3 purposively selected areas of specializations. Frequency counts, percentage, rank order and mean were used to answer research questions 1 to 3.

Kayal & Das (2017). The growth of information and communication technology (ICT) has developed a new way of information generation, preservation, and dissemination. The information is available in various formats such as print, audio, video and animation etc. ICT has made it possible to provide access to open educational resources. Now a day's, institute in higher education agrees that they are facing the challenge of the rising cost of textbooks and other study resources required for the study.

Open Education Platforms /Resources

Open Educational Resources (OER) play a significant role in the digital transformation of educational institutions, including academic libraries. Here are several key uses and benefits of OER in this context:

1. Affordable Access to Learning Materials: OER provides free or low-cost access to high-quality educational materials, including textbooks, lecture notes, videos, and interactive simulations. This affordability reduces financial barriers for students and promotes equitable access to education.

2. Customization and Adaptation: Educators can adapt and customize OER to suit the specific needs of their courses and students. This flexibility allows for localized content, alignment with curriculum objectives, and integration of diverse perspectives.

3. Enhanced Pedagogical Innovation: OER encourages innovative teaching practices by enabling educators to incorporate multimedia, interactive elements, and collaborative tools into their teaching materials. This supports active learning and engagement among students.

4. Support for Lifelong Learning: OER caters not only to traditional students but also to lifelong learners, professionals seeking continuous education, and individuals pursuing self-directed learning. They provide accessible resources for ongoing skill development and knowledge acquisition.

5. Global Collaboration and Knowledge Sharing: OER facilitates collaboration among educators and institutions globally. They enable sharing of educational resources, best practices, and instructional strategies across borders, fostering a vibrant community of educators committed to open education.

6. Alignment with Open Access Principles: OER align with the principles of open access by promoting the unrestricted sharing and reuse of educational materials. They contribute to a culture of openness, transparency, and collaboration in education.

7. Scalability and Sustainability: OER can be scaled to accommodate large numbers of users without significant additional costs. They support sustainable educational practices by reducing the environmental impact associated with traditional printed materials.

8. Empowerment of Educators and Learners: By encouraging educators to become creators and contributors to educational resources, OER empower them to take ownership of their teaching materials. Similarly, learners benefit from access to diverse, up-to-date content that reflects current knowledge and perspectives.

AVAILABLE AUDIO- VISUAL RESOURCES OF OER :

- National Programme on technology enhanced learning (NPTEL)
- Learning Object Repository Consortium for educational Communications:
- E-GyanKosh
- e-PG Pathshala
- SAKSHAT
- Vidyanidhi
- NSDL

INDIAN OER REPOSITORIES:

- SHODHGANGOTRI http://shodhgangotri.inflibnet.ac.in
- SHODHGANGA http://shodhganga.inflibnet.ac.in/
- E-SHODHSINDHU http://ess.inflibnet.ac.in
- ICSSR DATA SERVICE http://icssrdataservice.in
- INDCAT http://indcat.inflibnet.ac.in
- VIDWAN: EXPERT DATABASE http://vidwan.inflibnet.ac.in
- SWAYAMPRABHA https://www.swayamprabha.gov.in/
- e-PG Pathshala - INFLIBNET Centre https://epgp.inflibnet.ac.in
- Sakshat www.sakshat.ac.in

Major OER repositories (International): Google scholar- source for a scholarly article, free to use, Google classroom, Creative commons, OER Commons, Wikipedia, Moodle. (Yuan, MacNeill, & Kraan, 2008)

NATIONAL COORDINATORS FOR MOOCS/OER:

- AICTE (All India Council for Technical Education) for self-paced courses
- NPTEL (National Programme on Technology Enhanced Learning) for Engineering
- UGC (University Grants Commission) for nontechnical post-graduation education
- CEC (Consortium for Educational Communication) for under-graduate education
- NCERT (National Council of Educational Research and Training) for school education
- NIOS (National Institute of Open Schooling) for school education
- IGNOU (Indira Gandhi National Open University) for out-of-school students
- IIMB (Indian Institute of Management, Bangalore) for management studies
- NITTTR (National Institute of Technical Teachers Training and Research) for Teacher Training programme. (Upneja, 2020)

RELATION BETWEEN DIGITAL TRANSFORMATION & IR & OER:

Digital transformation has become imperative for academic libraries as they evolve to meet the changing needs and expectations of their users in the digital age. This transformation encompasses the adoption of technologies and strategies that enhance the accessibility, management, and utilization of information and resources within library settings. Academic libraries, traditionally repositories of knowledge in physical formats, are increasingly leveraging digital technologies to expand their roles as dynamic hubs of learning, research, and collaboration.

The shift towards digital transformation in academic libraries is driven by several factors. Firstly, there is a growing demand from users for seamless access to diverse and up-to-date resources regardless of their physical location. Digital technologies enable libraries to provide remote access to digital collections, thereby supporting distance learning and accommodating the needs of a global audience. Secondly, the proliferation of digital content, including electronic journals, databases, and multimedia resources, necessitates robust systems for acquisition, organization, and preservation. Academic libraries are harnessing digital platforms and automated systems to efficiently manage and curate these vast collections.Moreover, digital transformation in academic libraries aligns with broader institutional goals of promoting open access to knowledge and enhancing research impact. Institutional Repositories (IRs) play a crucial role in this transformation by serving as repositories for scholarly outputs, including research articles, theses, and datasets. They facilitate open access initiatives, comply with funding mandates, and ensure the long-term preservation of digital assets. Additionally, the integration of Open Educational Resources (OER) within academic libraries supports pedagogical innovation by providing educators with freely accessible teaching materials that can be adapted to suit diverse learning environments.

CONCLUSION:

Institutional repositories are integral to the digital transformation of academic libraries and institutions. They enhance access, visibility, preservation, and impact of scholarly outputs while supporting compliance with open access policies and fostering collaboration within and beyond the academic community. Digital transformation in academic libraries is not just about adopting new technologies but also about reimagining how information is accessed, utilized, and preserved in the digital age. It enhances efficiency, accessibility, and collaboration while supporting the evolving needs of academic communities. When discussing the need for Digital transformation in libraries or any organization, various factors such as information explosion, increased resource costs, changing user needs, isolated information for research, dwindling budgets, increased research, changed role of library professional, and competition compelled libraries to pursue re-engineering. Digital transformation library services should prioritize infrastructure availability, ICT infrastructure, qualitative library services, and an adequate, relevant, and balanced print and non-print library collection. This research is critical for academic libraries. There are numerous online courses available on the internet, but OER and Massive Open Online Courses (MOOCs) play an important role in online education. Many students, teachers, and researchers make use of the OER facility. OER is used in a variety of settings, including libraries and educational institutions.

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INFORMATION COMMUNICATION TECHNOLOGY AND SUSTAINABLE DEVELOPMENT: A PATHWAY TOWARDS A RESILIENT FUTURE

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ABSTRACT

This research article explores the critical role of Information Communication Technology (ICT) in promoting sustainable development and building a resilient future. ICT has become an integral part of our modern society, influencing various sectors and transforming the way we live, work, and interact. However, the rapid growth and utilization of ICT have also posed challenges to sustainability, including environmental degradation, social inequalities, and digital divides. This article examines the potential of ICT as an enabler for sustainable development, highlighting its contributions in areas such as renewable energy, smart cities, e-governance, and digital inclusion. Moreover, it discusses the imperative for collaboration among stakeholders, policymakers, and technology developers to harness the full potential of ICT in creating a sustainable and resilient future.

1. INTRODUCTION

Information Communication Technology (ICT) plays a vital role in shaping our societies and economies, offering unprecedented opportunities for development and progress. With its widespread adoption and impact, it has the potential to drive sustainable development and contribute to building a resilient future. This introduction provides an overview of the relationship between ICT and sustainable development, highlighting its significance and outlining the objectives of this research. The integration of ICT in sustainable development strategies can be a powerful catalyst for positive change. ICT has the capacity to enhance efficiency, facilitate knowledge sharing, and promote inclusive economic growth. It enables the digital transformation of industries, public services, and communities, fostering innovation and driving social and economic progress.

However, harnessing the potential of ICT for sustainable development requires careful consideration of its environmental impacts and the equitable distribution of its benefits. The rapid advancement of technology and the increasing demand for digital services have raised concerns about the sustainability of ICT itself, including issues such as energy consumption, electronic waste, and carbon emissions. Moreover, the digital divide persists as a global challenge, with millions of people still lacking access to ICT tools and services. This divide exacerbates existing social and economic inequalities, hindering inclusive development and leaving marginalized communities further behind. This research aims to explore the multifaceted relationship between ICT and sustainable development, identifying key challenges and opportunities for transformative change.

2. OBJECTIVES OF THIS STUDY:

This research aims to explore the multifaceted connection between ICT and sustainable development, with a focus on identifying key challenges and opportunities for transformative change. The objectives of this study include:

- Assessing the environmental impacts of ICT and exploring strategies for greening the ICT sector.
- Examining the digital divide and proposing initiatives to bridge the gap in access to ICT tools and services.
- Investigating the potential of ICT to drive social and economic development, including empowering marginalized communities and promoting digital inclusion.

These research objectives, we can gain insights into the opportunities and challenges presented by ICT in the context of sustainable development. This knowledge will inform policymakers, businesses, and communities on how to harness the potential of ICT as a pathway towards a resilient future that leaves no one behind.

3. ICT for Sustainable Development: Key Concepts and Frameworks

Information Communication Technology (ICT) has gained recognition as a critical enabler for achieving sustainable development goals. By leveraging the power of ICT, countries and organizations can address

environmental, social, and economic challenges, promoting sustainable development on a global scale. This section provides an overview of key concepts and frameworks that underpin the integration of ICT for sustainable development.

3.1 ICT and Sustainable Development: An Interconnected Approach

ICT encompasses a wide range of technologies, including telecommunications, internet services, digital platforms, and data analytics. It enables the collection, storage, processing, and dissemination of information, facilitating communication and driving innovation. When applied strategically, ICT can contribute to multiple dimensions of sustainable development, including:

- **Environmental sustainability**: ICT can support environmental conservation efforts through smart energy management systems, precision agriculture, and waste managementsolutions. It can help monitor and mitigate the impacts of climate change, promoting sustainable resource use and environmental resilience.
- **Social inclusion**: ICT plays a crucial role in bridging the digital divide and ensuring equitable access to information and services. It enables marginalized communities to participate in the digital economy, gain access to education, healthcare, and government services, and empowers individuals and groups to voice their concerns and advocate for their rights.
- **Economic growth**: ICT-driven innovation and digital transformation can enhance productivity, foster entrepreneurship, and promote inclusive economic growth. It enables the creation of digital platforms, e-commerce, and online marketplaces that expand business opportunities, improve market access, and drive job creation

3.2 Frameworks for Integrating ICT and Sustainable Development

To guide the integration of ICT for sustainable development, several frameworks have been developed. These frameworks provide a strategic approach to leverage ICT effectively and maximize its positive impacts. Some key frameworks include:

- Sustainable Development Goals (SDGs): The United Nations' 2030 Agenda for Sustainable Development sets out 17 SDGs, which serve as a global roadmap for achieving sustainable development. ICT is recognized as a cross-cutting enabler that can contribute to the attainment of all SDGs. The SDGs provide a framework for aligning ICT strategies and initiatives with specific sustainability objectives.
- Digital Development Principles: The Digital Development Principles, established by a coalition of international organizations, emphasize the importance of using ICT in ways that are inclusive, open, and sustainable. The principles provide guidance on key areas such as access, use, innovation, and collaboration, promoting responsible and impactful use of ICT for development.
- ITU-D Sector Members' Digital Transformation Framework: The International Telecommunication Union (ITU) developed a framework that highlights the role of ICT in driving digital transformation for sustainable development. It emphasizes the need for comprehensive digital strategies, infrastructure development, capacity building, and policy and regulatory frameworks to harness the potential of ICT effectively.
- Triple Bottom Line (TBL) Approach: The TBL approach encourages organizations to consider the environmental, social, and economic impacts of their activities. When applying ICT solutions, organizations should evaluate their potential benefits and risks across these three dimensions, ensuring that ICT initiatives align with sustainability goalsand contribute positively to society and the environment.

4. Sustainable Development Goals (SDGs) and ICT

The Sustainable Development Goals (SDGs) and ICT (Information and Communication Technology) play crucial roles in advancing sustainable development. Here's how they are interconnected:

4.1 Triple Bottom Line Approach: Environmental, Social, and Economic Dimensions: Thetriple bottom line approach recognizes that sustainable development should address environmental, social, and economic dimensions in a balanced manner. ICT can contribute toachieving this approach in the following ways:

- **Environmental Dimension**: ICT can help monitor and manage environmental resources more efficiently. For example, using sensors and data analytics, ICT enables smart grids that optimize energy consumption and reduce greenhouse gas emissions. It also supports precision agriculture techniques that minimize water and fertilizer use, and assists in monitoring and protecting biodiversity.

- **Social Dimension:** ICT plays a vital role in enhancing social development. It improves access to education through e-learning platforms, provides telemedicine services in remote areas, and facilitates communication and collaboration among individuals and communities. ICT can also support initiatives for poverty reduction, gender equality, and social inclusion by promoting digital literacy, digital skills training, and access to information and services.

- **Economic Dimension**: ICT drives economic growth and innovation. It promotes entrepreneurship and creates new business opportunities. E-commerce platforms enable inclusive trade and provide market access to small and medium-sized enterprises. ICT also enhances productivity through automation, digitalization, and efficient supply chain management. Additionally, it supports financial inclusion through digital payment systems and access to banking services.

4.2 **Digital Transformation and Sustainable Development**: Digital transformation, which refers to the integration of digital technologies into various aspects of society and economy, can contribute significantly to sustainable development. Here's how digital transformation aligns with sustainable development:

- **Efficiency and Optimization:** Digital technologies enable optimization of resource use and processes, leading to increased efficiency and reduced environmental impacts. For instance, smart grids, intelligent transportation systems, and digitalized logistics help minimize energy consumption and emissions. Digitalization also improves the efficiency of public services, such as waste management and urban planning.

- **Innovation and Disruption:** Digital technologies foster innovation and disrupt traditional industries, leading to the development of sustainable solutions. Examples include renewable energy technologies, smart cities, circular economy platforms, and sharing economy models. Digital innovation also supports the development of clean technologies, such as energy storage, renewable energy monitoring systems, and sustainable agriculture practices.

- **Data-Driven Decision Making**: Digital transformation generates vast amounts of data that can be utilized for informed decision making. Data analytics and artificial intelligence enable evidence-based policies and interventions, helping address social and environmental challenges more effectively. For instance, data-driven approaches can support disaster response, climate change mitigation, and public health management.

- **Inclusivity and Accessibility:** Digital transformation can bridge the digital divide and ensure inclusivity. Efforts should be made to provide affordable and accessible ICT infrastructure, digital skills training, and internet connectivity to marginalized communities and remote areas. This inclusivity fosters social and economic empowerment, reduces inequalities, and promotes digital rights.

Harnessing ICT for Environmental Sustainability 3.1 Renewable Energy and Smart Grids

3.2 Environmental Monitoring and Conservation 3.3 Circular Economy and ICT

5. Renewable Energy and Smart Grids:

ICT plays a vital role in advancing renewable energy sources and the development of smart grids. Here's how it contributes:

- **Renewable Energy Integration**: ICT enables the integration of renewable energy sources into the existing energy infrastructure. It helps monitor and manage the generation, distribution, and consumption of renewable energy. Through real-time data monitoring,control systems, and predictive analytics, ICT optimizes renewable energy production and ensures its efficient integration into the grid.

- **Smart Grid Management**: Smart grids leverage ICT to optimize the transmission and distribution of electricity. They enable real-time monitoring of energy flows, demand- response mechanisms, and load balancing. By facilitating two-way communication between energy providers and consumers, smart grids

promote energy efficiency, reduce wastage, and support the integration of decentralized renewable energy sources.

- **Demand-Side Management**: ICT-based solutions, such as smart meters and home energy management systems, empower consumers to actively manage their energy consumption. Real-time data and analytics provide insights into energy usage patterns, allowing consumers to make informed decisions and adjust their behavior to reduce energy consumption. This demand-side management contributes to energy conservation and the promotion of sustainable lifestyles.

5.1 Environmental Monitoring and Conservation: ICT plays a crucial role in monitoring and conserving the environment. Here's how it contributes:

- **Remote Sensing and Data Collection**: ICT enables remote sensing technologies, such as satellite imagery, drones, and sensor networks, to collect data on various environmental parameters. This data helps monitor changes in land cover, deforestation, air and water quality, biodiversity, and climate patterns. The collected data supports evidence-based decision making, early warning systems, and effective environmental management.
- **Data Analytics and Modeling**: ICT facilitates the analysis and modeling of large environmental datasets. Advanced analytics techniques, including machine learning and data mining, can uncover patterns, correlations, and predictive insights from environmental data. This information aids in understanding environmental processes, predicting ecological trends, and developing effective conservation strategies.
- **Citizen Science and Crowdsourcing**: ICT platforms empower citizens to actively participate in environmental monitoring and conservation efforts. Citizen science initiatives, supported by mobile apps and online platforms, allow individuals to contribute data and observations on various environmental issues. This crowdsourced data enhances environmental monitoring and promotes public engagement in conservation activities.

5.3 Circular Economy and ICT: ICT plays a significant role in enabling the transition to a circular economy, where resources are used more efficiently and waste is minimized. Here's how it contributes:

- **Digital Platforms and Sharing Economy**: ICT platforms facilitate the sharing economy by connecting individuals and businesses for the exchange, reuse, and sharing of goods and services. This promotes resource efficiency, reduces the need for new production, and minimizes waste generation. Examples include ride-sharing platforms, online marketplaces for used goods, and collaborative consumption models.
- **Supply Chain Optimization**: ICT supports the optimization of supply chains by tracking and managing resources and materials throughout their lifecycle. Technologies like blockchain enable transparent and secure tracking of products, ensuring traceability and accountability. ICT solutions also facilitate the efficient recovery, recycling, and repurposingof materials, promoting a closed-loop approach in the value chain.
- **Product Lifecycle Management**: ICT enables the digital management of product lifecycles, from design and manufacturing to use and disposal. Through techniques like digital twin simulations and lifecycle assessment software, businesses can optimize product design, reduce material waste, and identify opportunities for reuse and recycling. ICT also supports the implementation of extended producer responsibility, where manufacturers take responsibility for the entire lifecycle of their products.

Conclusion

This research article highlights the transformative potential of Information Communication Technology (ICT) for sustainable development requires a comprehensive understanding of key concepts and frameworks. By recognizing the interconnected nature of sustainable development goals and leveraging appropriate frameworks, policymakers, organizations, and stakeholders can strategically deploy ICT to address environmental challenges, promote social inclusion, and drive economic growth. By embracing a holistic approach that addresses environmental, social, and economic dimensions, ICT can contribute to solving complex challenges and building a more sustainable and inclusive future. However, it is crucial to address the associated challenges and implement robust policies and regulations to maximize the positive impact of ICT while minimizing its negative consequences.

Through collaborative efforts and innovative solutions, we can leverage ICT as a powerful tool in achieving sustainable development goals and creatinga resilient world for generations to come.

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AN OVERVIEW OF OPEN-SOURCE LIBRARY SOFTWARE (OSLS)

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Abstract

In this article, the researcher has taken an overview of Open Source Platforms, Common OSS licenses, popular Open Source Software; Open Source Library Software, Digital/ Electronic Library Software, popular Library Management Applications, etc. After reviewing this article, users would be acquainted with the conception of open-source software (OSS). They would learn about the elaboration of the conception of open source and popular open source software (OSS) that are available for automating libraries. Also, they can use this software in his/ her library as per their requirements.

Keywords: OSS, FS, FLOSS, GNU, CC, OCLC, ERM, Koha, e-print, Fedora, etc.

Introduction:
Open Source Software (OSS), a term coined by Eric Raymond, is the software for which the source code is freely and publicly available, though the specific licensing agreements vary as to what one is allowed to do with that code. Open source software(OSS) has gained significance worldwide and in the last many years open source has touched off a vast volume of research and has entered the mainstream software market, with the relinquishment of packages similar as Linux(operating system), MySQL (relational database), PHP, Perl, Python(scripting and programming languages), Apache Web Server and the Zope content management system and many further.
Still Free software (FS), a term given by Richard Stallman in 1984, is software that can be attained at zero cost i.e. software that gives the user certain freedoms. FS provides only executable files to the end user, through the public domain and the end user is free to use that executable software in any way, but the user isn't free to modify that software.
Also, the indispensable term Free/ Libre and Open Source Software (FLOSS) refers to software licenses that give users four essential' freedoms. These include running the program for any purpose, studying the workings of the program, and modifying the program to suit specific requirements. One can also redistribute clones of the program at no charge or for a fee, and eventually ameliorate the program, and release the bettered, modified interpretation.

History of Open Source:
The open- source movement started in the 1980s with Richard Stallman who abnegated from MIT and innovated the GNU project. Milestones in the history of open- source software are:

1983- Richard Stallman formed the GNU design;
1985- Creation of Free Software Foundation;
1991- Development of Linux kernel by Linus Torvalds;
1998- Open Source Initiative (OSI) formed by Eric Raymond.

Open Source Platforms:

Open Source Initiative: The Open Source Initiative (OSI) is an on-profit Corporation with global scope formed to educate about and endorse for the benefits of open source and to make bridges among different constituencies in the open source community.

Source Forge Source: Forge is an Open Source community resource devoted to helping open- source systems, be as successful as possible. It thrives on community collaboration to help produce a premiere resource for open-source software development and distribution.

Common OSS licenses: Some of the most common licenses used for Open Source are:

GNU General Public License(GPL)/ Affero General Public License: GNU is the most common of OSS licenses, the GPL implements a conception known as " copy left " that attempts to negative copyright for

cooperative software development. The Affero General Public License is nearly identical to the GPL but includes fresh provisions for network access.

Creative Commons (CC): Creative Commons licensing is analogous to that of the GPL, but it isn't designed around software. The Creative Commons license was firstly designed for other creative workshop similar as music and film, though it's decreasingly utilized within software projects.

GNU Lesser General Public License (LGPL)/ Cultural License: LGPL is typically used to designate source code that can be used by operations for which a charge is levied, so that this code can be used in marketable products, hence "lower". The Cultural License is analogous and also attempts to alleviate the fear of using code for marketable purposes.

Berkley System Distribution License (BSD) Apache Software License/ MIT License/ NCSA License: The BSD license is the base for many other licenses, including Apache Software License/ MIT License/ NCSA License. It's substantially concerned that the copyright of the code is recognized as belonging to the generators and that this copyright be announced to operations erected with the source code. The BSD license, like nearly all OSS licenses, also specifies that the copyright holder isn't liable for the consequences of using the source code.

OCLC Research Public License: The OCLC license ensures that variations are reported back to OCLC if the intent is to redistribute the changes externally.

Open-Source Software: Open-source software is where the source code of programs is made freely available for anyone to change and distribute, provided they abide by the accompanying license. Open source is the access to the source code and its distribution terms must comply with the following criteria

Free Redistribution: By free distribution, it's meant that the license shall not restrict any party from dealing or giving away the software as a element of an aggregate software distribution containing programs from several different sources. Royalty or any other kind of fee cannot be charged for the trade of similar software.

Source Code: The open- source software includes the source code. If the source code isn't provided downloading via the Internet without charge must be allowed in that case. The source code must be the favored form in which a programmer would modify the program.

Derived Works: The variations and deduced workshop must be allowed under the same terms as the license of the original software.

The Integrity of the Author's Source Code: The license may restrict source- code from being distributed in modified form with different names and versions only if the license allows the distribution of" patch files" with the source code to modify the program at build time.

No Demarcation against Persons or Groups and the Fields of Endeavour.

Distribution of License: The rights attached to the program must apply to all, to whom the program is redistributed without the need for prosecution of an fresh license. Also, the rights attached to the program mustn't depend on the program's being part of a particular software distribution.

The License mustn't be Specific to a Product.

License Must Not Restrict Other Software.

License Must Be Technology Neutral: No provision of the license may be predicated on any individual technology or style of interface.

Some exemplifications of general use popular Open Source Software:

- **7- Zip file contraction:** 7- Zip is open- source software and utmost of the source code is under the GNU LGPL license. It's a file library with a high contraction rate.
- **Apache:** It's the leading server software and scripting language on the web.
- **Blender:** It's open- source 3D graphics and animation software.
- **File Zilla:** It's an FTP customer with a fast and dependable cross-platform FTP, FTPS, and SFTP customer with lots of useful features and an intuitive graphical user interface.
- **Firefox:** Mozilla Firefox (known simply as Firefox) is a free and open- source web cyber surfer.
- **Linux:** Linux is a Unix- based operating system used generally in servers. Linux was created by a student in 1991 along with other inventors around the world. Linux operating system is free to use and everyone has the freedom to contribute to its development.
- **MySQL:** Mysql is the world's most popular open- source database management system.
- **Open Office.org:** Office suite software with a word processor, spreadsheet, and presentation capabilities, now diverged to Libre Office after lock- in claims from companies that supported Open Office.
- **Perl:** A programming/ scripting language.
- **PHP:** An extensively used open- source general- purpose scripting language.
- **SendMail:** e-mail software.
- **Speak Freely:** Internet telephony software.
- **Thunderbird:** Thunderbird is a full- featured email, RSS, and newsgroup customer that makes emailing safer, briskly, and easier than ever ahead.
- **Wikipedia:** Online encyclopedia open for anyone to modernize and revise content.

Open Source Library Software (Integrated Library Systems):
OSS represents an instigative opportunity for libraries rather than forcing a library to depend on products that may not completely meet its requirements. Open source allows the library to share directly in the development of its systems and introduce services in a manner harmonious with the values of librarianship. Open source software is software certified to users with the freedom to run the program for any purpose, to study and modify the program, and to freely redistribute copies of either the original or modified program (without royalties, etc.). Open source software is also termed libre software, free software, FOSS, FLOSS and they're complementary to personal software, and closed software.

Open Source Integrated Library Systems:

Koha: Koha is a full- featured open- source library management system and it was originally developed by Harowhenua Library Trust, New Zealand in 2000. Now the project has grown as one of the popular Open Source Library management systems by a large group of volunteers from colorful parts of the world. The Software consists of several modules supporting all the activities of a library online catalog(OPAC), cataloging, authorities ' operation, rotation, stoner operation, accessions, diurnals, reporting, and administration. It's translated into over 100 languages and is enforced in further than 900 institutions around the world.

Evergreen: Evergreen is an open- source Integrated Library System(ILS) that includes rotation and cataloging features, OPAC, SIP2.0 support for interaction with management software, and search/ reclamation through Z39.50. It's a robust, enterprise position ILS solution developed to be able of supporting the workload of large libraries in a fault-tolerant system. It too is standards biddable and uses the OPAC interface, and offers numerous features including flexible administration, workflow customization, and adaptable programming interfaces. It features the Open Scalable Request Framework (OpenSRF) that allows inventors to produce applications for Evergreen with a minimal knowledge of its structure. It Operates on Debian or Ubuntu Linux servers.

OpenBiblio: OpenBiblio is an easy- to- use, open- source, automated library system written in PHP containing OPAC, circulation, cataloging, and staff administration functionality for the particular interest of small libraries with limited specialized moxie and resources of lower than 50,000 volumes.

NewGenLib (NGL): NewGenLib is an outgrowth of collaboration between Verus and Kesavan Institute of Information and Knowledge Management in Hyderabad, India. NGL is developed and maintained by Verus results and Kesavan Institute has provided the domain expertise. It provides numerous introductory ILS functions as well as several social media functions erected in. NGL comprises numerous open- source factors, principal among which are Apache Tomcat, PostgreSQL Database, and the well- known search machine SOLR. NewGenLib is certified under GNU interpretation 3. It supports MARC21, OAI- PMH, and z39.50.

SOPAC: SOPAC(Social Online Public Access Catalog) is a module for the Drupal CMS that provides true integration of the library catalog system with the power of the Drupal content management system while allowing users to label, rate, and review their holdings. User input is also incorporated into the discovery index so that SOPAC becomes a truly community- driven catalog system.

Digital/ Electronic Library Software

Dienest: Dienest is a system for configuring a set of individual services running on distributed servers to cooperate in furnishing the services of a digital library. It has been written in PERL. It works more comfortably on UNIX/ Linux- run web servers.

D-Space: D-Space is a digital library system to capture, store, index, save, and redistributes the intellectual output of a university's exploration faculty in digital formats. D- Space has been developed concertedly by MIT Libraries and Hewlett- Packard (HP). It's now freely available to probe institutions worldwide as an open- source system.

E-prints: E-prints are general archive software under development by the University of Southampton. It's intended to produce a highly configurable web- based library. E-Prints primary thing is to set up as an open archive for research papers, but it could be fluently used for other things similar as images, research data, and audio archives – anything that can be stored digitally by making changes in configuration. It works on Linux O/ S and it needs MySQL, PERL modules, and an Apache web server.

Fedora: Fedora is an Open- Source digital repository management system based on the Flexible Extensible Digital Object and Repository Architecture (Fedora). The Fedora repository system is open- source software certified under the Mozilla Public License. It requires Sun Java Software Development Kit, v1.4. Voluntarily one can use MySql or Oracle 9i to produce a relational database. It works both on Windows and UNIX performances of O/S.

Greenstone: Greenstone is a suite of software for building and distributing digital library collections. It provides a new way of organizing information and publishing. It's available for Windows and Linux O/ S. It requires PERL software to make collections.

Invenio: Invenio software developed, maintained, and used at the CERN Document Server. It allows running electronic preprint or digital library servers, online library catalogs, or a document system on the web. It complies with the Open Archives Initiative Metadata Harvesting Protocol (OAI- PMH) and uses MARC 21 as its underpinning bibliographic standard. It's free software issued under a GNU- GPL license.

Some important popular Library Management Applications:

A Tutor: A Tutor is an Open Source technology and cost-effective tool for both small and large associations, presenting their educational accoutrements on the Web, and delivering completely independent online courses. It's an Open Source Web- based Learning Content Management System (LCMS) designed with availability and rigidity in mind.

CORAL: CORAL is an open source Electronic Resources Management System developed at the University of Notre Dame certified under a GPLv3 license. Its web- based and runs in an Apache, MySQL, and PHP environment. It delivers modules to manage coffers, licensing, associations (publishers, merchandisers, societies, etc.), and statistics. These modules link resources to licenses and providers, but they can be enforced singly. It also allows integration with different link purposefulness (presently only SFX).

CUFTS: CUFTS is open- source software developed at the Simon Fraser University Library. It was designed for use in a consortial environment, but can also be used by individual libraries. CUFTS is an Online Serials Management System, which includes a knowledge base of full- textbook journal collections, a searchable A-Z database of databases(the CUFTS Resource Database or CRDB), and an A-Z journal database(the CUFTS Journal Database or CJDB), MARC records for each title, direct to article Open URL link resolving(GODOT), and electronic resource management(ERM) tools.

Drupal: Drupal is a free and open- source content operation frame written in PHP and distributed under the GNU General Public License that allows you to fluently organize, manage and publish content, with an endless variety of customization. It's a content management platform powering millions of websites and operations. It's built, used, and supported by an active and different community of people around the world.

GODOT: GODOT is open- source software developed at the Simon Fraser University Library. It's Full- text Link from CUFTS, Interlibrary Holdings Locator. GODOT provides direct links to full- text collections, using the CUFTS knowledge base, and also reveals holdings in the library catalog or other locales. It also embeds links in the library's citation databases or other resources.

Joomla: Joomla is a Content Management System (CMS), which enables to make Web sites and important online applications. The core Joomla frame enables inventors to snappily and fluently build force control systems; Data reporting tools Application bridges; Custom product catalogs; Integrated-commerce systems; Complex business directories; Reservation systems and Communication tools.

Manhattan: Manhattan was developed by Steven Narmontas, head of the Educational Technology Center at Western New England College. The first interpretation of the system was used at the college back in 1997. In October 2000, the software was released in its wholeness on the Internet for free under the GNU General Public License. Manhattan Virtual Classroom is a fast, stable, and effective Course Management System that runs on Linux and other UNIX- suchlike systems. It's written entirely in the C programming language and is database-free software. Today, Manhattan is in use around the world and continues to be actively developed.

Moodle: Moodle is freely Open Source software for literacy, under the GNU General Public License designed to give educators, administrators, and learners with a single robust, secure, and integrated system to produce substantiated literacy surroundings. Moodle is built by the Moodle project which is led and coordinated by Moodle HQ, an Australian company of 30 inventors which is financially supported by a network of 60 Moodle Partner service companies worldwide. It provides the most flexible toolset to support both amalgamated literacy and 100 online courses.

Open Source Software: Advantages
The benefits with Open Source Software are as follows:

- **Lower Software Costs:** Open source results generally bear no licensing freights. Expenditures can be for media, attestation, and support, if needed.

- **Simplified License Management:** gain the software formerly and install it as numerous times and in as many locales as you need. There's no need to count, track, or monitor for license compliance. It provides cooperative, resembling development involving source code sharing and exercise.
- **Lower Hardware Costs:** In general, Linux and open source results are elegantly compact and movable, and as a result require lower hardware power to negotiate the same tasks as on conventional servers (Windows, Solaris) or workstations. So they're less precious.
- **Scaling/ Consolidation Implicit:** Open source applications and services can frequently gauge vastly as they've multiple options for cargo balancing, clustering.
- **Support:** Open source support is freely available and accessible through the online community via the Internet. Numerous tech companies also support open source with free online and multiple levels of paid support.
- **Escape Vendor Lock:** in Frustration with vendor lock- in is a reality and with ongoing license fees, there's lack of portability and the incapability to customize software to meet specific requirements. Open source exists as a protestation of freedom of choice.
- **Unified Management:** Specific open source technologies similar as CIM Common Information Model) and WBEM (Web Based Enterprise Management) provide the capability to integrate or consolidate server, service, application, administration.
- **Quality Software:** The peer review process and community standards make the open source software's, quality software. It gives participated approach to problem working through constant feedback and peer review. The fact that source code is out there for the world to see, tend to drive excellence in design and effectiveness in coding of these software.

Open Source Software: Disadvantages

- ✓ Possibility of slower results due to the rapid-fire development environment leading to the absence of formal management structures.
- ✓ Open source software can tend to evolve more in line with inventors' wishes than the requirements of the end user.
- ✓ Strong user involvement and participation throughout a project come problematic as users tend to produce bureaucracies which hinder development.
- ✓ Rapid releases and generally more duplications than marketable software creates further management problem. Version control systems are needed to track multiple variations.
- ✓ The user interfaces of open source products aren't veritably intuitive. Can be less "user-friendly" and easy to use because lower attention is paid to developing the user interface.
- ✓ No single source of information, so users have no 'definitive' answers to problems.
- ✓ System deployment and training is frequently more precious with OSS as it's lowered intuitive and doesn't have the usability advantages of personal software.

Conclusion:

Open Source Software dominates the infrastructure of Internet and Web services and present libraries also. OSS has continued to grow and so come the open source applications in libraries. These software and applications are more stable, secure, auditable, and extensible than marketable alternatives. Also using OSS guarantees that the standards and protocols used in the library will be open to examination and helps the library community to build upon former success.

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IMPACT OF OPEN ACCESS ON SCHOLARLY COMMUNICATION: A LIBRARY PERSPECTIVE

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Abstract

The open access (OA) movement has significantly transformed scholarly communication by advocating for free and unrestricted access to research outputs. This paper explores the historical evolution of open access, various OA licenses, and the implementation of policies and practices promoting OA. Additionally, it highlights the critical role of academic libraries in facilitating open access and addresses the challenges faced in sustaining funding, ensuring quality control, and navigating legal considerations. Through a comprehensive analysis, this paper aims to elucidate the benefits and challenges of open access, providing insights into how libraries can continue to support and advance this movement.

Keywords

Open Access, Scholarly Communication, Academic Libraries, Creative Commons, Institutional Repositories, Copyleft, Permissive Licenses

1. Introduction

Open access (OA) has revolutionized the dissemination of scholarly research by removing barriers to access and allowing free availability to the public. The movement towards OA aims to enhance the visibility, reach, and impact of research outputs, making them accessible to a broader audience. Various types of OA models, licenses, and policies have emerged to support this initiative, promoting a more inclusive and equitable approach to knowledge sharing.

The evolution of open access is closely linked to advancements in digital technologies and the increasing demand for unrestricted access to scholarly literature. This paper delves into the history and development of open access, examines different types of licenses, and explores their implications for the academic community. It also underscores the pivotal role of academic libraries in promoting and supporting open access, highlighting their contributions to the broader scholarly communication ecosystem.

2. A Brief History of Open Access

The concept of open access has undergone significant transformations over the past few decades. Early efforts were characterized by individual researchers and small groups advocating for free access to scientific literature. The formalization of the OA movement began in the late 20th century, with key milestones such as the Budapest Open Access Initiative (BOAI) in 2002, which provided a public definition and set the stage for subsequent developments in the field (BOAI, 2002).

The growth of digital repositories and the proliferation of online journals further accelerated the adoption of open access. The launch of influential OA platforms such as PLOS ONE and BioMed Central demonstrated the feasibility and benefits of making research freely available. These developments have fundamentally altered the landscape of scholarly communication, challenging traditional subscription-based publishing models and promoting greater accessibility and transparency.

3. Open Access Licenses

Open access relies heavily on various types of licenses that dictate how materials can be used, shared, and reused. These licenses include:

3.1 Creative Commons (CC) Licenses

Creative Commons licenses are widely used in the OA community, allowing authors to grant permissions in a standardized way. These licenses range from allowing any type of use with proper attribution (CC BY) to more restrictive licenses that limit commercial use or derivative works (e.g., CC BY-NC-ND) (Creative Commons, 2013).

3.2 Copyleft Software Licenses

Originating from the free software movement, copyleft licenses require that any derivative works be distributed under the same license terms as the original work. This ensures that the freedoms associated with the original work are preserved in all subsequent versions (Free Software Foundation, n.d.).

3.3 Permissive Software Licenses

In contrast to copyleft licenses, permissive licenses allow for more flexible use of the software, including the creation of proprietary derivative works. Common examples include the MIT License and the Apache License (Open Source Initiative, n.d.).

3.4 Public-Domain-Equivalent Licenses

These licenses, such as the Creative Commons Zero (CC0) license, allow authors to waive all rights and place their works directly into the public domain, making them free for any use without restrictions (Creative Commons, n.d.).

3.5 Open Data Licenses

Open data licenses, such as the Open Database License (ODbL), govern the use and sharing of data sets. These licenses ensure that data remains open and accessible while providing guidelines for attribution and the creation of derivative works (Open Data Commons, n.d.).

4. Policies and Practices

The implementation of open access policies varies widely across institutions and countries. Key examples include:

4.1 Institutional Repositories

Many universities have established institutional repositories to archive and provide access to the research outputs of their faculty. These repositories play a crucial role in promoting OA by ensuring that research is freely available and easily discoverable (Ghosh & Das, 2007).

4.2 Funding Agency Mandates

Several funding agencies now require that the research they support be made openly accessible. For instance, the National Institutes of Health (NIH) in the United States mandates that all publications resulting from NIH-funded research be deposited in PubMed Central and made publicly available within a year of publication (NIH, 2008).

4.3 Open Access Journals

Journals that publish exclusively open access content have proliferated in recent years. These journals make all their articles freely available online immediately upon publication, often supported by article processing charges (APCs) paid by authors or their institutions. Prominent examples include PLOS ONE and BioMed Central (PLOS, n.d.).

5. The Role of Libraries in Open Access

Libraries have been at the forefront of the OA movement, advocating for more accessible research and supporting researchers in navigating the OA landscape. Key contributions include:

5.1 Supporting Open Access Publishing

Libraries often manage institutional funds to cover APCs for researchers, negotiate with publishers for more favorable terms, and provide guidance on selecting appropriate OA journals (Chang, 2015).

5.2 Developing Institutional Policies

Libraries work with university administration to develop and implement OA policies that encourage or mandate the deposit of research outputs in institutional repositories. These policies help increase the availability of research outputs and ensure compliance with funding agency requirements (Ghosh & Das, 2007).

5.3 Providing Training and Support

Libraries offer workshops and resources to educate researchers about the benefits of OA, how to comply with funder mandates, and how to select appropriate licenses for their work.

6. Benefits and Challenges of Open Access

Open access provides numerous benefits, including increased visibility and impact of research, broader dissemination, and enhanced collaboration opportunities. However, several challenges need to be addressed to fully realize the potential of OA.

6.1 Benefits:

- **Increased Accessibility:**
  OA makes research freely available to anyone with internet access, removing financial barriers and enabling broader readership (Anderson, 1998).

- **Enhanced Impact:**
  Studies have shown that OA articles receive more citations and have a greater impact compared to subscription-based articles (Fund, 2015).

- **Promotion of Collaboration:**
  By making research more accessible, OA facilitates greater collaboration and knowledge sharing among researchers across different disciplines and geographical locations (Eve, 2015).

6.2 Challenges:

- **Sustainable Funding Models:**

  The reliance on APCs to support OA journals can be a financial burden for researchers, especially those from low-income institutions or countries. Alternative funding models, such as institutional subsidies or cooperative publishing agreements, need to be explored (Kitchin, Collins, & Frost, 2015).

- **Quality Control:**

  Ensuring the quality and integrity of OA publications is crucial. The rise of predatory journals that exploit the OA model for financial gain without adhering to rigorous peer review standards poses a significant threat to the credibility of OA (Snijder, 2015).

- **Legal and Ethical Considerations:**

  Navigating the legal landscape of OA, including copyright issues and licensing agreements, can be complex. Clear guidelines and support from libraries and institutions are essential to help researchers understand their rights and responsibilities (Mishra & Das, 2015).

Table 1: Overview of Major Open Access Licenses

License Type	Description	Example
Creative Commons (CC)	Standardized licenses allowing various levels of permissions and restrictions	CC BY, CC BY-NC-ND
Copyleft	Requires derivative works to be distributed under the same license terms	GNU General Public License (GPL)
Permissive	Allows for flexible use, including proprietary derivative works	MIT License, Apache License
Public-Domain-Equivalent	Waives all rights, placing works directly into the public domain	Creative Commons Zero (CC0)
Open Data	Governs the use and sharing of data sets, ensuring data remains open and accessible	Open Database License (ODbL)

Conclusion

Open access has the potential to transform the scholarly communication landscape by making research more accessible, enhancing its impact, and fostering a culture of openness. However, achieving the full potential of open

access requires ongoing efforts to address challenges related to funding, quality control, and legal considerations. Libraries, publishers, and researchers must work together to develop sustainable models, uphold high standards of quality and integrity, and promote the principles of open access in all areas of scholarly communication.

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OPEN SOURCE DIGITAL LIBRARY SOFTWARE'S

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Abstract

Open-source software is software that druggies have the capability to run, copy, distribute, study, change, partake and ameliorate for any purpose. Open-source library software's doesn't need the original cost of marketable software and enables libraries to have lesser control over their working terrain. Library professionals should be apprehensive of the advantages of open-source software and should involve in their development. They should have introductory knowledge about the selection, installation and conservation. Open-source software requires a lesser degree of calculating responsibility than marketable software. Library professionals don't suppose seriously about the advantages of open-source software for robotization and hence are reticent to use it. They don't have the moxie to support open-source software. The present paper is highlights on major open-source library software. Open-source Digital Library Management Software, Information Dissemination.

Keywords: Open source, Digital Library, Digital Library Management Software, Information Dissemination.

Introduction

Preface In the present period digitalized databases are being collected in maturity of the library services, which are grounded on information technology as well as coffers available in electronic formats. In order to manage all kinds of coffers and information, libraries bear high quality integrated software, along with cutting edge reclamation tools. still, the high price of similar software prevents utmost of the libraries from using them. So as to deal with this issue, and for the benefit of exploration scholars and the stoner communities of libraries, different NGOs, associations and individualities have developed software, which are distributed free of cost. Known as free/ open-source software, these are considerably available on the internet and can be downloaded, installed and distributed.

What Is Open-Source Software?

Open-source software is software that provides access to the source law, meaning that druggies are free to see how the product is made. also, druggies have the right to modify the product (change the law) to their relish, trial with different performances, and give away or resell the new product with the guarantee that they must also give their source law, and so on. Modifying the product and redivision are the two main factors of open-source software. Testament still, open-source software is right for you and your library,

Ideology

If you value fair use of information and intellectual freedom. But flash back; suppose of" free" as in freedom, not inescapably" free" as in price, although it frequently is. The free software movement differs slightly from open-source software testament in that free software promotes the freedom of all software far and wide and abhors personal software. Open-source software proponents believe that this isn't fully realistic and prefer promoting collaboration styles as superior to personal software. However," also it's also open-source software, if a piece of software is called" free software. Live free, law free, ameliorate the world.

Reasons To Use Open-Source Software

It promotes creative development those who cannot go personal software can Download open source programs for free plutocrat saved can be used to buy other demanded accoutrements Can fluently modify your software to suit patron's requirements and your requirements Little to no upgrade costs No more challenging over software that does not meet your norms-- produce it yourself grounded off of a close preexisting piece of software The price(free) makes it easier to change your mind when the software does not live up to its prospects Little to no contagions!

Definitions:

Proprietary - the software costs money and the source code is restricted. You cannot modify, fix, add to, take away, or change the code in any form.

Open Source - the software is most likely free and the source code is completely open. You can modify, fix, add to, take away, and change the code any way you wish.

Selected Open-Source Software'S:

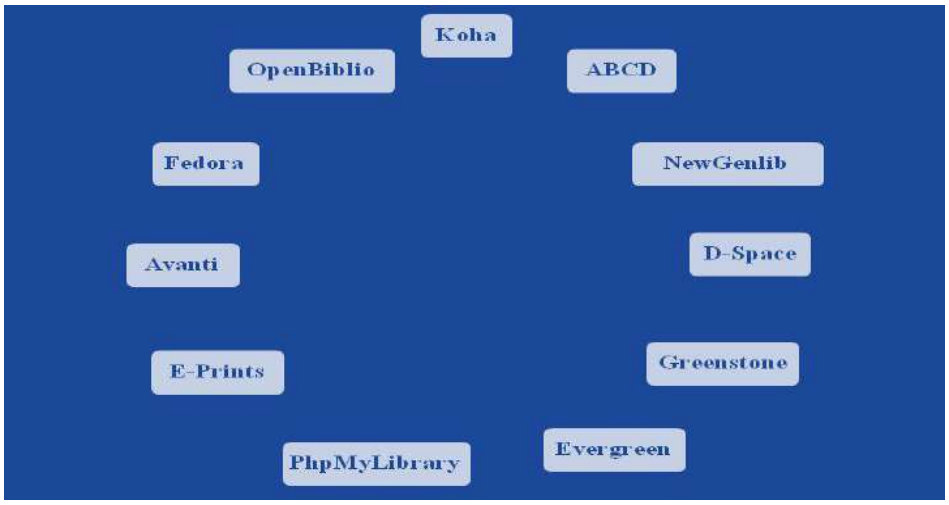

Figure 1Figure: .Some of open source software's.

Major software's developed and available are described briefly hear;

Koha

Koha has the distinction of being the first open-source integrated library operation system, which includes all the main functions related to library operation. It's web- grounded open-source software distributed under the general public license. Koha supports windows as well as Linux platform. The first interpretation of it was released in time 2000. The 'Koha Development Team' offers to host the website for Koha library system on its garçon. Koha also has the capacity to manage digital libraries and online and offline electronic coffers.

FEATURES:

Koha is web-based ILS, with a SQL database (MySql preferred) backend with cataloguing data stored in MARC and accessible via Z39.50. The user interface is very configurable and adaptable and has been translated into many languages. Koha has most of the features that one expects in an ILS, including:

- Simple, clear interface for librarians and members (patrons)
- Various Web 2.0 facilities like tagging and RSS feeds
- Union catalog facility
- Customizable search
- Circulation and borrower management
- Full acquisitions system including budgets and pricing information (including supplier and currency conversion)
- Simple acquisitions system for the smaller library
- Ability to cope with any number of branches, patrons, patron categories, item categories, items, currencies and other data
- Serials system for magazines or newspapers
- Reading lists for members

D-Space

D-Space is an open-source software package that provides the tools for management of digital assets, and is commonly used as the basis for an institutional repository. It supports a wide variety of data, including books, theses, and 3D digital scans of objects, photo-graphs, film, video, research data sets and other forms of content. The data is arranged as community collections of items, which bundle bit streams together. D-Space is also intended as

a platform for digital preservation activities. D-Space was released by HP-MIT Alliance in 2002 and since its release is very popular open-source software. It has been installed and successfully working extensively and widely in universities, higher education colleges, cultural organizations, and research centers etc. It is shared under a Berkeley Software Distribution license, which enables users to customize or extend the software as needed.

Evergreen

Evergreen is an open-source Integrated Library System (ILS), initially developed by the Georgia Public Library Service (2006), Public Information Network for Electronic Services (PINES) and the Evergreen Community. It is distributed under the GNU General Public License. Evergreen has been written primarily in Perl and Postgre SQL, with a few optimized sections (Singh, 2007) rewritten in C. The catalogue interface is primarily JavaScript with XHTML, and the staff client user interface is written in Mozilla's XUL (XML + JavaScript). The user interface for most new staff client functionality is being built with the Dojo Toolkit JavaScript framework. Python is used for the internationalization-built infrastructure. EDI functionality for the acquisitions system depends upon Ruby support.

Php My Library

Php My Library is a PHP/My SQL web-based library automation application meant for smaller libraries. The software has the facilities of cataloguing, circulation, and OPAC module. The software also has an import export feature. It strictly follows the USMARC standard for adding materials. This software is compatible with the content management system and has as facility of online reservation system for library and also supports import from ISIS database with an ISIS2MARC program.

Fedora

Fedora software gives organizations a flexible service-oriented architecture for managing and delivering their digital content. Digital objects exist within a repository architecture that supports a variety of management functions. All functions of Fedora, both at the object and repository level, are exposed as web services. These functions can be protected with fine-grained access control policies. This unique combination of features makes Fedora an attractive solution in a variety of domains. Some examples of applications that are built upon Fedora include library collections management, multimedia authoring systems, archival repositories, institutional repositories, and digital libraries for education.

E-Prints

E-Prints has been developed at the University of Southampton School of Electronics and Computer Science in 2000 and released under a GPL license for building open access repositories that are compliant with the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). It shares many of the features commonly seen in document management systems, but is primarily used for institutional repositories and scientific journals.

OpenBiblio

OpenBiblio is an easy to use, open source, automated library software written in PHP. This software has facilities of OPAC, circulation, cataloguing, and other administrative work. OpenBiblio is well documented, easy to install with minimal expertise and designed with common library feature.

Avanti

Avanti Micro LCS Software is developed by Avanti Library Systems in Java language. This is a small, simple, and easy to install and use open-source software. It is a platform independent, and can run on any system that supports a Java runtime environment. This software is useful for small libraries; it has a powerful and very flexible architecture that allows it to be adapted for use in libraries of any type. This software incorporates standards such as MARC and Z39.50 as modules and interfaces.

Greenstone

The Greenstone Digital Library Software (GSDL) is a top of the line and internationally renowned ‘Open-Source Software’ system for developing digital libraries, promoted by the New Zealand Digital Library project research group at the University of Waikato and is sponsored by the UNESCO (http://www.unesco.org). The software is issued under the terms of GNU General Public License. Greenstone provides a way of building, maintaining and

distributing digital library collections, opening up new possibilities for organizing information and making it available over the Internet or on CD-ROM.

JOOMLA

JOOMLA is a free and open-source content management system (CMS) for publishing web content. It is built on a model–view–controller web application framework that can be used independently of the CMS. JOOMLA is written in PHP, uses object-oriented programming (OOP) techniques (since version 1.5) and software design patterns,[3] stores data in a MySQL,MS SQL (since version 2.5), or PostgreSQL (since version 3.0) database,[4][5]and includes features such as page caching, RSS feeds, printable versions of pages, news flashes, blogs, search, and support for language internationalization.

As of February 2014, JOOMLA has been downloaded over 50 million times.[6]Over 7,700 free and commercial extensions are available from the official JOOMLA! Extension Directory and more are available from other sources. It is estimated to be the second most used content management system on the Internet, after Word Press.

ADVANTAGES

The advantages of digital libraries as a means of fluently and fleetly penetrating books, libraries and images of colourful types are now extensively honoured by marketable interests and public bodies likewise. Traditional libraries are limited by storehouse space; digital libraries have the eventuality to store much further information, simply because digital information requires veritably little physical space to contain it.(12) As similar, the cost of maintaining a digital library can be much lower than that of a traditional library. A physical library must spend large totalities of plutocrat paying for staff, book conservation, rent, and fresh books. Digital libraries may reduce or, in some cases, do down with these freights. Both types of library bear listing input to allow druggies to detect and recoup material. Digital libraries may be more willing to borrow inventions in technology furnishing druggies with advancements in electronic and audio book technology as well as presenting new forms of communication similar as wikis and blogs; conventional libraries may consider that furnishing online access to their OP AC roster is sufficient. An important advantage to digital conversion is increased availability to druggies. They also increase vacuity to individualities who may not be traditional patrons of a library, due to geographic position or organizational cooperation.

- **No physical boundary**. The user of a digital library need not to go to the library physically; people from all over the world can gain access to the same information, as long as an Internet connection is available.
- **Round the clock availability** A major advantage of digital libraries is that people can gain access 24/7 to the information.
- **Multiple access**. The same resources can be used simultaneously by a number of institutions and patrons. This may not be the case for copyrighted material: a library may have a license for "lending out" only one copy at a time; this is achieved with a system of digital rights management where a resource can become inaccessible after expiration of the lending period or after the lender chooses to make it inaccessible (equivalent to returning the resource).
- **Information retrieval**. The user is able to use any search term (word, phrase, title, name, and subject) to search the entire collection. Digital libraries can provide very user-friendly interfaces, giving click able access to its resources.
- **Preservation and conservation**. Digitization is not a long-term preservation solution for physical collections, but does succeed in providing access copies for materials that would otherwise fall to degradation from repeated use. Digitized collections and born-digital objects pose many preservations and conservation concerns that analogue materials do not. Please see the following "Problems" section of this page for examples.
- **Space**. Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information; simply because digital information requires very little physical space to contain them and media storage technologies are more affordable than ever before.
- **Added value**. Certain characteristics of objects, primarily the quality of images, may be improved. Digitization can enhance legibility and remove visible flaws such as stains and discoloration.
- **Easily accessible.**

Limitations of Open-Source Software

For any up gradation/ change in the OSS, the library needs support. In case of OSS, there's nothing to break problem, either one has to hire some expert to break the problem or library should make arrangement with some company. Open-source products bear specialized moxie to operate and maintain open-source costs further to support because the software is generally tone- supporting. Generally, a marketable software company will incontinently respond on client requests for any problem. With OSS, if one does not do it himself, he she is at the mercy of a disjoint community of inventors.

Conclusion:

Libraries that are open source have a promising future in the realm of software. They have several distinct advantages compared to proprietary or commercial software. Open-source software is user-friendly and comes at no cost, making it a preferred choice for many. One major advantage is the ability for users to modify and address bugs, which is not an option with commercial software. From the above discussion it is said that the OSS are very essentials part of library and the Library & Information Science (LIS) professionals should keep eyes on development in order to choose applicable technology depending upon Institution's requirements. Since, figures of libraries worldwide are using OSS for managing their library systems more economically and effectively. Librarians and programmers should work together in order to apply open-source integrated library systems and at the same time, library professional is also needed to acquire new chops to create and maintain the library using an open-source library management system (LMS). For taking benefit from OSS fresh technology, education, and training of the professionals is basically needed.

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USE OF SOCIAL NETWORKING SITES BY BCA STUDENTS OF SAVITRIBAI PHULE MAHILA MAHAVIDYALAYA, SATARA: A STUDY

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Abstract

The usage of social networking sites for academic purposes has become increasingly significant among students. The proliferation of social networking sites and the extensive time spent on them have made smartphones highly promising tools for education. However, the resulting information overload from prolonged online activity and simultaneous access to multiple sources can be overwhelming. Students often face difficulties in sorting through the vast amount of information available and in discerning credible sources.

This research investigates the impact of social networking on college students particularly focusing on the awareness levels and purposes for accessing these sites among B.C.A. students at Savitribai Phule Mahila Mahavidyalaya, Satara. Employing a range of methodologies, including descriptive and interpretive literature analyses, this study aims to understand better how students engage with social networking sites. The findings will contribute to a deeper knowledge of how these platforms are accessed and utilized for academic purposes.

Key words: Social networking sites, college students, social media, sharing communication, virtual communities.

Introduction: College students today are very good at multitasking, finding information, and learning. They often use social media to get much of the knowledge they need. Social media has become a big part of college students' daily lives. They find that being connected online with friends and classmates is mostly helpful. Because of their busy schedules, it is easier and more convenient for them to build social media networks.

Social networking sites like Facebook, Twitter, LinkedIn, MySpace and Instagram have become very popular in recent years. Many people use the internet to communicate and share with others, making these platforms widely used for both business and personal reasons. Joining these sites is usually free, and registered users can create and improve their online profiles. Users can design their own home page by entering personal information like age, location, and marital status, and share their interests with relevant communities. They can chat in real-time, share videos, pictures, and music, send messages to friends, and download games and apps.

Statement of the Problem:

Social networking sites (SNS) are used very often by college students in India, and this has a big impact on their academic performance. This study aims to show the SNS usage patterns of BCA students. A survey of 160 BCA students at Savitribai Phule Mahila Mahavidyalaya in Satara was conducted for this purpose. The study's findings highlight how widely students use social networking sites. A questionnaire was given to 160 students at Savitribai Phule Mahila Mahavidyalaya, Satara to explore the impact of social networking on college students.

Review of Literature:

Studies on various aspects of online social networking have been conducted since SNSs were first introduced and have continued to be a topic of discussion. Many researchers have noted that teens and college students, especially undergraduates, use social networking sites like Facebook and MySpace at very high rates (Aquisti and Gross, 2006).

According to a survey by Cassidy (2006), the average Facebook user spends twenty minutes a day on the site, and most users log on at least once a day. Dwyer, Hiltz, and Passerini (2007) found similar results: 55% of Facebook users and 60% of MySpace users use these sites daily, and 82% of Facebook users and 72% of MySpace users update their profiles frequently.

A recent study in India (Hussain, Loan, and Yaseen, 2017) on postgraduate students at Kashmir University also found that students use SNSs extensively, logging in for an average of 1.43 hours a day. The main reasons for using

SNSs were to spread social, religious, political, and environmental awareness, gain knowledge, and stay in touch with loved ones.

This aligns with Eke, Omekwu, and Odoh's (2014) findings that most University of Nigeria students used SNSs for social interactions, online learning with classmates, discussing important national issues, watching movies, and other activities. Students see SNSs as tools that improve web skills, enable virtual meetings with research scientists, and strengthen relationships, self-esteem, and general well-being.

The use of SNSs has become increasingly common among college students, significantly impacting their academic performance (Talaue et al., 2018; Whitley & Grous, 2009). A study on the impact of social media on the academic performance of selected college students found that social networks are a major part of students' lives, taking up much of their free time. This study used a descriptive research design to assess the impact of social media on the academic performance of 60 business administration and management information system students who actively use social media. Another study on the impact of social media networks on students' academic performance in Oman found that social media use can negatively affect academic performance, especially in terms of face-to-face communication.

While some studies suggest that social media can benefit students by helping them socialize, make new friends, and discuss academic issues, the overall consensus is that excessive use of social media can harm students' academic performance (Ishaq, K., Zaki, F., Abid, A., & Ijaz, M. 2019).

In summary, college students use social networking sites for various purposes to meet their daily needs. They are increasingly using smartphones to access these networks, although this trend comes with challenges related to trust, selection, and filtering. It is important to understand how social media usage affects the academic performance of students, particularly those enrolled in BCA programs at Savitribai Phule Mahila Mahavidyalaya, Satara. Social networking sites impact students both positively and negatively, and this study explores these aspects in detail.

Objectives of the Study:

To know the main purpose of using online social networking

To determine the frequency (how often students use social networking sites) and amount of time students spend on social networking sites.
To identify the priority of different activities accomplished through social networking sites.

Hypothesis:

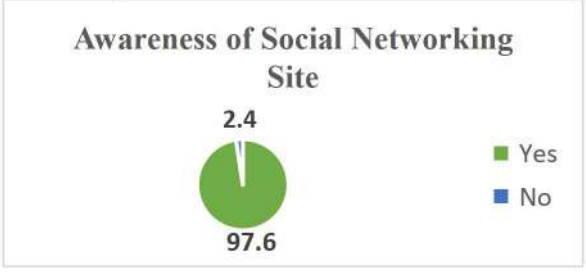
- College students spend a long time on social networking sites.
- College students are facing problems in trusting, filtering, and selecting all the different information accessed from social networking sites.

Research Methodology:

The strength of any research lies in the systematic method of data collection and analysis. This study data was collected from college students, with the main tool being a questionnaire. The questionnaire was carefully prepared with relevant questions to achieve the research objectives. It was distributed to 160 (I-65, II-60 & III-35) BCA students. Out of these, 125 students responded, giving a response rate of 78.12%. The research focused on BCA students at Savitribai Phule Mahila Mahavidyalaya, Satara.

Data Interpretation:

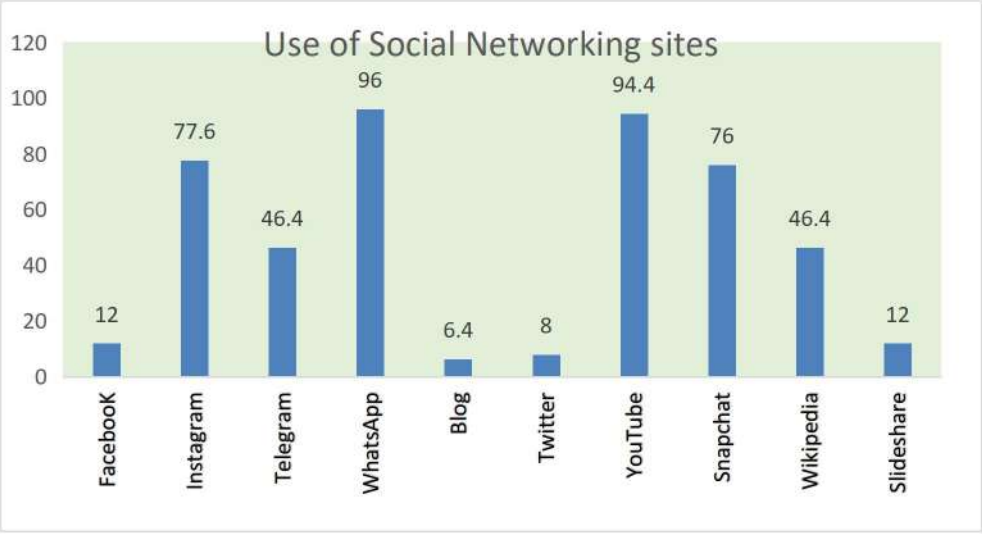
Awareness of various social networking sites:



The chart shows that a vast majority of respondents (97.6%) are aware of various social networking sites, while a very small percentage (2.4%) are not aware the SNS.

Use of Social Networking sites:

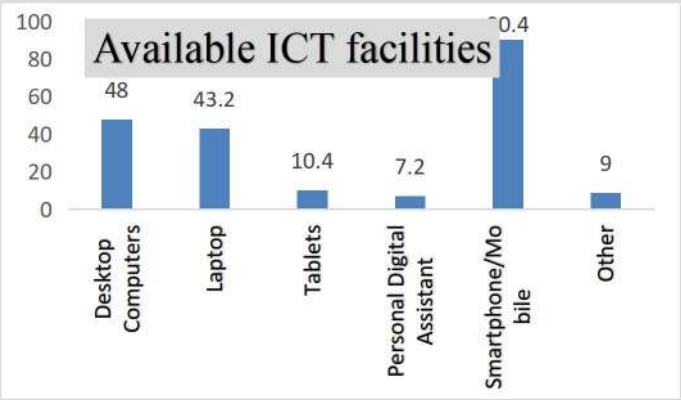
	Facebook	Instagram	Telegram	WhatsApp	Blog	Twitter	YouTube	Snapchat	Wikipedia	Slides hare
Frequency	15	97	58	123	8	10	118	95	58	15
Percentage	12.0	77.6	46.4	96	6.4	8.0	94.4	76.0	46.4	12.0
Total	125	125	125	125	125	125	125	125	125	125



This charts indicates that WhatsApp (96%) and YouTube (94.4%) have the highest usage percentages, indicating they are almost universally used among the sample group. Instagram (77.6%) and Snapchat (76.0%) are also very popular. Telegram and Wikipedia share the same percentage usage (46.4%), indicating moderate usage. Facebook and Slideshare, both at 12%, indicate low usage. Twitter (8%) and Blog (6.4%) are the least used platforms.

ICT facilities are available for accessing social networking sites:

	Desktop Computers	Laptop	Tablets	Smartphone /Mobile	Personal Digital Assistant	Other
Frequency	60	54	13	113	9	9
Percentage	48.0	43.2	10.4	90.4	7.2	7.2
Total	125	125	125	125	125	125



This chart shows that Smartphone/Mobile has the highest usage percentage at 90.4%. Desktop Computers and Laptops are moderately used, with usage percentages of 48% and 43.2%, respectively. Tablets have a low usage percentage of 10.4%. Personal Digital Assistants and Other devices have the lowest usage percentage, both at 7.2%.

Type of Internet connections for accessing social networking sites

	Wi-Fi	Mobile data	Broadband
Frequency	71	120	7
Percentage	56.8	96.0	5.6
Total	125	125	125

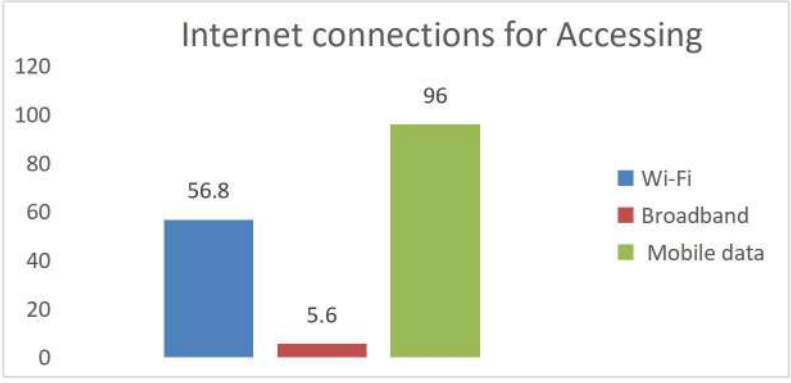
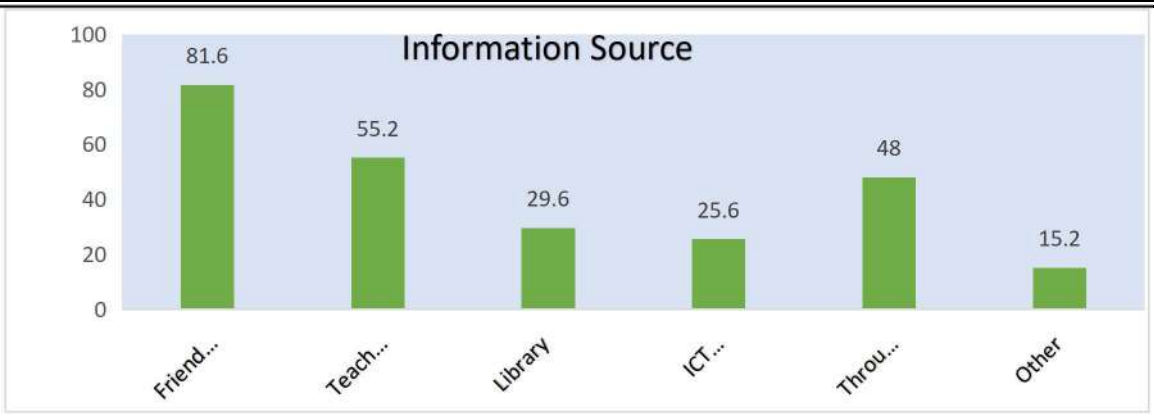


Chart shows that Mobile data is the most frequently used method, with 120 out of 125 users (96%), Wi-Fi is used by 71 users (56.8%), Broadband is the least used method, with 7 users (5.6%).

Information source for the use of social networking sites

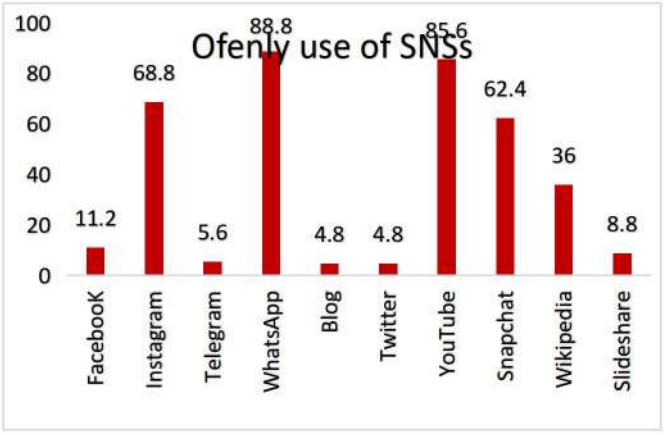
	Friends and family	Teachers	Library	ICT Training programs	Through reading materials	Other
Frequency	102	69	37	32	60	19
Percentage	81.6	55.2	29.6	25.6	48.0	15.2
Total	125	125	125	125	125	125



The most common source of information is Friends and family with 81.6% of people using this source. Teachers are the second most common source with 55.2%. Reading Materials (e.g. books, articles) are used by about half of the population (48%). The library is a source of information for about 29.6% of people. "Other" sources are used by about 15.2% of people.

Social networking sites use often.

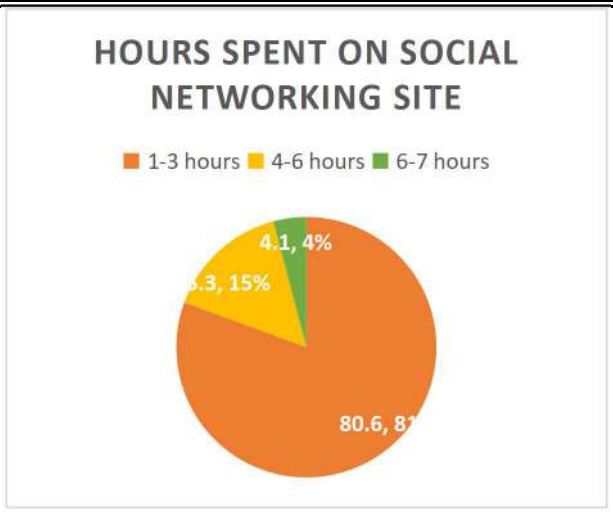
	Facebook	Instagram	Telegram	WhatsApp	Blogs	Twitter	YouTube	Snapchat	Wikipedia	Slideshare
Frequency	14	86	7	111	6	6	107	78	45	11
Percentage	11.2	68.8	5.6	88.8	4.8	4.8	85.6	62.4	36.0	8.8
Total	125	125	125	125	125	125	125	125	125	125



The chart shows the usage percentages of various social media platforms, with the top 3 (WhatsApp, YouTube, Instagram) being used by over 60% of people, followed by Snapchat and Facebook at around 20%. The platforms with lower usage rates are Wikipedia and Slideshare (10%), and Telegram and Twitter (less than 5%). The numbers may vary depending on target audience, location, and other factors.

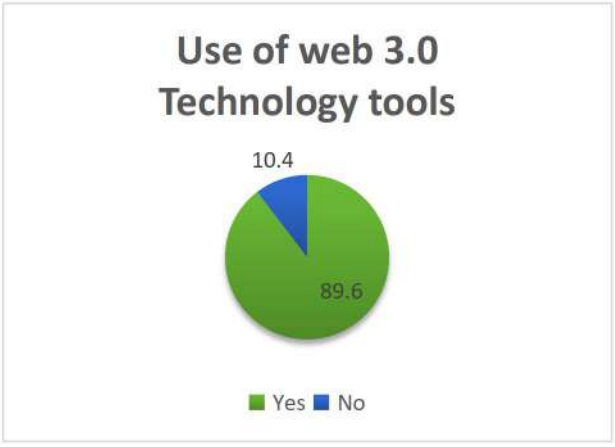
Hours spent on social networking sites

Hours spent on social networking sites	
1-3 hours	80.6
4-6 hours	15.3
6-7 hours	4.1



According to the data, most people (80.6%) spend 1-3 hours on social networking sites, while a smaller group (15.3%) spends 4-6 hours, and only a small minority (4.1%) spends 6-7 hours.

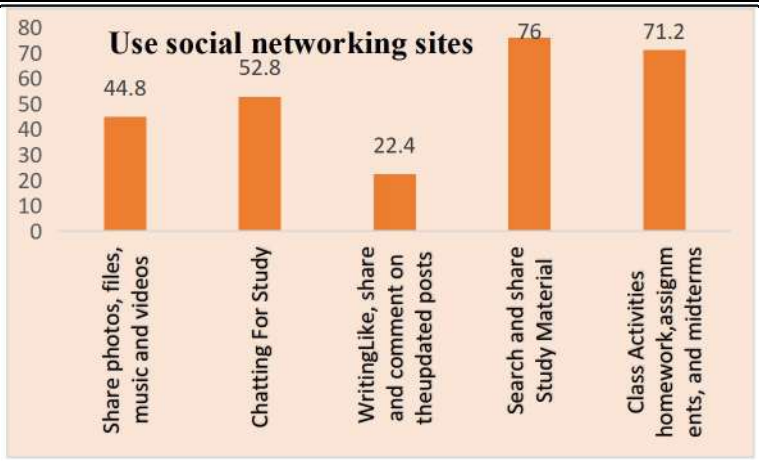
Use of Web 3.0 Technology tools for Study and Research



The chart shows that a majority of people (89.6%) use Web 3.0 technology tools for study and research, while a smaller percentage (10.4%) do not use these tools for these purposes.

Use of social networking sites.

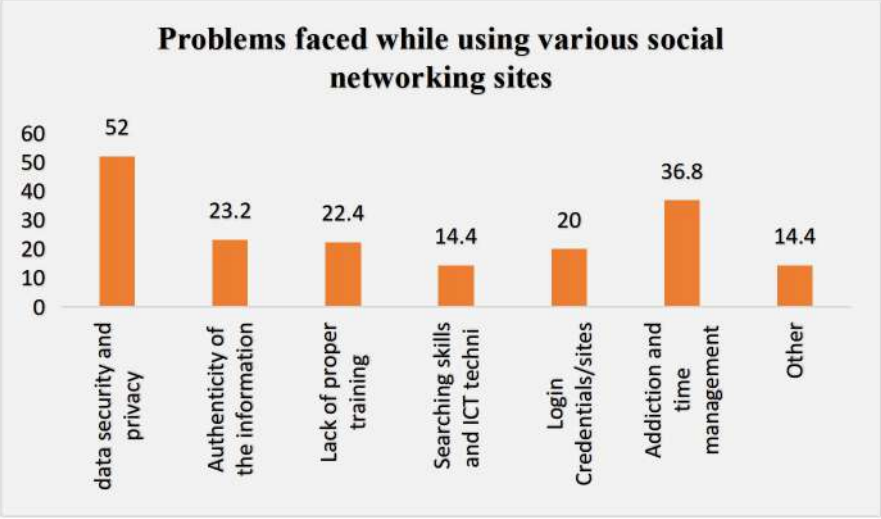
	Express opinions, share ideas, thoughts, views, stories and experiences	Chatting For Study Writing	Like, share and comment on the updated posts	Search and share Study Material	Class Activities, homework, assignments, and midterms
Frequency	56	66	28	95	89
Percentage	44.8	52.8	22.4	76.0	71.2
Total	125	125	125	125	125



Above bar chart shows that the highest percentages are for searching and sharing study material (76%) and participating in class activities such as homework, assignments, and midterms (71.2%). This indicates that a significant number of students use social networking sites for educational purposes. A little more than half of the students (52.8%) use these platforms for chatting related to studies, which shows moderate use for academic discussion and peer support. Activities like sharing photos, files, music, and videos (44.8%) and writing, liking, sharing, and commenting on posts (22.4%) have lower percentages, suggesting that social interactions are less prioritized compared to academic uses.

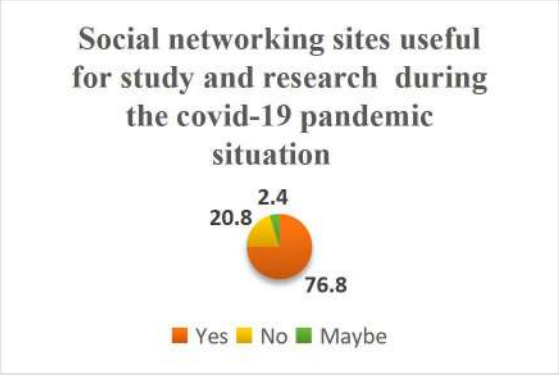
Problems faced while using various social networking sites

	data security and privacy /Cybercrime/ Cyber-bullying	Authenticity of the information	Lack of proper training and technical knowledge	Searching skills and ICT techniques	Login Credentials/sites that require to register with them	Addiction and time management	Other
Frequency	65	29	27	18	25	45	18
Percentage	52.0	23.2	21.6	14.4	20.0	36.0	14.4
Total	125	125	125	125	125	125	125



52% users a major problem for data security and privacy is issues about the security of personal data and the risk of data leakage. 36.8% of users say they have issues managing the amount of time spend on social networking sites, it can result in addiction and poor time management. 36.8% users says that with spending excessive time on these platforms, which can lead to addiction and poor time management. 23.2% users often face challenges verifying the credibility of information shared on social networking sites. 22.4% there is a notable gap in users' knowledge and skills regarding the effective use of social networking platforms. 20% of users may find it difficult to deal with various websites and manage several login credentials. Searching Skills and ICT Techniques 14.4% - Users sometimes lack the necessary skills for efficient searching and use of information and communication technologies (ICT). Other 14.4% - This includes various other unspecified problems that users encounter while using social networking sites.

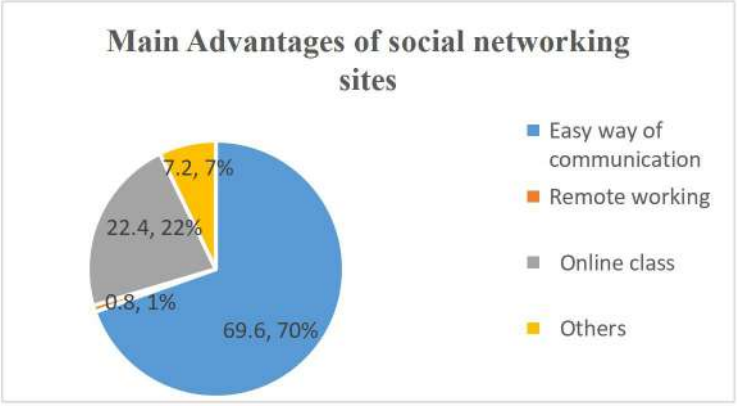
Social networking sites useful for study and research during the covid-19 pandemic situation



Above Pie chart shows that a significant majority (76.8%) of students found social networking sites useful for study and research during the COVID-19 pandemic. This highlights the critical role these platforms played in facilitating academic activities during remote learning periods. Only 20.8% of students felt that social networking sites were not useful, indicating a relatively low level of dissatisfaction. A small portion of students (5%) were unsure about the usefulness of these sites, reflecting a minor degree of uncertainty or mixed experiences.

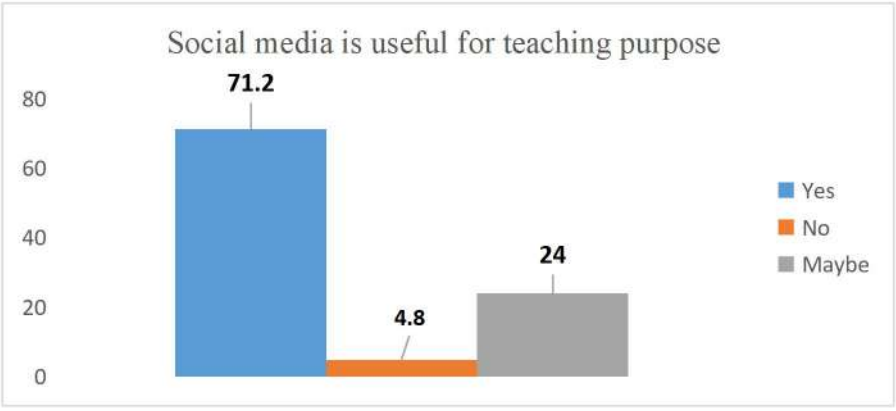
Main Advantages of social networking sites.

	Frequency	Percentage
Easy way of communication	87	69.6
Remote working	1	0.8
Online class	28	22.4
Others	9	7.2
Total	125	100



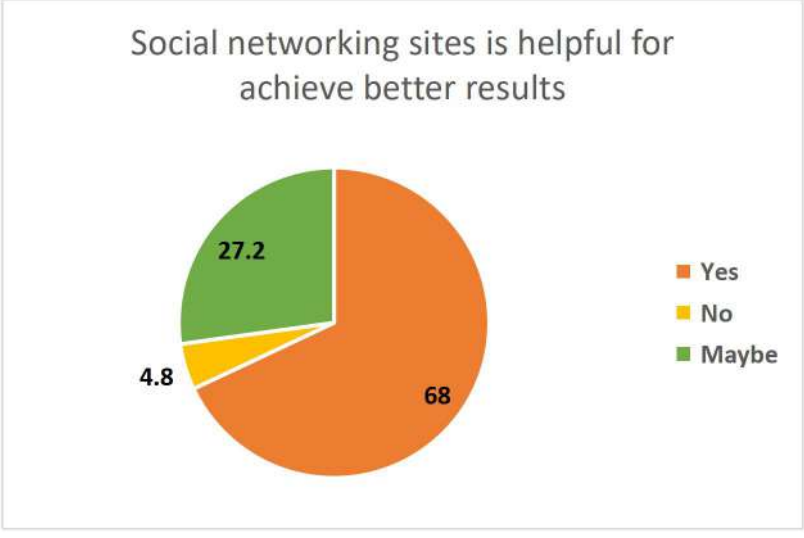
The chart shows that the highest advantage, cited by 69.6% of students, is that social networking sites provide an easy way of communication. This suggests that these platforms are highly valued for their ability to facilitate quick and efficient communication among students and educators. 22.4% of students see the benefit of using social networking sites for online classes. This indicates a significant recognition of these platforms as tools for conducting and attending virtual classes. Only 0.8% of students identified remote working as an advantage of social networking sites, suggesting that this benefit is not widely recognized or needed among the student population. 7.2% of students mentioned other unspecified advantages, indicating that there are additional perceived benefits not captured in the primary categories.

Social media is useful for teaching purpose



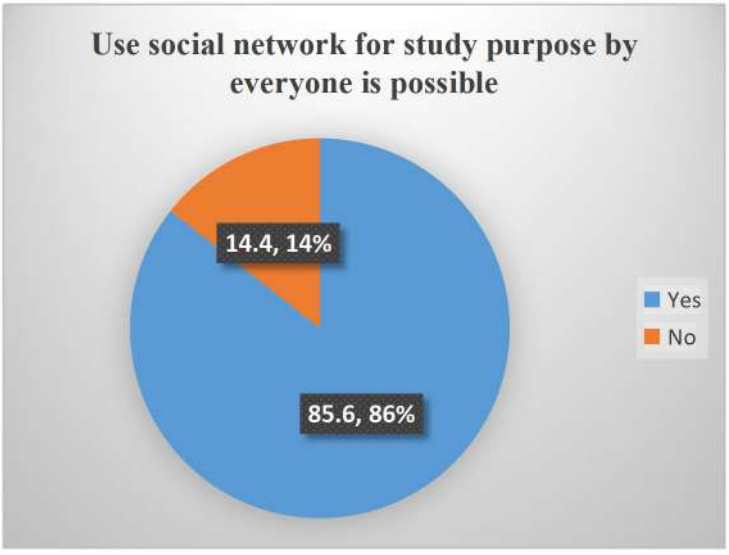
This chart shows that a significant majority (71.2%) of students believe that social media is useful for teaching purposes. This suggests that many students see the value in using social media as a tool for educational instruction and engagement. Only 4.8% of students do not find social media useful for teaching purposes, indicating a very low level of dissatisfaction or opposition to its use in education. 24% of students are unsure about the usefulness of social media for teaching.

- **Social networking sites is helpful for achieve better results**



The chart shows the results of a survey on the usefulness of social networking sites for achieving better results. This suggests that a significant majority (68%) believe social networking sites are helpful, a small percentage (4.8%) do not find them helpful, and a notable portion (27.2%) are unsure.

- **Use social network for study purpose by everyone is possible**



This chart shows that 85.6% of respondents believe it's possible for everyone to use social networks for study purposes, while 14.4% believe it's not possible. These percentages reflect the prevalence and significance of different issues experienced by users on social networking platforms.

Finding:

1. 97.6 percent of the students aware the SNS. 2.4 percent of the students not aware the SNS.
2. WhatsApp (96%) and YouTube(94.4%) are the most widely used social networking sites among users, followed by Instagram(77.6%) and Snapchat(76%). Telegram and Wikipedia also have a significant user base, while Facebook, Slideshare, Twitter, and Blogs are less commonly used.
3. 90.4% students used smartphones or mobile devices to access social networking sites, followed by desktop computers and laptops. Tablets and personal digital assistants are less frequently used, and there are also other unspecified devices used by some users.
4. 96% users access social networking sites using mobile data, followed by Wi-Fi. Smartphones or mobile devices are the most commonly used devices, with desktop computers and laptops also being popular choices.
5. 81.6% student's friends and family are the primary source of knowledge for using social networking sites, afterward teachers (55.2%) and reading materials (48%). Libraries and ICT training programs also play a significant role.
6. WhatsApp (88.8%), YouTube (85.6%) and Instagram (68.8%) are indicating a strong preference for platforms that offer both communication and visual content sharing features. Snapchat and Wikipedia also show significant usage. Facebook, Telegram, Twitter, and Blogs have relatively low usage compared to the other platforms.
7. Users spend (80.6%) between 1 to 3 hours on social networking sites.
8. The students are use web 3.0 technology tools like; Artificial Intelligence, Internet of Things, RFID, ChatGPT etc. for study and research.
9. 76% users use SNS for searching and sharing study material and 71.2% participating in class activities such as homework, assignments and midterms.
10. Users face several problems while using social networking sites, such as concerns about data security and privacy (52%), addiction and time management issues (36.8%), and difficulties in verifying the authenticity of information (23.2%). Other problems include the lack of proper training, managing multiple login credentials, and inadequate searching skills.
11. 76.8% students says that SNS useful for study and research during the COVID-19 pandemic.

12. 69.6% students are mainly used social networking sites for communication purposes, with recognition of their utility for online learning (22.4%). Remote working, however, is not widely seen as a significant advantage among students.
13. 71.2% students recognize the benefits of using social media for teaching, there is a 24% of students are unsure about the usefulness of social media for teaching.
14. 71.2% students believe that social media is useful for teaching purpose. 24% students are unsure about usefulness of social media for teaching.
15. 68% of students stated that social networking sites were useful for enhancing academic achievement.

Suggestion:

- ❖ Students should use social networking sites for study and self-development.
- ❖ Guidance is needed to verify the information obtained by using social networking sites.
- ❖ Organize workshops for better use of social networking sites.

Conclusion:

The purpose of the current study was to investigate the use of SNS by BCA students of Savitribai Phule Mahila Mahavidyalaya, Satara. An important finding from this study is that most of the students are members of some social networking site. Most of them are using social networks for research, entertainment, and obtaining other study materials related to their courses. Social networking sites play a significant role in facilitating communication, learning, and social interaction, but users must navigate challenges related to privacy, information credibility, and time management. Social networking sites offer various advantages, including easy communication, online learning opportunities, and the ability to share and access study materials. They also facilitate remote working and provide a platform for engaging in class activities and discussions.

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MAPPING THE POSTGRADUATE LEVEL STUDENTS' SATISFACTION WITH LIBRARY RESOURCES AND SERVICES IN PEMRAJ SARDA MAHAVIDYALAYA, AHMEDNAGAR.

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Abstract

The development in information and communication technology has transformed the user expectations from academic libraries in various aspects. The library should provide the readers with different types of information resources that they need for their studies. The present study makes an attempt explore user satisfaction of the postgraduate students of Pemraj Sarda Mahavidyalaya, Ahmednagar. The study also highlights to determine and find out the present status of information resources, frequency of library visit, purpose, library services, facilities, barriers and user suggestions.

Keywords: Library Resources and Services, Postgraduate Students, College Library, Users Satisfaction.

Introduction

College libraries are repositories of knowledge and an integral part of education. College libraries are considered to be the important centre of academic institutions and foremost support teaching, research and other academic programmes. The library of the Pemraj Sarda Mahavidyalaya is one of the well maintained and equipped Library in Savitribai Phule Pune University area. Main activities of a library include the collection, storage, retrieval and dissemination of information to the users. College library play an important role in support of education of academic institutions and provision of knowledge to the users. The users of the college libraries are students, faculty members, research scholars and they use the libraries for different purposes to satisfy their information need. Library is important for the students in the field of science, social science and humanities. The collection of the college libraries follows the courses offered and research undertaken within the institution. The collection of college library includes the print and non- print materials to meet the information needs of postgraduate students and researchers on wide variety of subject. It provides interdisciplinary and general collection, rare materials of research value, thesis, dissertations, archives, journals, audio visual materials, newspapers etc. Application of information and communication technology has transformed the concept of library services. In the beginning of every academic year the knowledge resource centre organizes user orientation program for the students. The aim of this program is to make the students familiar with various sections of the knowledge resource centre.

Review of literature

There are many articles and case studies available on this topic by various authors; some of the more relevant articles are reviewed as follows:

Verma and Laltlanmawii (2016) identified the different type of library services in library like providing latest collection and extended opening hours among other lead to user satisfaction. They systematically examine the use and user satisfaction of library resources and services by UG students in Government Hrangbana college Aizawl. He also highlighted type of library users and their frequency to visit the library, strength and weakness of the library collection, satisfaction level of library users towards library resources and services. Majority of the respondents were satisfied with books, journals, print and online databases.

Gudi and Paradkar (2018) explored the measurement of satisfaction level of students and faculty members with library resources in engineering colleges located at Pune city. The study revealed that the students are mainly satisfied with print resources such as reference books, text books, journals and their back volumes and e-resources they were satisfied by e-journals, e-books, e- databases, satisfaction level of the respondent with ten different print resources was surveyed. They also identified that text books and reference books are main information sources. The finding of this study shows that users suggestions are necessary to meet their information need and increasing number of copies of books is essential for meeting their regular demand.

Muthuraja, S.et.al (2018) conducted a study on user satisfaction with library resources, services and facilities: A study. This study is intended to know the use of library resources and user satisfaction on library resources and services. It will help to revise collection development policy and design new library services. The effectiveness of library service can be evaluated only by the level to which is services and resources are utilised. The library is having a wide range of collection on various disciplines. Author suggested that college library should carry out user to meet their information needs and make users aware of the available library resource and services. He also found that, journals, text books and reference books were the most popular source of information for the students.

Arumugam, Balasubramani and Pratheepan (2019) examine the user's satisfaction with library resources and services in Polytechnic College Libraries Coimbatore district. In this study 53.08% respondents are satisfied with the collection in the library. Most of the respondents collect the information from books/ e-books. The predominant barriers are library timing and inadequate resources. Most of the respondents are satisfied with the library orientation program. The 73.08% respondents are satisfied with the overall facilities and services in the library. Most of the respondents belong to mechanical and production department. A survey research method was adopted to address the research questions. The author is concluded that most users are satisfied with the library orientation programme, circulation, newspaper clipping service, Bulletin board service, reprographic service, CAS/SDI service, CD-ROM, reference service, inter library loan and internet service.

Aminu, M. and Trivedi, M. (2022). discussed user's satisfactions with information resources and services provided to all the staff and students in Smt. Hansa Mehta library. The Maharaja Sayajirao University of Baroda Gujarat, India. The study adopted the survey method and the population in this study cover the staff and student of Smt. Hansa Mehta library. The information resources have a great impact on activities carried out by staff and students of library. Some problem observed are positively addressed. Result obtained from this study are quite encouraging, many staff and students use some of these information resources. He also focuses on research is necessary to show how best to encourage staff and students to make effective use of the information sources available.

Objectives of the study:

The study is focused on achieving the following objectives;

- To assess the reading habit of students
- To examine the all type of information sources read by students
- To determine the purpose of visit to library
- To ascertain the ICT facility in library
- To evaluate the satisfaction level of students about services and facilities

Scope and limitation of the study:

Pemraj Sarda Mahavidyalaya library purchased a variety of information sources to facilitate its users. Present study confined to the student perception towards the library services and facilities. The present study is further limited to the postgraduate students of Commerce, Marathi, English, Political Science department.

Hypotheses:

The following hypotheses have been formulated for the presence study.

H1 Information sources provided by the library have impact on students' satisfaction.

H2 Advance services and facilities produced by the library have significant positive impact on students' satisfaction.

Methodology:

A survey method was conducted using well-structured questionnaire to accomplish the above objective of the study. The survey was conducted among the postgraduate students of Commerce, Marathi, English and Political Science departments. 150 questionaries circulated among the postgraduate students at the reading room section in the central library. However, 132 questionnaires were received from the students. Which constitutes 88% in total.

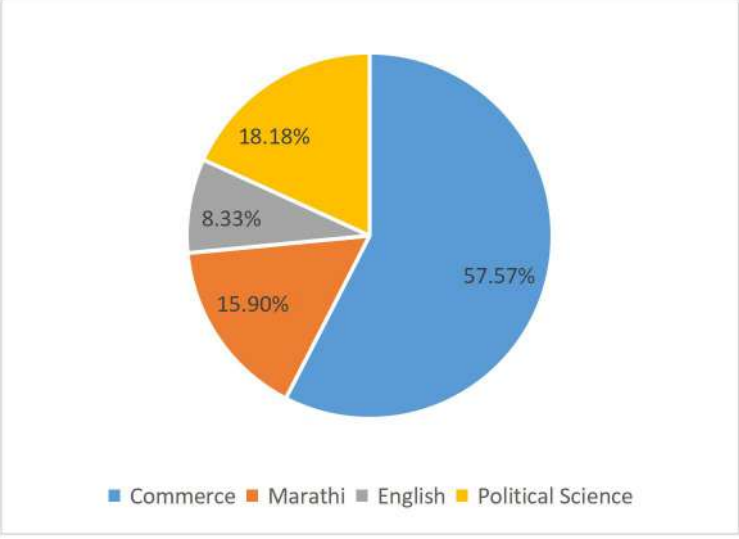
Data Analysis and Interpretation:

The data was recorded and analysed by using data analysis tool SPSS. It was organised, tabulated and then statistical method were used to calculate the responses on the basis of common responses.

The college department wise distribution of respondents to the questionnaire is presented in Table1. Further the data is presented graphically using pie chart in Figure 1.

Table 1. Department wise Distribution of Respondents

Sr. No.	Departments	No. of Respondents	Percentage
1	Commerce	76	57.58
2	Marathi	21	15.90
3	English	11	08.33
4	Political Science	24	18.18
Total		**132**	100



From Table 1 it is observed that the response of the Commerce department is maximum 57.58 percent followed by Political Science 18.18 percent Marathi 15.90 percent and English 08.33 percent.

The Gender wise Distribution of Respondents is presented in Table 2

Table 2. Gender wise Distribution of Respondents

Sr. No.	Gender	No. of Respondents	Percentage
1	Male	85	64.39
2	Female	47	35.60
Total		**132**	100

From Table 2 it is observed that among the total respondents the 64.39 percent were male and 35.60 percent were female.

The distribution of the respondents regarding frequency of visit to library is presented in Table 3.

Table 3. Frequency of Library Visit

Sr. No.	Frequency	No. of Respondents	Percentage
1	Everyday	61	46.21
2	Once in two days	32	24.24
3	Once in a week	24	18.18
4	Once in a month	13	09.84
5	Rarely	02	01.51
Total		**132**	100

From Table 3 it is observed that 46.21 percent respondents visited library every day. Whereas, 24.24 percent visited is once in two days. The proportion of the respondents visiting library once

in a week 18.18 percent. The 9.84 percent respondents are visiting to library once in a month.

The distribution of the respondents according to purpose of visit to library is presented in

Table 4.

Table 4. Purpose of Visit to Library

Sr. No.	Purpose	No. of Respondents	Percentage
1	Borrow Books	60	45.45
2	News Paper Reading	14	10.60
3	Reference Books, Journals and Magazines	27	20.45
4	Study for Semester and Competitive Examination	13	09.84
5	Browse Internet Resources viz; N-LIST and DELNET	18	13.63
Total		**132**	**100**

From Table 4 it is observed that the 45.45 percent of the respondents visit the library for borrowing books. The 20.45 percent of the respondents visit library for reference books, journals and magazines. The 13.63 percent of the respondents visit library for browse internet resources viz; NLIST, DELNET.

The respondent's satisfaction level regarding library resources is presented in Table 5.

Table 5. Satisfaction Level of Library Resources

Sr. No.	Information Sources	Level of Satisfaction			Total
		Satisfied	Unsatisfied	No Comments	
1	Text-Books	117 (88.64%)	09 (06.82%)	06 (04.54%)	132 (100%)
2	Reference Books	114 (86.36%)	05 (03.79%)	13 (09.85%)	132 (100%)

3	General Books	108 (81.82%)	16 (12.12%)	8 (06.06%)	132 (100%)
4	E-books	81 (61.36%)	32 (24.24%)	10 (07.57%)	132 (100%)
5	Journals/e-journals	83 (62.87%)	27 (20.45%)	22 (16.67%)	132 (100%)
6	Other Reading Materials	103 (78.03%)	12 (09.09%)	17 (12.88%)	132 (100%)

Chi square P value = 5.28 E-09 Highly Significant

Implies Information Sources and Level of satisfaction are dependent.

From Table 5 it is observed that 88.64 percent of the respondents are satisfied with information resources like text books, 86.36 percent with reference books, 81.82 percent with general books, 61.36 percent with e-books, 62.87 percent with journals/e-journals and 78.03 percent with other reading materials. The chi square test result is significant showed that the responses to the level of satisfaction for library resources is dependent.

The respondent's satisfaction level regarding library services is presented in Table 6.

Table 6. Users Satisfaction with Library Services

Sr. No.	Library Services	Level of Satisfaction			Total
		Satisfied	Unsatisfied	No Comments	
1	Library Orientation Program	115 (87.12%)	11 (08.33%)	06 (04.54%)	132 (100%)
2	Borrowing Facility	101 (76.51%)	17 (12.87%)	14 (10.60%)	132 (100%)
3	Reference Service	110 (83.33%)	15 (11.36%)	07 (05.30%)	132 (100%)
4	Bibliographic Service	90 (68.18%)	19 (14.39%)	23 (17.42%)	132 (100%)
5	News Paper Clipping Service	118 (89.39%)	05 (03.78%)	09 (06.81%)	132 (100%)
6	Inter Library Loan	95 (71.96%)	07 (05.30%)	30 (22.73%)	132 (100%)
7	OPAC Facility	92 (69.69%)	16 (12.12%)	24 (18.18%)	132 (100%)
8	Opening Hours of the Library	86 (65.15%)	10 (07.58%)	36 (27.27%)	132 (100%)
9	Library Website	114 (86.36%)	05 (03.78%)	13 (09.84%)	132 (100%)

Chi square P value = 0.0<.05

Implies Library services and Level of satisfaction are dependent

From Table 6 it is observed that the satisfaction level of the respondents regarding library services the 87.12 percent respondents are satisfied with the services like library orientation program, 76.51 percent with borrowing facility, 83.33 percent with reference service, 68.18 percent with bibliographic service, 89.39 percent with newspaper clipping service, 71.96 percent with inter library loan, 69.69 percent with OPAC facility,65.15 percent with opining hours of the library and 86.36 percent with library website. The chi square test result is significant showed that the responses to the level of satisfaction for library services is dependent.

The respondent's satisfaction level regarding library facilities is presented in Table 7.

Table 7. Users Satisfaction about Library Facility

Sr. No.	Library Facilities	Level of Satisfaction			
		Satisfied	Unsatisfied	No Comments	Total
1	Reading Room Facilities	122 (92.42%)	06 (04.54%)	04 (03.03%)	132 (100%)
2	Library Furniture	98 (74.24%)	13 (09.84%)	21 (15.90%)	132 (100%)
3	Lighting, Battery Backup and Ventilation	97 (73.48%)	06 (04.54%)	29 (21.97%)	132 (100%)
4	Equipment's	106 (80.30%)	17 (12.87%)	09 (06.82%)	132 (100%)
5	Internet and Wi-Fi Service	95 (71.97%)	24 (18.18%)	13 (09.85%)	132 (100%)
6	Display Board of New Arrivals	118 (89.39%)	08 (06.06%)	06 (04.54%)	132 (100%)
7	Drinking Water	114 (86.36%)	03 (02.27%)	15 (11.36%)	132 (100%)

Chi square P value =0.0<.05

Implies Library services and Level of satisfaction are dependant

From Table 7 it is observed that the satisfaction level of the respondents regarding library facilities the 92.42 percent respondents are satisfied with the facilities like reading room facilities,73.48 percent lighting, battery backup and ventilation, 80.30 percent with equipment's, 71.97 percent with internet and Wi-Fi services, 89.39 percent with display board of new arrivals and 86.36 percent with drinking water. The chi square test result is significant showed that the responses to the level of satisfaction and various library facilities are inter dependent.

The barriers in using library resources are presented in Table 8.

Table 8. Barriers in Using Library Resources

Sr. No.	Barriers	No. of Respondents	Percentage
1	Extent Library Hours at the Time of Examination	52	39.39
2	Shortage Library Staffs	26	19.70
3	Inadequate Library Resources	18	13.64
4	Slow Internet Connectivity	36	27.27
Total		**132**	100

From Table 8 it is observed that the maximum 39.39 percent respondents have responded that they are expect extent library hours at the time of examination, the 27.27 percent respondents are facing the problem of slow internet connectivity and 19.70 percent respondents are of the opinion that there is shortage of library staff.

The suggestions given by respondents for improving facilities and services are presented in Table 9.

Table 9. Suggestions Given by Users for Improving Resources, Facilities and Services

Sr. No.	Users Suggestions	No. of Respondents	Percentage
1	Printing Facilities	30	22.73
2	Increasing Study Desk	19	14.39
3	To Purchase Electronic Databases	45	34.09
4	Added Computers for Internet Browsing	38	28.79
Total		**132**	100

From Table 9 it is observed that the maximum 34.09 percent respondents have suggested purchasing electronic databases in library, 28.79 percent respondents have suggested adding computers for internet browsing, 14.39 percent respondents have suggested to increase study desk in library.

Findings:

- It is observed that the response of the Commerce department is maximum 57.58 percent followed by Political Science 18.18 percent Marathi 15.90 percent and English 08.33 percent.
- It is observed that among the total respondents the 64.39 percent were male and 35.60 percent were female.
- It is observed that 46.21 percent respondents visited library every day. Whereas, 24.24 percent visited is once in two days.
- It is observed that the 45.45 percent of the respondents visit the library for borrowing books. The 13.63 percent of the respondents visit library for browse internet resources viz; NLIST, DELNET.
- It is observed that 88.64 percent of the respondents are satisfied with information resources like text books, 86.36 percent with reference books, 81.82 percent with general books, 61.36 percent with e-books.
- It is observed that the satisfaction level of the respondents regarding library services the 87.12 percent respondents are satisfied with the services like library orientation program, 76.51 percent with borrowing facility, 83.33 percent with reference service, 68.18 percent with bibliographic service, 89.39 percent with newspaper clipping service.
- It is observed that satisfaction level of respondents regarding the library facilities more than 80.00 percent respondents are satisfied with reading room, equipment's, display board of new arrivals and drinking water. Whereas, more than 70.00 percent respondents are satisfied with library furniture, lighting battery backup and ventilation, internet and Wi-Fi services.
- It is observed that the maximum 39.39 percent respondents have responded that they are expect extent library hours at the time of examination.
- It is observed that the maximum 34.09 percent respondents have suggested purchasing electronic databases in library.

Suggestions:

- Conducting awareness program on library usage by the librarian for newly admitted students in the college. This orientation program enables students to make effective use of the different sections and resources of the library.
- Electronic databases of different subjects should be procured according to the needs of the readers.
- Printing facilities and study desks in reading room should be extended in the library.
- Collecting regular feedback from faculty members and students at the end of each academic year will go a long way in improving the library services as per the expectations of the readers from the library.

Conclusions:

College library is an important tool for any educational institutions, this fact no need elaboration. Pemraj Sarda Mahavidyalaya library is a combination of traditional books as well as e-resources, accordingly library services are provided to the students. Institutional repository, digital library with 11 computers, open access databases like INFLIBNET N-LIST, DELNET, Directory of Open Access Journals to faculty members and students. Our study should be viewed against the backdrop of the existing context of the explanation in this paper. The study shows an encouraging situation regarding the quality of library services, but there is a need for improvement regarding extend library hours at the time of examination and internet facility. It has been suggested to increase the establishment of printing facility, student desk in reading room, electronic databases, provision of new computers for postgraduate students. To conclude of this study is that the postgraduate students of the college are satisfied with overall services and facilities provided by the library.

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"A CONTENT ANALYSIS OF WEBSITES / WEBPAGES OF KNOWLEDGE RESOURCE CENTRES OF STATE UNIVERSITIES IN MARATHWADA REGION"

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Abstract

Website plays vital role in promotion of activities of any institution. Libraries are now working in digital era. Library must perform as per the need of current generation to fulfill the requirements of digital user with the help of new emerging technologies. Website is a best tool to promote library activities and services. This study aims to evaluate websites / web pages of the state universities in Marathwada region. For this study a check list has been prepared as per literature review. Check list consists of five main aspect and then further divided into 71 elements. There are four state universities in the Marathwada region these four state universities have been selected for study. This study, found that Swami Ramanand Teerth Marathwada University,Nanded is at 1st rank, Dr.Babasaheb Ambedkar Marathwada University, Cha.Sambhaji Nagar is at 2nd rank, Vasantrao Naik Marathwada Krushi Vidyapeeth, Parbhani at 3rd rank and Maharashtra National Law University, Cha.Sambhaji Nagar have no library information provided on website.

Keywords: State Universities, Content Analysis, Website

Introduction

Library website is a mirror to library. So, responsibility of website developer has become more important in updating and development of library website time to time. As per the need of current generation library professionals must adopt the new arriving technologies to fulfill user's requirements. Users are now techno savvy. Due lack of time and technological development users are browsing information on website instead of physically visit to library. In this digital era user can get information at any time from any place as per his/ her convenience. Information sources are now available 24/7 hours. Library is the authentic source of information. User can get thousands of links in single click but validity of information is unknown so, responsibility of librarians is increasing as per the increasing sources of information.

It is not difficult to develop website but it is challenging to develop an ideal website is. Due to content analysis of existing website, one should know how well fulfilled website should be and how to make website informative. The purpose of this study is to analyze the content on website / web page link of state universities in Marathwada region.

State Universities under Marathwada Region:

There are four state universities in the Marathwada region these are Swami Ramanand Teerth Marathwada University, Nanded, Dr.Babasaheb Ambedkar Marathwada University, Chatrapati Sambhanji Nagar, Vasantrao Naik Marathwada Krushi Vidyapeeth, Parbhani & Maharashtra National Law University, Chatrapati Sambhanji Nagar. The websites / webpages of these four respective universities have been studied.

Significance of the study:

To develop ideal website for library, there is need to evaluate developed websites and plan for the best website which may be useful and informative. Evaluating web site provide different approaches for the developer in preparing better accessible web page. The present study aims to analyse this concept. Librarians are unaware of details of building websites but evaluation may provide guidelines to librarians in developing better websites for academic and other type of libraries.

Objectives of the study

1. To take the review of website / webpage link of state university libraries in Marathwada region.
2. To know the information available on the website / webpage link of the state university libraries in Marathwada region.
3. To evaluate the contents of website / webpage link of the state university libraries in Marathwada region.

4. To identify the best library, libraries website / webpage link of the state university libraries in Marathwada region.
5. To suggest and recommend for the improvement in the state university library website / web page link.

Research Methodology:

List of state university in the Marathwada region prepared by visiting UGC website which is authentic source of information i.e., https://www.ugc.gov.in.Related literature reviewed and prepared check list for content analysis of selected websites. Content of website done as per the prepared check list. The quantitative rating system 0 and 1 adopted to identify the presence of things on website. For presence of content 1 has been taken and for no information 0 has been taken. Means Yes =1 & No =0. The system of 0 and 1 is easier to evaluate the website and results obtain in quantitative form.

Data analysis and interpretation:

For this study researcher select survey and observation method of research and data interpretation. List of websites of state universities in Marathwada region selected by visiting UGC official website and found that there are four state universities present in the Marathwada region. In this study websites of respective universities have been studied and quantitative and qualitative outcomes of selected universities has been presented as per following sections.

1. General Information available on library websites of State Universities in Marathwada Region -17 elements
2. Information about library collection – 13 elements
3. Information on e-resources – 7 elements
4. Links, Search and Retrieval Interfaces – 8 elements
5. Information about library service – 26 elements

Table-1:- State Universities in Marathwada region

Sr	Name of the University	Year of establishment	Website	Short Name
1	Dr. Babasaheb Ambedkar Marathwada University Cha.Sambhaji Nagar	1958	http://www.bamu.ac.in/	Dr.BAMU
2	Maharashtra National Law University Cha.Sambhaji Nagar	2017	https://www.mnlua.ac.in/	MNLU
3	Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani	1972	https://www.vnmkv.ac.in/	VNMKV
4	Swami Ramanand Teerth Marathwada University,Nanded	1994	http://www.srtmun.ac.in	SRTMU

Table 1st shows list of state universities in the Marathwada region. In table include year of establishment, URL and short names of universities.

Table: -2 General Information available on library websites of State Universities in Marathwada Region

Sr.No.	General Information about library	Dr.BAMU	MNLU	VNMKV	SRTMU	Total Score (N=3)	Percentage (%)
1	About	Yes	Not available	Yes	Yes	3	100

2	Mission	Yes		Yes	Yes	3	100
3	Vision	Yes		Yes	Yes	3	100
4	Objectives	Yes		No	Yes	2	67
5	Location	Yes		Yes	No	2	67
6	Sitemap	No		Yes	Yes	2	67
7	Working Hours / Holidays	Yes		Yes	Yes	3	100
8	Membership	Yes		No	Yes	2	67
9	Library rules	Yes		No	Yes	2	67
10	News & events	Yes		Yes	Yes	3	100
11	Photo Gallery	Yes		Yes	Yes	3	100
12	Website in multiple languages	No		Yes	Yes	2	67
13	Copyright	Yes		Yes	Yes	3	100
14	Library Staff	Yes		Yes	Yes	3	100
15	Library Sections	Yes		Yes	Yes	3	100
16	Last update date	No		Yes	No	1	25
17	FAQ	Yes		No	No	1	25
University wise score out of 17		14	0	13	14		

Table 2 indicate that general information regarding about, mission, vision, working hours, news and event, photo gallery, copyright, Library staff, Library sections is available on the website / web page link of 100% state universities. Information about objective, sitemap, location, membership, library rules, website in multiple language have 67%. Information about last update date and FAQ is available on website 25%.

Table: -3 Information about library collection

Sr.No.	Library Collection	Dr.BAMU	MNLU	VNMKV	SRTMU	Total Score (N=3)	Percentage (%)
1	Books	Yes	No information available	Yes	Yes	3	100
2	Journals	Yes		Yes	Yes	3	100
3	Magzines	Yes		Yes	Yes	3	100
4	Reference sources	Yes		Yes	Yes	3	100
5	Back Voloume of journals	Yes		Yes	Yes	3	100
6	Photographs	No		Yes	Yes	2	67
7	News papers	Yes		No	Yes	2	67
8	Thesis	Yes		Yes	Yes	3	100
9	Dissertations	Yes		No	Yes	2	67
10	List of print journals	No		No	Yes	1	33
11	Reports	No		No	Yes	1	33
12	Conference Proceedings	No		No	No	0	0
13	Manuscripts	Yes		No	No	1	33
University wise score out of 13		9		7	11		

Table 3 illustrate information about library collection. Information of books, journals, magzines, reference sources, back volume of journals, thesis have 100%. Photographs, newspaper, dissertations have 67%. List of print journals, reports and manuscripts have 33% availability and information about conference proceedings not observed on any website.

Table: -4 Information on e-resources

Sr.No.	E-Resources	Dr.BAMU	MNLU	VNMKV	SRTMU	Total Score (N=3)	Percentage (%)
1	E-Books	Yes	No information available	Yes	Yes	3	100
2	E- Journals	Yes		Yes	Yes	3	100
3	Online Database	Yes		Yes	Yes	3	100
4	CD Rom Database	Yes		No	No	1	33
5	CD / DVD	Yes		No	Yes	2	67
6	Institutional Repository	Yes		No	Yes	2	67
7	Consortia resources	Yes		No	Yes	2	67
Unniversity wise score out of 7		7	0	3	6		

Table 4 shows that 100% information available about e-books, e-journals and online database on the website. Information about CD Rom Database is 33% while 67 % information available about CD/ DVD, Institutional repository and consortia.

Table: -5 Links, Search and Retrieval Interfaces

Sr.No.	Dimensions	Dr.BAMU	MNLU	VNMKV	SRTMU	Total Score (N=3)	Percentage (%)
1	Download	Yes	No information available	No	Yes	2	67
2	Contact	Yes		Yes	Yes	3	100
3	User guide / Instructions	Yes		No	Yes	2	67
4	Images	Yes		Yes	Yes	3	100
5	News	Yes		Yes	Yes	3	100
6	Suggestion Box	Yes		No	No	1	33
7	Links to search engines	Yes		Yes	Yes	3	100
8	Visitors counter	No		Yes	Yes	2	67
University wise score out of 8		7	0	5	7		

Table 5 shows that information about images, news and links to search engine have 100% made available. Information about user guide and visitor counter present on 67% of website. Information about suggestion box appeared only 33%.

Table-6: - Information about library service

Sr.No.	Library Services	Dr.BAMU	MNLU	VNMKV	SRTMU	Total Score (N=3)	Percentage (%)
1	OPAC	Yes	No information available	Yes	Yes	3	100
2	Circulation	Yes		Yes	Yes	3	100
3	Databse access	Yes		Yes	Yes	3	100
4	Digital Library	Yes		Yes	Yes	3	100
5	Web OPAC	Yes		Yes	Yes	3	100
6	Wi-Fi Service	No		No	Yes	1	33
7	Reprographic service	Yes		Yes	Yes	3	100
8	Reference service / Desk / email queries	Yes		Yes	Yes	3	100
9	ILL	Yes		Yes	Yes	3	100
10	Plagiarism Check	Yes		Yes	Yes	3	100
11	DDS	Yes		Yes	Yes	3	100
12	CAS	Yes		No	Yes	2	67
13	News Paper Cliping service	Yes		No	Yes	2	67
14	Bibliography	Yes		Yes	Yes	3	100
15	Service for researchers	Yes		Yes	Yes	3	100
16	Reading room	Yes		No	Yes	2	50
17	Publications Links	Yes		No	Yes	2	50
18	Training and guidance	Yes		No	Yes	2	50
19	Book Banks	No		No	Yes	1	25
20	Video View	No		No	No	0	0
21	Email	Yes		Yes	Yes	3	75
22	Blog	No		No	No	0	0
23	Social Networking services	No		No	No	0	0
University wise score out of 23		18	0	13	20		

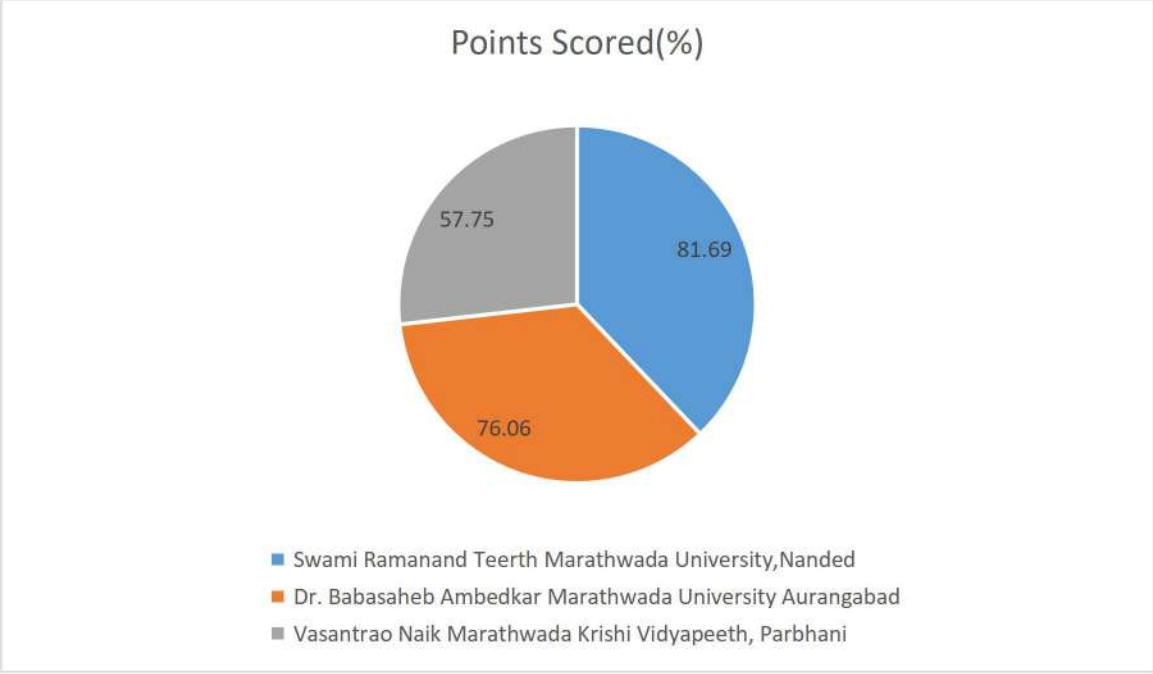
Table 6 indicates information regarding library services and found that maximum services are provided by the university website these are OPAC, circulation, database access, web OPAC, reprographic service, reference service, ILL, Plagiarism check, DDS, Bibliography, services for researcher are available 100% on the university website. Email service is available 75%. CAS, News papers information is 67%. Reading room, training & guidance is available 50%. Facility of wi-fi provided by 33%. Information book bank is 25% .

Table 7 : Ranking of library websites based on total score

Rank	Checklist	General Information available on library websites of State Universities in Marathwada Region (out of 17)	Information about library collection (out of 13)	Information on e-resources (out of 7)	Links, Search and Retrieval Interfaces (out of 8)	Information about library service (out of 26)	Total Score (out of 71)	Percentage (%)
1	Swami Ramanand Teerth Marathwada University,Nanded	14	11	6	7	20	58	81.69
2	Dr. Babasaheb Ambedkar Marathwada University Cha.Sambhaji Nagar	13	9	7	7	18	54	76.06
3	Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani	13	7	3	5	13	41	57.75
	Maharashtra National Law University Cha.Sambhaji Nagar	No information available						

Table 7 demonstrates the ranking of universities websites under study based on the elements available on their website. Table shows that Swami Ramanad Teerth Marathwada University, Nanded have scored 81.69 %. Dr.Babasaheb Ambedkar Marathwada University, Chatrapati Sambhaji Nagar have scored 76.06%. Vasantrao Naik Marathwada Krushi Vidyapeeth, Parbhani have scored 57.75%. Maharashtra National Law University, Chatrapati Sambhaji Nagar have no information provided on university portal about library.

Pie chart for showing points scored in percentage



Conclusion

This study aims to analyze contents available on websites / web page links of state university libraries. As per literature review a check list was prepared and content analysis was carried out and found that out of four university in Marathwada region Swami Ramanad Teerth Marathwada University, Nanded have scored 81.69 % and ranked at 1st position. It is concluded that librarians should try to build up informative library website which will fulfill the all information about library promotional activities, library services, links to various educational institutions, e-resources, e-databases and to be with digital era.

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DIGITAL LIBRARY AWARENESS AMONG LIBRARY PROFESSIONALS IN BIDAR DISTRICT: A STUDY

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Abstract

This study investigates digital library awareness among library professionals in Bidar District. A survey was conducted to assess demographics, experience, qualifications, and digital resource familiarity among librarians. The study says that digital libraries serve as valuable valuation tools for both educators and students, offering a platform to showcase progress and creativity. Digital libraries present real-world applications beyond traditional test scores, allowing for easy duplication, sharing, and expansion of diverse materials in compact, electronic formats. This research underscores the growing importance and potential of digital libraries in the evolving landscape of information management and education. The study reveals that 76% of respondents are between 35-55 years old, with 40% having 1-5 years of experience. The majority are assistant librarians, with a significant proportion holding PhD qualifications. Arts & Science colleges employ 26% of the respondents. Notably, most professionals demonstrate high awareness of digital resources such as e-books and e-journals.

Keywords: Digital Library, DSpace, E-Library, Digital resources, Internet, Web Sources

Introduction: The main role is physical libraries, are a unit information assortment storage arrangement, and retrieval method. Most libraries perform are a unit learning and giving out of data. During this digital era completely different perform of libraries are a unit digital choice, scanning cropping uploading for matting of data of knowledge of data and arrangement of knowledge through data for retrieval information. Digital resources embody every kind of non-printed material sort of e-books-journals, e-newspapers, digital library services, etc.

Information technology has a modification at each level therefore libraries extremely affected in gift digital era, day by day there's a decrease within the reading habit by the users during this context librarians ought to have been familiars or information of digital library services to all or any sorts of digital resources to maximize response to the digital library services. Certainly. I'll expand the literature review section with more detailed analysis and additional studies. Here's an enhanced version:

Literature Review: The concept of digital libraries has been a subject of extensive research in library and information science literature. Borgman (1999) provided one of the early comprehensive definitions of digital libraries, describing them as a set of electronic resources and associated technical capabilities for creating, searching, and using information. This definition has since been expanded and refined by numerous scholars as the field has evolved.

Digital Library Awareness and Skills: Several studies have explored the awareness and attitudes of library professionals towards digital libraries. Ramzan (2004) conducted a survey of library professionals in Pakistan, finding that while there was general awareness of digital library concepts, there were significant gaps in practical knowledge and skills. The study highlighted the need for formal training programs and infrastructure development to bridge this gap.

Similarly, Hussain and Abalkhail (2013) investigated the perceptions of academic librarians in Saudi Arabia towards digital libraries. Their research revealed a positive attitude among librarians towards digital libraries, with most respondents recognizing their importance in modern information services. However, the study also identified challenges such as lack of technical skills and inadequate IT infrastructure as barriers to effective digital library implementation.

In a more recent study, Anyim (2018) examined digital literacy skills among librarians in Nigerian universities. The research found that while librarians possessed basic computer skills, there were deficiencies in more advanced digital competencies such as database management and digital content creation. This study emphasized the need for continuous professional development to keep pace with rapidly evolving digital technologies.

Reviews in India: In the Indian situation, several studies have addressed digital library awareness among library professionals. Satpathy and Maharana (2011) studied digital library awareness among library professionals in Odisha. Their findings indicated varying levels of awareness across different types of libraries, with academic librarians generally showing higher levels of digital literacy compared to public librarians. The study also noted a correlation between age and digital literacy, with younger professionals demonstrating greater comfort with digital technologies.

Thanuskodi (2011) focused on the digital literacy of library professionals in Tamil Nadu, emphasizing the importance of continuous professional development in the face of rapidly evolving technologies. The study found that while most librarians were familiar with basic digital tools, there was a significant need for training in advanced digital library management systems and metadata standards.

Kumar and Sinha (2018) examined the digital literacy skills of library professionals in Bihar, identifying a significant need for training programs to enhance their capabilities in using and managing digital resources. Their study also highlighted the challenges faced by library professionals in rural areas, where infrastructure and resource constraints often hinder digital library implementation. The research pointed out the digital divide between urban and rural libraries, suggesting targeted interventions to address this disparity.

Bhoi and Bhoi (2017) conducted a comprehensive review of digital literacy among library professionals in India. Their analysis of various studies across different states revealed a general trend of increasing digital awareness but persistent gaps in practical skills. The authors emphasized the need for standardized digital literacy curricula in library science education and regular skill enhancement programs for practicing professionals.

Global Perspectives: Extending beyond the Indian context, Rafiq et al. (2021) conducted a global survey on the impact of COVID-19 on digital literacy skills of library professionals. The study, which included respondents from 53 countries, found that the pandemic had accelerated the adoption of digital technologies in libraries worldwide. However, it also exposed significant disparities in digital readiness among library professionals across different regions, highlighting the need for global initiatives in digital skills development.

Challenges and Opportunities

Several studies have identified common challenges in digital library implementation and awareness. Usman and Igbafe (2012) highlighted issues such as inadequate funding, poor infrastructure, and lack of technical expertise as major barriers to digital library development in developing countries. Their study emphasized the need for policy interventions and international collaborations to overcome these challenges.

On the other hand, Shem (2015) explored the opportunities presented by digital libraries, particularly in preserving cultural heritage and improving access to information in remote areas. The study showcased successful digital library projects in Africa, demonstrating how digital technologies can be leveraged to address unique local needs and preserve indigenous knowledge.

Gap in Literature: While these studies provide valuable insights into digital library awareness in various regions of India and globally, there is a notable gap in the literature regarding the specific context of Bidar District. This study aims to address this gap by focusing on the unique characteristics and challenges of library professionals in this region. By examining digital library awareness in Bidar, this research will contribute to a more comprehensive understanding of the digital library landscape in India, particularly in regions that have been underrepresented in previous studies.

The literature review reveals a consistent theme across different geographical contexts: while there is generally a positive attitude towards digital libraries among library professionals, there often exists a gap between awareness and practical skills. This study will build upon these findings to explore whether similar patterns exist in Bidar District and to identify any unique factors that may influence digital library awareness in this specific region.

Objectives of DL

- A digital library provides facilities and services to support analysis, teaching, learning, and studious communication across disciplines.
- To guarantee an efficient securing of information and create simply accessible to the organization

- It helps together organize and collate print data, and publicize it for the purpose of care and for future use.
- To make certain of efficient resource sharing of recent information and improvement of existing data it provides a world perspective and integrates material kinds might source in one place.
- To ascertain a selected distribution of recent deciliter and transfer of information to new workers
- To improve the shape of deciliter bearers with respect to the users
- To encourage students to scan reference books on the market.
- To encourage students to create use of digital media for reading
- It acts as an entryway to digital and electronic data.
- It offers absolute access to data.

Methodology: Together the excellent and relevant knowledge from the library skilled engineering schools, polytechnic institute faculty, Arts, Science, and Commerce have, academic schools (B. Ed), Pharmacy schools and Law faculty in Bidar, a structured form was designed and interview strategies were conjointly adopted because of the tool for an assortment of date. The form was formulated keeping visible, the target and numerous faces of the study, and also the questionnaires were in person distributed and picked up with constant personal pursuance, and also the knowledge obtained from the stuffed in questionnaires, later classified, analyzed and logically taken.

Data Collection

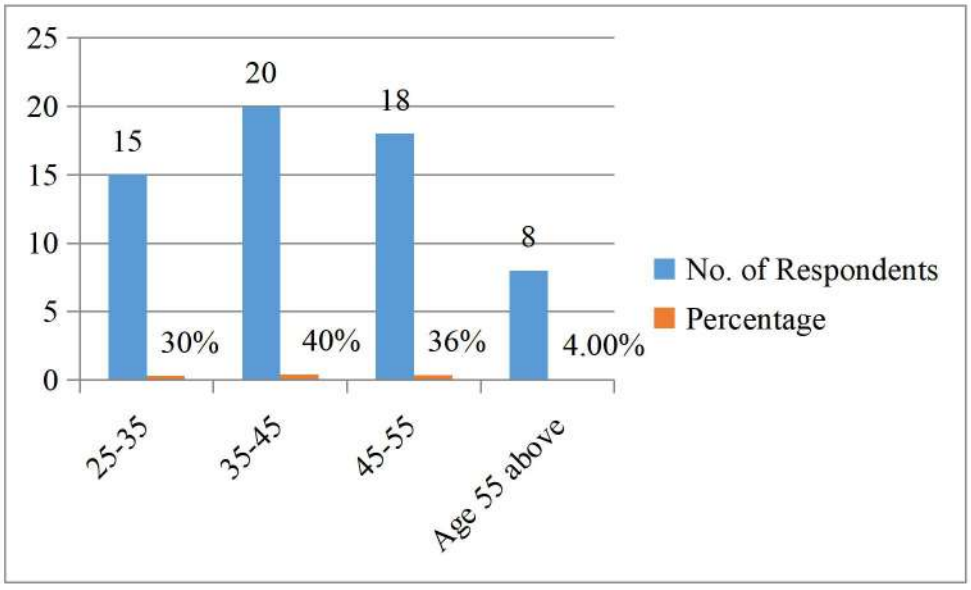
Primary Data: A questionnaire technique has been adopted together with the desired primary knowledge.

Secondary Data: Secondary knowledge has conjointly been collected through printed and unpublished resources.

Sample Design: Fifty samples were selected for the current study. The library professionals were requested to extra service the form.

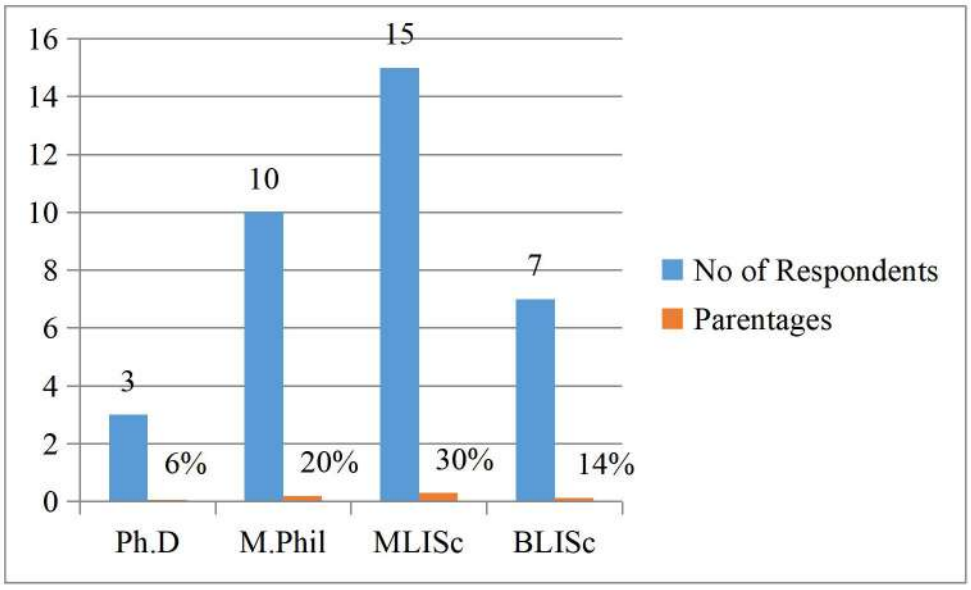
Limitations: The study covers the professional's World Health Organization area unit operating in numerous sorts of faculty libraries in Bidar district. Engineering faculty Library, polytechnic institute faculty Library, Arts, Science and Commerce faculty Library, academic faculty Library, Pharmacy faculty Library, Law faculty Library

Data Analysis and Interpretation



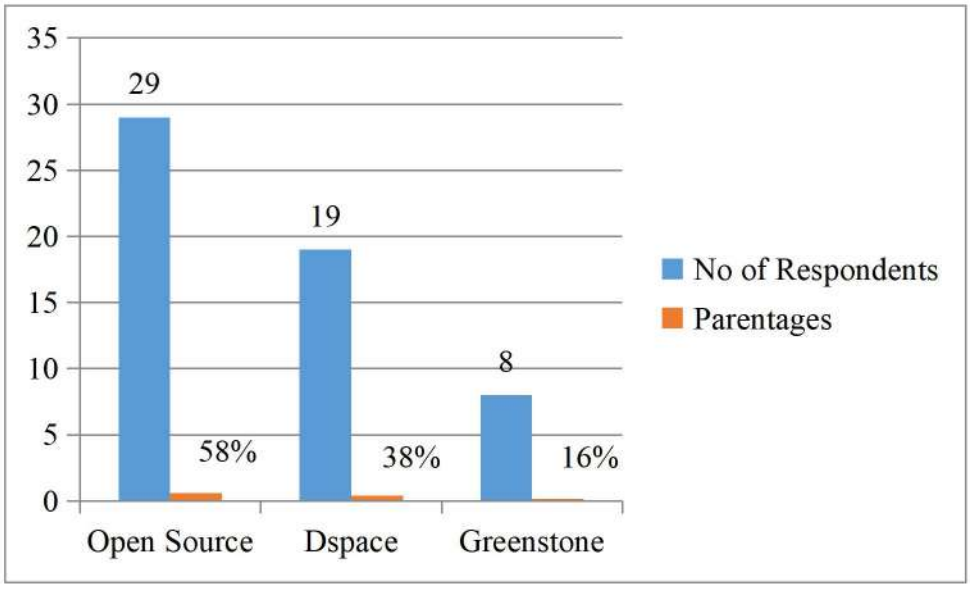
They found that 40% of the library skilled belong to the age bracket 35-45 and 36% of them area unit within the age bracket of 45-55.

Classification by Qualification



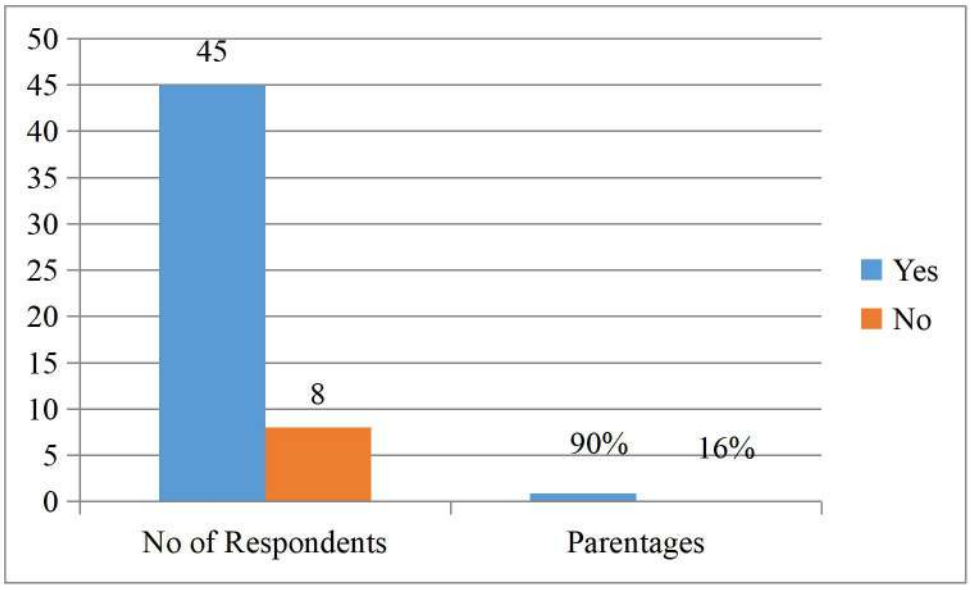
It is ascertained from the on top of that 30% of the respondents, are a unit possessing postgraduate degrees together with master degrees in Library and knowledge Science 20% respondents possess MLISc, M. Phil degree in Library and knowledge Science 14% respondents BLISc degree in Library and knowledge Science 6 % PhD degree in Library and knowledge Science.

Awareness on Digital Library Software's



The maximum range of responders 58% is information on open supply and 38% area unit information on DSpace and 16% of the respondents' area unit information on greenstone.

Opinion on Application of Digital Library



The on top of the table show that 90% of respondents needing to apply the idea, “Digital Library” and 16% of the respondents aren't willing.

Summary of Findings:

- 40% of the respondents are the age group of 35-45 years and 36% of them are in 45-55.
- It is identified that 40% of the professional have obtained experience in between 1-5 years.
- Most of the respondents belong to the category of assistant librarian.
- It is noteworthy to mention them respondents have PhD and 20% of them qualified for MLISc with M.Phil.
- 26% of the respondents belong of Arts & Science colleges
- It is time to high light that most of the professionals are well aware of digital creations like e-books, e-journals.
- It is noteworthy to staff that the entire population of the respondents are having CD-Rom, Floppy and Audio, Video collections in there.

Conclusion: This analysis reveals a workforce that is predominantly middle-aged, well-qualified, and generally receptive to digital library concepts. There's a notable variance in awareness of different digital library software, which could indicate areas for potential training or education initiatives. The overwhelmingly positive attitude towards applying digital library concepts suggests a workforce ready to embrace technological changes in library services. Digital Library is a great assessment tool, each for lecturers and students. They permit the us together with the most effective samples of our progress, our work, and our work and our creative thinking.

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E-LEARNING AWARENESS AND INFORMATION NEEDS OF STUDENT-TEACHER

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Abstract

This era is known as information explosion era, due to development in technologies and importance of information technology affects the education mostly. In COVID-19 pandemic online education become more important and students and teachers face so many problems in online teaching. This paper explores the information needs and the utilization of online education among B.Ed. student-teachers during the pandemic. Researcher do the literature review and then use the descriptive method for research for the study of e learning awareness among the student teachers. Data was collected through questionnaires distributed to second-year students of Azad College of Education in Satara. In this study findings shows that student seek information mainly for study and teaching purposes with the help of social media. However, when seeking information students faced challenges are lack of proper training, time management issues and suspicious about data security. The study concludes by highlighting the significance of understanding student-teachers' information needs and the role of online education in modern teaching practices.

Key Words: E-learning, Online Teaching Learning, Information Needs

Introduction

The present age is considered to be the age of information. New information is being created in every field in every corner of the world. Information that seemed new till the day before yesterday seems old today and new faculties are emerging today with new additions to that information. With the advancement of science, new technologies are being developed. It is seen that the development of information technology is very fast all over the world. This technology has also brought about a drastic change in the information sector. Information that was earlier available only in print form is now available in electronic form as well. Information technology is very necessary today to bring progress in human life. Its usage seems to be very high nowadays. COVID pandemic has affected all levels such as personal, family, professional and social. Even education has not been spared from this COVID pandemic, on the contrary, it is seen that it has been affected more. In all these situations, Online education with the help of information technology has been found useful in COVID pandemic.

Need of Study

A student in a B. Ed college is a student-teacher. Like other students, he has his own studies, but at the same time he has to go to school and teach. Student-teacher plays two roles at the same time, one of a student and the other of a teacher. Teachers should be able to achieve the teaching learning process by knowing the art and science of communication. A teacher has to use various skills to maintain the attention of students in his classroom teaching.

Review of Literature

Some research papers were observed during the said research. (Singh et al., 2023) The research paper entitled "Adopting e-learning facilities during COVID-19: Exploring perspectives of teachers working in Indian Public-funded Elementary Schools" researcher examines the challenges and opportunities faced by teachers in adopting e-learning during the COVID-19 pandemic. The study found that teachers and students of government-funded elementary schools face various issues in using digital platforms, including poor connectivity, physical health issues, emotional disturbance, lack of support from parents, and worries related to adequate learning and the spread of COVID-19.

(Sofi-Karim et al., 2023) This article "Online education via media platforms and applications

as an innovative teaching method" explores the challenges and potentials of implementing online learning, particularly in the context of the recent COVID-19 lockdown. It highlights the main challenges faced by teachers in implementing online learning. This study emphasizes the need for substantial subsidies, training, and infrastructure development to support the successful implementation of online learning in educational settings.

(Maatuk et al., 2022) The article "The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors" discussed about the issues, challenges and advantages of using e learning.

After studying some such research articles, the researcher B. Ed. Since he is working as a librarian in a college, he is also dealing with online education in the Corona era, difficulties faced by students, etc. Considering the issues, the said research topic has been chosen in order to combine the informational needs of the students who are going to become teachers as well as its use for online education due to the revolution in information technology.

Research Objectives:

1. Understanding the Information Needs of College of Education Students
2. To know the usefulness of online education in Corona period
3. To know the fulfilment of informational needs of students for online education
4. To know the difficulties faced by teachers and students in online education

Hypothesis:

1. All students know about online education
2. Students face some difficulties in online education

Scope And Limitation of Research

The purpose of this research is to understand the informational needs of B. Ed college students; to know the information they have about online education and to understand the difficulties they face in it. The research was limited to second year students of Azad College of Education Satara.

Research Methods and Tools of Data Collection

Descriptive research method was used for this research. Questionnaire was used as a tool for data collection. Google form was used while preparing the questionnaire and the information was collected by giving the link of that form to the students through WhatsApp.

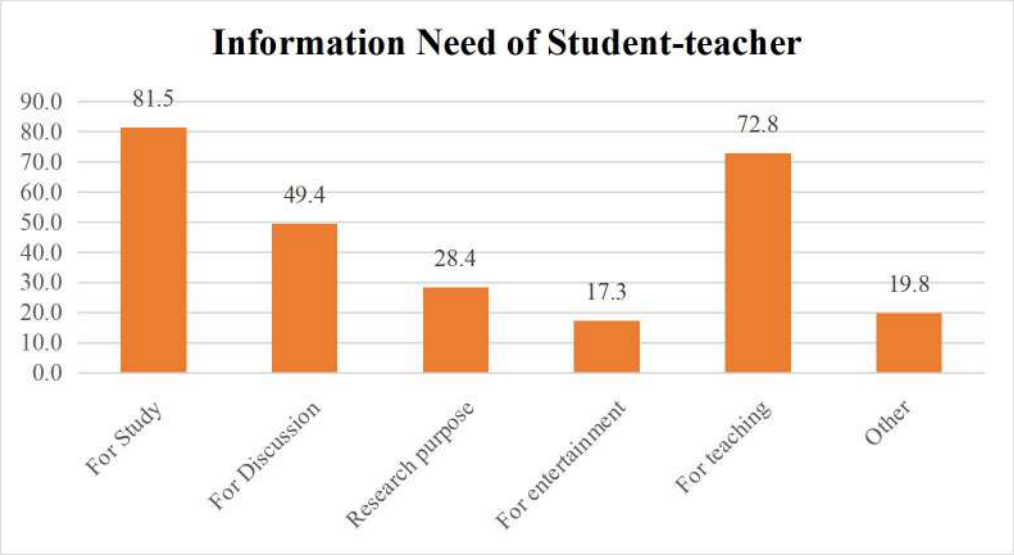
Analysis And Presentation of Collected Information

Questionnaire instrument was used for data collection. Second year students of Azad College of Education, Satara were selected for this research. Questionnaire was given to 90 students of this class. 81 students responded to the questionnaire. Each question in the questionnaire is followed by a detailed analysis.

The researcher has used charts and graphs in the analytical presentation of the said information.

Information Need of Student-teacher:

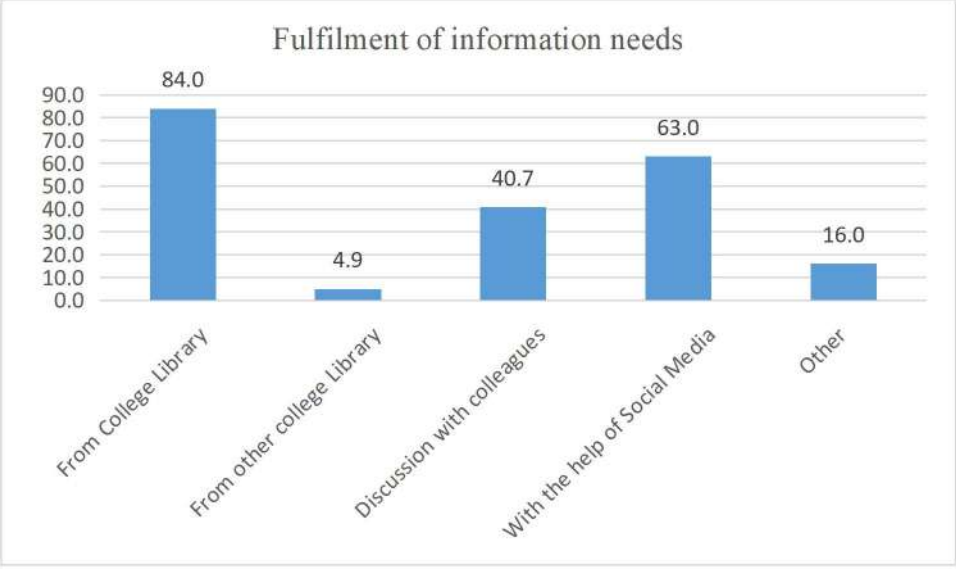
Information Need	Number of Student-teacher	Percentage (%)
For Study	66	81.5
For Discussion	40	49.4
Research purpose	23	28.4
For entertainment	14	17.3
For teaching	59	72.8
Other	16	19.8



From the above table and graph, it can be seen that 66 (81.5%) student-teachers need information for study, 40 (49.4%) student-teachers for discussion, 23 (28.4%) student-teachers for research, 14 (17.3%) student-teachers need information for entertainment, 59 (72.8%) student-teachers need information for teaching and 16(19.8%) students need information for other reasons.

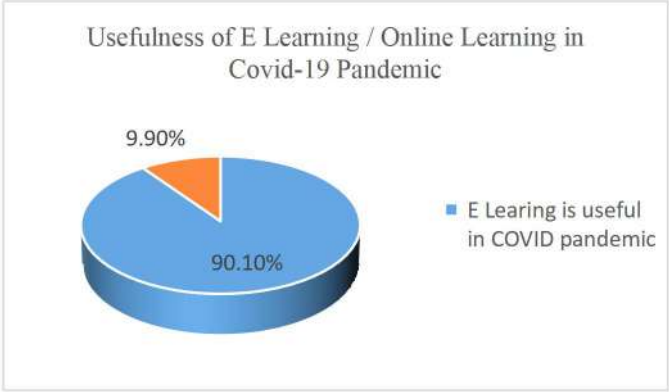
Fulfilment of information needs:

Fulfilment of information needs	Number of Student-teacher	Percentage (%)
From College Library	68	84
From other college Library	4	4.9
Discussion with colleagues	33	40.7
With the help of social media	51	63
Other	13	16



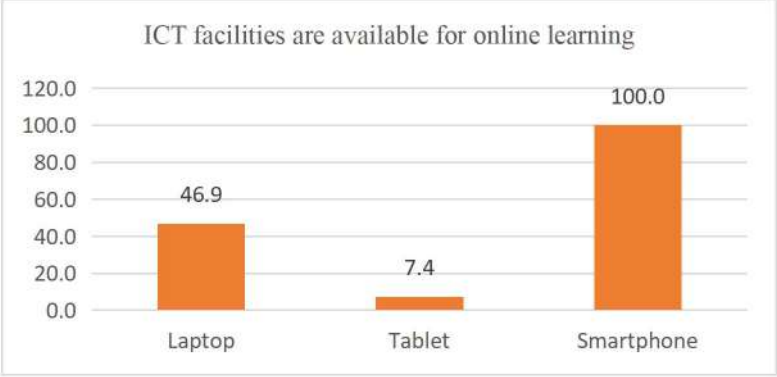
From the above graph it can be seen that 84% of the student-teachers fulfill their information needs through college library, 4.9% student-teachers through other college library, 40.7% through discussions with colleagues or friends, 63% through social media, and 16% through other means.

Usefulness of E Learning / Online Learning in Covid-19 Pandemic



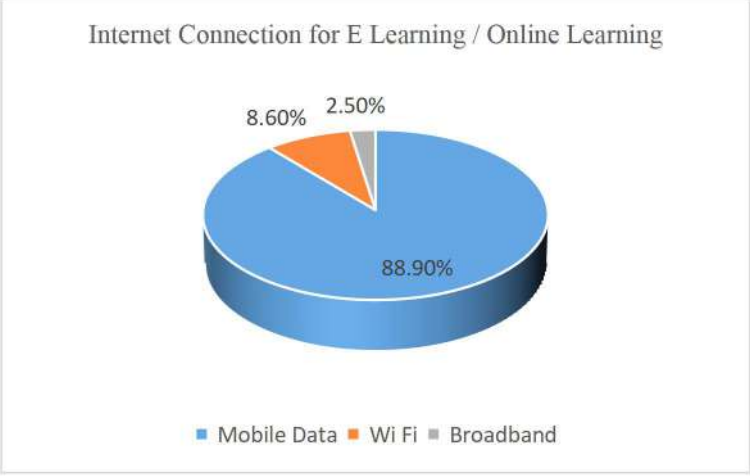
From the above graph, it can be seen that 90.10% student-teachers found online learning useful in Covid-19 Pandemic

ICT facilities are available for online learning



From the above graph, it can be seen that, Laptop is available for 46.9% student-teachers, tablet is available for 7.4% student-teachers and all students have smartphone for online learning.

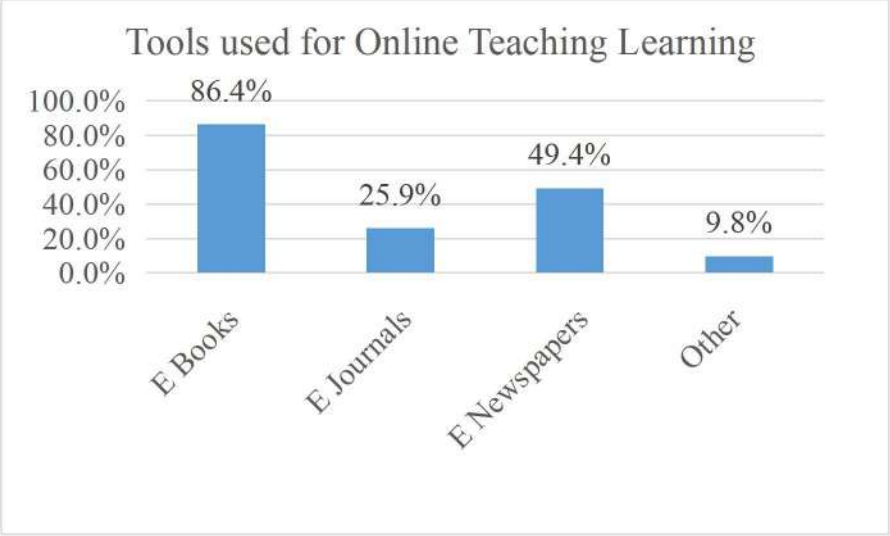
Internet Connection for E Learning / Online Learning



From the above graph, it can be seen that for online learning, 88.90% student-teachers used mobile data, 8.60% student-teachers used WiFi and 2.50% student-teachers used broadband internet connection.

Tools used for Online Teaching Learning

Tools used for Online Teaching Learning	Number of Student-teacher	Percentage (%)
E Books	70	86.4
E Journals	21	25.9
E Newspapers	40	49.4
Other	8	9.8



From the above table and graph, it can be seen that, 70(86.4%) student-teachers used E books, 21(25.9%) student-teachers used E journals, 40(49.4%) student-teachers used E newspapers, 8(9.8%) student-teachers used other tools for online teaching learning.

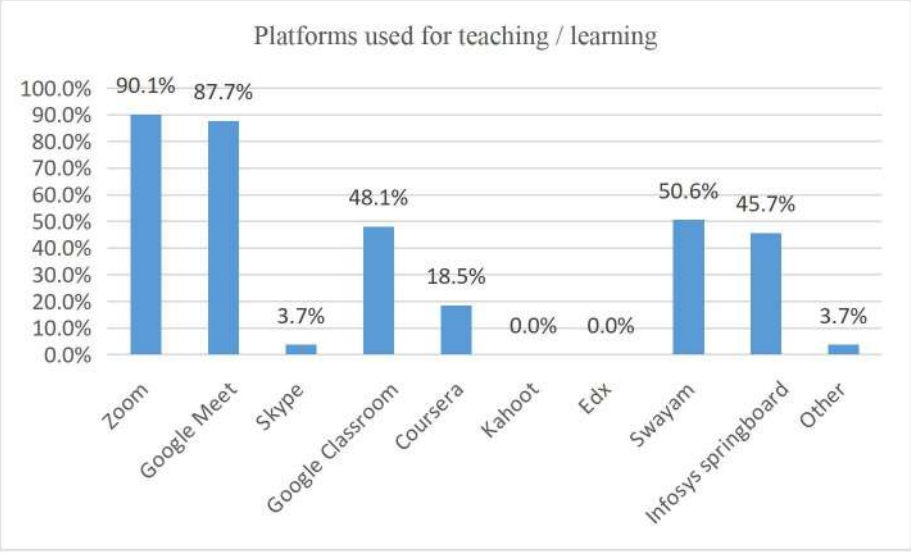
Awareness about E learning teaching platforms

All student-teachers are aware about E learning teaching platforms

Platforms used for teaching / learning

Platforms used for teaching / learning	**Number of Student-teacher**	**Percentage (%)**
Zoom	73	90.1
Google Meet	71	71
Skype	3	3.7
Google Classroom	39	48.1
Coursera	15	18.5
Kahoot	0	0

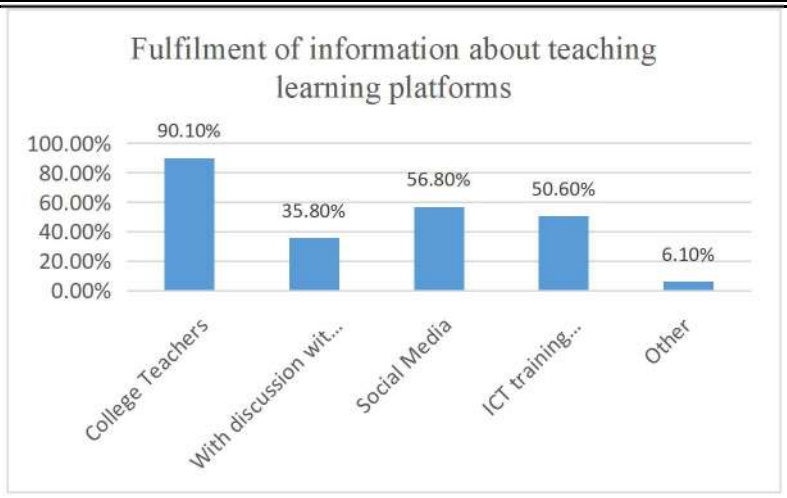
Edx	0	0
Swayam	41	50.6
Infosys springboard	37	45.7
Other	3	3.7



From the above table and graph, it can be seen that, 73(90.1%) student-teachers used zoom, 71(87.7%) student-teachers used Google Meet, 3(3.7%) student-teachers used Skype, 39(48.1%) student-teachers used Google classroom, 15(18.5%) student-teachers used Coursera,

Fulfilment of information about teaching learning platforms

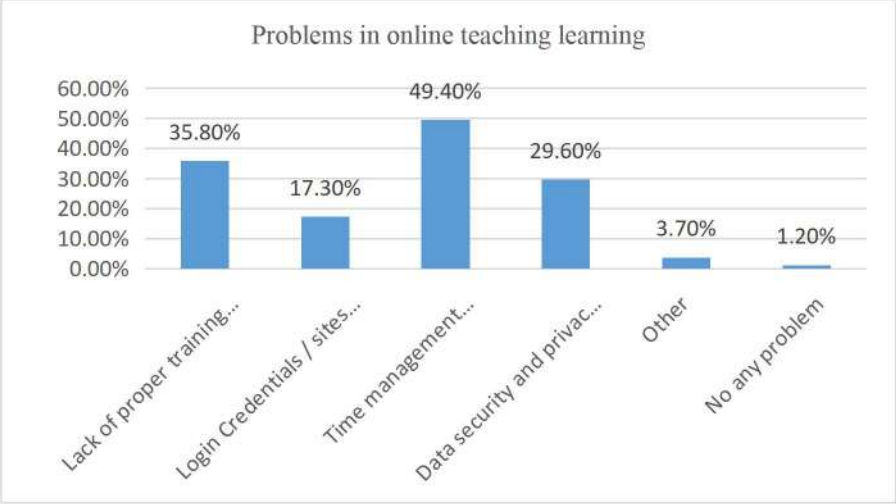
Fulfilment of information about teaching learning platforms	Number of Student-teacher	Percentage (%)
College Teachers	73	90.1
With discussion with colleagues	29	35.8
Social media	46	56.8
ICT training programmes	41	50.6
Other	5	6.1



From the above table and graph, it can be seen that, with the help of college teachers 73(90.1%) student-teachers got information about teaching learning platforms, with discussion with colleagues 29(35.8%), 46(56.8%) through social media, in ICT training programmes 41(50.6%) student-teachers got the information about teaching learning platforms.

Problems faced while online teaching learning

Problems faced while online teaching learning	**Number of Student-teacher**	**Percentage (%)**
Lack of proper training and technical knowledge	29	35.8
Login Credentials / sites that require to register with them	14	17.3
Time management problem	40	49.4
Data security and privacy / Cybercrime / Cyber-bullying	24	29.6
Other	3	3.7
No any problem	1	1.2



From the above table and graph, it can be seen that, Lack of proper training and technical knowledge

has created difficulty for 29(35.8%) student-teachers in online education. For online teaching learning login credentials are required and this problem faced by 14(17.3%) student-teachers. Due to hectic schedule time management is problem for 40(49.4%) student-teachers in online teaching learning. In online teaching learning 24(29.6%) student-teachers are afraid about Data security and privacy / Cybercrime / Cyber-bullying. 1(1.2%) student-teacher have no problem in online teaching learning.

Findings:

- Student-teachers need information for various reasons out of which students need more information for teaching.
- It seems that college library, social media and discussions with colleagues are used more for the fulfilment of information needs.
- Student-teachers find online education useful in covid-19 pandemic.
- Smartphone and mobile data are used by all student-teachers have for online learning.
- In online teaching learning E books are most useful for student-teachers.
- All student-teachers are aware about E learning teaching platforms, Zoom and Google Meet are most popular platforms used by student-teachers.
- College teachers gives information about E learning teaching platforms.
- In E teaching learning, time management is the problem faced by student-teachers.

Suggestions:

- It is necessary to provide training and proper technical knowledge to the student-teachers for online education which includes knowledge of various teaching learning platforms.
- It is necessary to teach time planning to the students of the College of Education for online teaching.

Conclusion:

E Learning awareness and information needs of Student teacher (B.Ed.), in this research the information needs of the student-teachers in the College of Education were studied and the factors used to fulfil those needs were also helped to understand. The research underscores the high utility of online education during the pandemic, with a vast majority of student-teachers acknowledging its usefulness. However, challenges such as the lack of proper training and technical knowledge, time management issues, and concerns regarding data security and privacy persist. The research was useful in study for e learning and its use for blended teaching.

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INFORMATION SOURCES IN THE FIELD OF SCIENCE

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Abstract

Scientific research and higher education depend heavily on the availability and availability of accurate and up-to-date information. The rapidly expanding scientific literature, facilitated by digital resources, has changed the way researchers gather, analyze, and disseminate knowledge. This paper examines the e-resources available in the field of pure science, including large databases, e-journals, and e-books, which are central to scientific progress. The role of higher education in fostering technological innovation and societal development is examined, highlighting the important roles of science libraries in supporting research and education.

Keywords: Digital Resources, Pure Sciences, Higher Education, Databases, Science Libraries

1. Introduction

Science is developing because of ongoing research, leading to huge development in the scientific literature at an exponential rate. In the pure sciences, the key to the development of research and innovation is the collection, dissemination, and use of knowledge. Science disciplines e.g.. Biology, Chemistry, Physics, and Mathematics depend on precise and current information, available through online databases, e-journals, and e-books, which provide specialized resources and tools to support scientific inquiries. Digital libraries and electronic databases have transformed the way researchers access and acquire information and impact their research.

2. Higher Education in Science

Higher education plays an indispensable role in the scientific domain and cannot be overstated when considering its profound impact on technological advancement, economic prosperity, and societal progress. The academic institutions, including universities and research centers, serve as hubs for interdisciplinary collaboration, generating revolutionary scientific breakthroughs and pioneering research. This sector contributes to economic growth by supplying highly skilled professionals essential for competitive industries. The partnerships between academia and industry, through the commercialization of research findings and the establishment of innovative start-ups further augment the economic value.

Furthermore, higher education in sciences plays an important role in the promotion of scientific literacy and empowers individuals to make well-informed and judicious decisions in critical domains. Educational institutions play a crucial role in nurturing talented and socially engaged individuals by engaging with the community through their initiatives and outreach programs.

3. Role of Science Libraries

Science libraries play an important role in education, research, and innovation. The libraries develop good collections and provide access to scientific publications, including journals, books, and online databases, which are important for conducting research. They provide a variety of services, including information literacy training, research support, and data management support. Librarians play an important role in guiding researchers to the most relevant and reliable information. They guide the users in searching complex databases, various search techniques, and how to manage citations effectively. The shift from print to digital resources has made information accessible globally. The science libraries take subscriptions to scientific databases and e-journals etc, which are generally expensive but necessary for carrying out current research by their users. Libraries sometimes subscribe directly from publishers and database providers or through consortiums for their institutions to get the best possible access, ensuring that researchers have the resources needed by them. Nowadays, libraries are providing their researchers access to a wide range of resources remotely, facilitating further study and research.

In addition, science libraries enhance interdisciplinary collaboration by providing spaces and resources conducive to teamwork and knowledge sharing. They support the dissemination of scientific knowledge through open systems and digital repositories and ensure greater access to research discoveries. By preserving historical scientific records

and encouraging current research, science libraries maintain the flow of knowledge that fuels scientific progress. Specifically, science libraries are needed to advance scientific research, education, and innovation.

Access to information is an essential issue of scientific studies. The ability to study preceding research, reflect on experiments, and construct upon present know-how is vital for medical development.

4. INFORMATION RESOURCES

There are several Online sources, and databases available in the discipline of pure sciences. The e-assets to be had in the universities of pick libraries in Delhi are mentioned below:

❖ Scopus

Scopus established in 2004, has evolved into an invaluable resource for researchers across a wide spectrum of disciplines, including the sciences, engineering, medicine, social sciences, and arts and humanities. It provides comprehensive coverage of academic journals, conference proceedings, and patents and has a collection of over 36,000 titles from more than 11,000 publishers. It has powerful citation search tools that empower researchers to monitor the impact of their work. The database features h-index metrics, author profiles, seamless communication collaborative network mapping, and provide cooperation among researchers. Institutions and organizations are enabled by providing author profiling by which they assess their research performance and strategic positioning within the global research landscape.

❖ Web of Science

Web of Science (WoS) is developed by way of Clarivate Analytics, which is every other most reliable quotation database supplying a comprehensive range of research materials throughout numerous disciplines. It covers over 21,000 peer-reviewed journals, in conjunction with convention lawsuits, books, and patents. WoS's specific feature is its citation indexing, which allows researchers to hint at the lineage of ideas and innovations via noted references, enhancing the understanding of the development and effect of research through the years. The journal impact factor and H index are the specific analytics and metrics, crucial for the evaluation of the impact and achievements of authors and publications provided by the databases. Some of the Indexes eg Science Citation Index (SCI0, Social Sciences Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI) are offered by WOS, which cater to the various research needs across disciplines

❖ American Association for the Advancement of Science (AAAS) – Science Magazine

The American Association for the Advancement of Science (AAAS) is an esteemed organization with a profound history tracing back to its establishment in 1848. The fundamental objective of the AAAS is to advance the cause of science for the improvement of society. One of its most noteworthy contributions to the scientific community is the publication of the esteemed journal, Science. Science magazine, which debuted in 1880, stands as one of the world's leading general scientific journals. Renowned for its comprehensive coverage of various scientific disciplines, Science upholds a rigorous peer-review process and boasts a high impact factor. With its groundbreaking research articles, reviews, and news, Science serves as a crucial platform for the dissemination of significant scientific discoveries and emerging trends. Its interdisciplinary nature and widespread impact make it an invaluable resource for researchers, policymakers, and the general public. In addition to showcasing essential original scientific research and review articles, Science also provides science-related news, discussions on science policy, and other topics relevant to scientists and individuals interested in the broader implications of science and technology.

❖ American Institute of Physics (AIP)

The American Institute of Physics (AIP), is an organization committed for the advancement and dissemination of knowledge within the physical sciences. Established in 1931, AIP's mission is to sell the know-how and application of physics through publishing, education, and public outreach. AIP publishes more than a few influential journals, including The Journal of Chemical Physics, Applied Physics Letters, and Physics Today. These journals cover a wide spectrum of subjects within the physical sciences, offering researchers with get entry to amazing, peer-reviewed content. Additionally, AIP hosts conferences and publishes conference complaints, fostering collaboration and the alternative of ideas among scientists. AIP helps technological know-how education and outreach through numerous packages aimed toward students, educators, and the general public, reinforcing its role as a key useful resource in the physical sciences.

❖ **The American Physical Society (APS)**

The American Physical Society (APS) is widely regarded as a leading authority in the field of physics, demonstrating unwavering dedication to the propagation and advancement of knowledge within the discipline. Since its establishment in 1899, APS has played an instrumental role in the publication of esteemed physics journals, including Physical Review Letters, Reviews of Modern Physics, and the Physical Review series. These influential publications serve as crucial repositories of contemporary research and comprehensive reviews for physicists. Additionally, APS functions as a pivotal platform for organizing significant scientific conferences and symposia, thereby fostering collaboration and facilitating the exchange of insights among researchers. Furthermore, APS is actively involved in advocacy and outreach initiatives aimed at promoting physics education and fostering a deeper public understanding of physics, thereby assuming a crucial role in the advancement and dissemination of the physical sciences. recognized as a leading authority in the field of physics, with a steadfast dedication to the propagation and advancement of knowledge within the discipline. Since its inception in 1899, APS has been instrumental in the publication of esteemed physics journals, including Physical Review Letters, Reviews of Modern Physics, and the Physical Review series. These influential publications serve as crucial repositories of contemporary research and comprehensive reviews for physicists. Furthermore, APS serves as a pivotal platform for the organization of significant scientific conferences and symposia, thereby facilitating collaboration and the exchange of insights among researchers. Additionally, APS is actively involved in advocacy and outreach initiatives aimed at promoting physics education and fostering a deeper public understanding of physics, thus assuming a crucial role in the advancement and dissemination of the physical sciences.

❖ **American Society for Microbiology (ASM)**

The American Society for Microbiology (ASM) plays an important role in the development of microbiology. it was founded in 1899 and the main aim is to promote and enhance microbiology through meetings, conferences, publications, certifications, and learning opportunities. ASM publishes various important journals, including the Journal of Bacteriology, Journal of Clinical Microbiology, and mBio. These journals cover everything in microbiology, from basic research to practical uses. Scientists often refer to and respect these journals, making them valuable to microbiologists. ASM also sets up meetings, offers ways to grow, helps the public understand microbiology, and strengthens its position as a key resource in microbial sciences.

❖ **Annual Reviews**

The Annual Review, founded in 1932, releases in-depth critical reviews written by top experts in various fields. Annual Reviews have focused on summing up large amounts of research, offering valuable insights and overviews. Annual Reviews cover many subjects, including biology, chemistry, physics, and social sciences. Each review article brings together a lot of research giving deep knowledge on specific topics. This helps researchers who want thorough overviews of their fields. The publisher's goal is to support the scientific community by presenting high-quality review articles that inform and guide research.

❖ **American Journal of Botany**

The American Journal of Botany is published by the Botanical Society of America. The journal has been published since 1914 and is a highly reputed journal. It covers plant biology. molecular and cellular biology to ecology and evolution. The journal is an important resource to botanists and scientists in the field of plants because of its high-quality, peer-reviewed research articles. The American Journal of Botany aims to boost the growth of botanical sciences by sharing extensive research results.

❖ **American Journal of Science**

The American Journal of Science, among the oldest medical journals in the US, has been published since 1818. It covers a wide range of topics in earth and environmental sciences, including geology, geophysics, and geochemistry. The magazine publishes original studies articles, reviews, and commentaries, offering treasured insights into geological and environmental strategies. The American Journal of Science's lengthy history and wide scope make it an important resource for researchers in these fields.

❖ **IEEE Xplore**

IEEE Xplore Digital Library is a most advantageous source for research in electric engineering, pc technological know-how, and electronics. IEEE Xplore consists of over 5 million from journals, convention proceedings,

technical requirements, and e-books. IEEE Xplore is indispensable for researchers because of its extremely good, peer-reviewed content and its position in disseminating cutting-edge studies and technological advancements. The platform's complete insurance and full-size assets guide the worldwide engineering and era network.

❖ **J-STOR**

J-STOR is a digital library providing access to heaps of academic journals, books, and primary resources. Covering a huge range of disciplines, which includes humanities, social sciences, and natural sciences, J-STOR is particularly precious for researchers in humanities and social sciences because of its significant archival content. JSTOR is an important resource as it is a platform that has features i.e. 12 million journal articles, books, images, and primary sources in more than 75 disciplines, The challenge is to preserve and provide access to scholarly content, assisting studies and education across disciplines.

❖ **Project Euclid**

Project Euclid was initially created by Cornell University Library and is now managed by Duke University Press. It was designed to assist small scholarly publishers of mathematics and statistics journals in transitioning from print to electronic publishing in a cost-effective manner. The platform provides access to a growing collection of high-quality, peer-reviewed journals, monographs, and conference proceedings in the fields of theoretical and applied mathematics and statistics. Access to the content on Project Euclid is available through open access and subscriptions determined by the participating publishers. As a non-profit partnership involving academic libraries, independent and society scholarly publishers, and scholars, Project Euclid hosts more than 100 publications from over 35 partner publishers worldwide, including several prestigious titles in mathematics and statistics.

❖ **Royal Society of Chemistry (RSC)**

The Royal Society of Chemistry (RSC) was established in 1841 with 77 scientists in the United Kingdom. RSC is a reputed learned society and professional association to makes advancements in chemical sciences. People know the RSC for putting out more than 50 top-notch journals and books, which cover a wide range of sub-areas of chemical sciences and related subjects. RSC's journals go through a very tough review process before the research is published which adds value to the journal. New and important research/scientific findings like original research and expert reviews are included. Besides journals, the RSC also provides detailed, up-to-date books about different parts of chemical sciences and related fields. These books help people in schools, research, and industry a lot. The RSC's editors and writers are top scientists and experts from all over the world. It makes the RSC a model of excellence in the chemical sciences community.

❖ **Sage Journals Online**

Sage Journals Online covers a wide spectrum of disciplines, which include social sciences, humanities, medicinal drugs, and engineering. With over 1,000 journals, Sage is understood for its huge series of peer-reviewed content material. The platform helps instructional and expert improvement across various fields by providing terrific study articles. Sage Journals Online's project is to disseminate scholarly expertise and support the worldwide academic network.

❖ **ScienceDirect**

ScienceDirect, operated through Elsevier, is one of the largest complete-textual content medical databases. It provides a substantial array of journals and books across numerous disciplines, especially in existing sciences, physical sciences, and engineering. ScienceDirect gives access to over 16 million articles from more than 2,500 journals and over 39,000 books. The platform's complete insurance and remarkable content make it an essential and useful resource for researchers seeking current medical statistics.

❖ **Springer Link**

Springer Link is a comprehensive online database that provides access to a wide range of academic journals, books, and conference proceedings in the field of pure science. The platform offers a user-friendly interface, allowing researchers to easily search, access, and download high-quality content from a diverse collection of publications. Springer Link 12 million documents, consisting of more than 3,000 journals and 290,000 books.

❖ **Taylor and Francis**

Taylor and Francis is a leading international academic publisher with a history dating back to 1798. The publisher offers a wide range of journals, books, and online resources spanning a wide range of disciplines, including the social sciences, humanities, science, engineering, and medicine. Taylor and Francis publish more than 2,500 journals and more than 7,000 new books annually, providing researchers with access to high-quality, peer-reviewed material. The publisher's digital platform, Taylor & Francis Online, provides access to its extensive collection of e-journals and e-books, supporting academic research and professional development worldwide

Taylor and Francis offer a wide range of e-books on a variety of scientific topics including environmental science, engineering, health science, and more. The Forum's extensive collection supports theoretical and applied research, providing practical guides, research papers, and advanced textbooks. Taylor and Francis' focus on interdisciplinary research helps scientists explore interdisciplinary relationships, encouraging innovation and collaborative research efforts

❖ **Wiley Online Library**

Wiley Online Library offers access to a considerable number of journals, books, and reference works throughout in more than one discipline. It is especially known for its great and exceptional content material, serving as a crucial useful resource for researchers. Wiley Online Library has over 1,600 journals and more than 22,000 books, in assisting educational studies and expert development. The platform strengthens expertise and master by providing reliable and trusted assets of scholarly records.

❖ **MathSciNet:**

MathSciNet, maintained by the American Mathematical Society (AMS), is a crucial online database designed for mathematicians and researchers. It offers reviews, abstracts, and bibliographic information for a wide range of mathematical literature. Covering from the early 1800s to the present day, it includes expert reviews by qualified mathematicians. The database also features robust search and retrieval capabilities, allowing users to efficiently locate specific information and track citations.

❖ **World Intellectual Property Search (WIPS)**

World Intellectual Property Search (WIPS) presents access to international patent databases, imparting valuable data for researchers involved in innovation and intellectual property. WIPS is critical for the ones looking to apprehend patent landscapes and trends, supporting research and development sports throughout numerous industries. The platform's comprehensive coverage of patent records enables researchers and groups to guard and commercialize their improvements.

❖ **Cambridge University Press**

Cambridge University Press is world's oldest and prestigious academic publishers, started in 1534. It aims to further the University's mission via disseminating expertise within the pursuit of education, getting to know, and research at the best worldwide tiers of excellence. The Press publishes over 380 educational journals and heaps of books across an extensive variety of subjects, inclusive of humanities, social sciences, technology, era, remedy, and law. Cambridge University Press is renowned for its rigorous peer-review system, ensuring the booklet of superb and impactful scholarly paintings. Its virtual platform, Cambridge Core, gives get right of entry to its sizeable series of e-journals and e-books, assisting the educational network with authoritative content. Cambridge University Press (CUP) offers a wealth of scientific literature on vast range of topics. The collection includes comprehensive research publications, textbooks, and reference works required by scientists. CUP's robust peer-review process ensures high-quality information that supports scientific research and education. The platform's advanced search and personal features enable scientists to quickly find relevant information, and help with literature searches, research design, and data analysis

❖ **De Gruyter Academic Publishing**

De Gruyter Academic Publishing, based in 1749, is a leading global writer primarily based in Berlin, Germany. De Gruyter publishes over 1300 journals and 900 new e-book titles every year, covering a huge range of disciplines, together with humanities, social sciences, natural sciences. De Gruyter's digital platform, De Gruyter Online, gives entry to its large series of e-journals, e-books, and databases, providing researchers with dependable and comprehensive scholarly resources.

De Gruyter offers a wide range of materials in the natural sciences, including physics, chemistry, biology, and geology. There e-books are known for their academic rigor and depth, making them valuable for in-depth research and reference. The platform supports scientists by providing access to groundbreaking research and historical scientific work, enabling them to gain a comprehensive understanding of scientific disciplines and developments

❖ **Emerald Publishing**

Emerald Publishing is a worldwide educational publisher specializing in business, control, and the social sciences. Established in 1967, Emerald publishes over 300 journals and more than 2,500 books and e-book series volumes annually. The publisher is dedicated to fostering studies with actual global impact, supporting researchers within the fields of business, control, education, engineering, health, and social sciences. Emerald Insight, the publisher's digital platform, offers entry to a considerable collection of e-journals, e-books, and case studies, helping researchers and practitioners live knowledgeable and linked to the contemporary trends of their fields.

Emerald Publishing focuses primarily on the business, business, and social sciences, but offers valuable resources in fields such as engineering, health sciences, and environmental studies.

❖ **IOP Science**

IOP Science, a part of the Institute of Physics, is a main writer of notable medical content material. Established in 1874, IOP Science is a specialty of the development and dissemination of understanding inside the physical sciences. The publisher offers an extensive range of journals, books, and conference proceedings, masking subjects together with physics, substances technology, environmental technology, and clinical physics. IOP Science's digital platform presents entries to over 90 journals, providing researchers with fantastic, peer-reviewed articles that pressure innovation and discovery in the bodily sciences.

IOP Science is an important field in the physical sciences, including physical sciences, materials sciences, and environmental sciences. There e-books include basic research, emerging technologies, and practical applications. The inclusion of IOP e-Books in journal and conference proceedings provides a comprehensive resource for scientists seeking to stay on top of the latest developments and advancements in their fields. The database is particularly useful for physicists and engineers involved in theoretical and applied research

❖ **Oxford University Press**

Oxford University Press (OUP), is one of the largest and maximum respected educational publishers globally. Founded in 1478, OUP publishes books and more than 450 journals across a various discipline, such as humanities, social sciences, science, etc. OUP is renowned for its rigorous instructional standards and commitment to excellence. The writer's digital platform, Oxford Academic, presents entry to its widespread collection of e-journals, e-books, and reference works, assisting researchers and students worldwide.

Its e-Books include official reference books, research monographs, and textbooks. OUP's rigorous academic standards ensure high quality, making it a trusted source of scientific research and education. The comprehensive conference proceedings also help scientists conduct comprehensive literature reviews and gain information about research methods and developments in their fields

❖ **Pearson:**

Pearson is a main international training organization focusing on instructional sources and services. Founded in 1844, Pearson specializes in improving getting-to-know outcomes through revolutionary educational answers. The organization publishes textbooks, academic materials, and digital sources throughout various subjects. Pearson's virtual structures, together with MyLab and Mastering, offer personalized studying experiences and get the right of entry to a vast collection of e-books and interactive content, supporting college students obtain their educational dreams.

: Pearson's eBooks are especially useful for educational purposes in science. Offering a wide range of textbooks and teaching materials for higher education, they support science education from basic to advanced Pearson's digital platforms, such as MyLab and Mastering, provide valuable interactive learning experiences for teaching and understanding scientific concepts.

❖ **Sage Publications**

Sage Publications is an impartial academic publisher established in 1965. Sage is well known for its focus on the social sciences, humanities, and Health sciences, publishing over 1,000 journals and more than 800 books annually. The writer is devoted to supporting instructional and professional communities with the aid of presenting

remarkable, peer-reviewed content. Sage Journals and Sage Knowledge, the publisher's virtual platforms, provide admission to a comprehensive series of e-journals, e-books, and reference substances, enabling researchers and practitioners to live knowledgeable and related to the modern-day traits in their fields.

Sage Publications offers a wide range of products in the life and health sciences. Sage e-books offer insights into research methodologies, data analysis, and interdisciplinary approaches critical to scientific research. Sage's focus on the social implications of science, health care, and ethical considerations enriches the context for scientific research and practice

Conclusion:

These academic eBook databases offer valuable resources to scientists by providing high-quality, peer-reviewed content that supports research, education, and professional development across a wide range of scientific disciplines. Access to comprehensive data, comprehensive searches, and integrated scientific literature enables researchers to access the latest advances, conduct comprehensive literature reviews, and apply new methods to their work. By facilitating powerful and comprehensive scientific knowledge, these databases play an important role in scientific research and education worldwide. The aforementioned publishers and databases are important resources for researchers, teachers, and students in a variety of disciplines. Each platform offers unique strengths, such as a strong peer review process, an extensive collection of e-journals and e-books, and a commitment to enhancing knowledge and education. By providing high-quality content, these publishers and repositories play an important role in supporting academic research, innovation, and professional development within the global scholarly community.

In conclusion, the integration of digital resources into pure science and higher education has had a profound impact on scientific research and innovation. The availability of comprehensive databases, e-journals, and e-books has democratized access to important scientific information, enabling researchers around the world to collaborate and leverage existing knowledge. Higher education plays an important role in driving technological progress and economic growth by providing the necessary skills and resources to students and researchers. Science libraries, with their extensive collections and specialized services, are important in facilitating access to information, supporting information management, and encouraging interdisciplinary collaboration. The ongoing development and maintenance of these digital resources is essential to enable researchers to continue to advance scientific knowledge and solve complex global challenges. As we move forward, it is important to support and improve these services, creating an environment in which scientific research and education can flourish, ultimately contributing to societal growth and innovation.

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RESEARCH DATA MANAGEMENT AND RESEARCH DATA REPOSITORIES: AN OVERVIEW

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Abstract

Academic and research institutions are rapidly generating research data in various digital formats. However, this data is at risk of being lost due to poor management. Effective management of research data is crucial for data sharing and future use. Researchers generate a wide range of data throughout their research activities, including quantitative data, raw data, questionnaires, images, and videos. This data needs to be archived for future use as it facilitates collaboration and innovation and ensures that valuable research data is preserved for future use. This paper studied the concept of research data management, research data repository, advantages of research data repository, software for implementing research data repository and various online platforms that provide research data management services like re3data, zenodo, Mendeley, OLAC, TROLLing, Dryad, Figshare, OSF, ICPSR.

Keywords: Research data management, Research data services, Research data repository, RDM

Introduction

Data has always been the foundation of all empirical knowledge, whether in social sciences, behavioural studies, physics, or computer science. For researchers, data is crucial for validating, refuting, or replicating findings. Therefore, research data must be managed professionally to support successful research projects. (Wilms et el, 2016). Researchers generate many types of research data in their research activity, such as images, audio files, instrument measurements, spreadsheets, databases, sketches, diaries, Notebooks, codebooks, interview transcripts, and samples.

Effective RDM is essential for maintaining the integrity, reproducibility and accessibility of research findings. Research data management services necessitate new skills and collaboration among library staff to work with researchers and end users in managing data effectively. (Hamad, et el, 2019).

Literature Review

Austin et. el (2015) explored the study "Research Data Repositories: Review of Current Features, Gap Analysis, and Recommendations for Minimum Requirements". The present study is Broadview of the current features of Canadian and international repositories and data sharing platforms. This survey showed various features and services across platforms, non-standardized use of terms and a need for certified data repositories.

Bhoi and Dutta (2019) investigated a study on "Participation of Higher Education Institutions (HEI) in Research Data Management: A study". Objectives of the study were to examine the status of research data management in higher education institutions and to investigate the features of data repositories. The conclusion of the study showed that significant institutes are involved in RDM. The author found that librarians are the main stakeholder in Research data management.

Wadhawa Joshi (2022) conducted a study, "Status of Indian Research Data Repositories: A Study based on Research Data Registry". The study's main objective was to examine the various research data repositories in India indexed in the registry of research data repositories. The study also found that "ICSSR-Data Service is a national social science data repository to make all social science statistical datasets generated by government and non-government initiatives, public in open access to the entire social science research society"

Research data management

"Research data management concerns the organization of data, from its entry to the research cycle through to the dissemination and archiving of valuable results. It aims to ensure reliable verification of results, and permits new and innovative research built on existing information"(White & Tedd, 2011)

"RDM consists of several different activities and processes associated with the data lifecycle, involving the design and creation of data, storage, security, preservation, retrieval, sharing, and reuse, all taking into account technical capabilities, ethical considerations, legal issues, and governance frameworks". (Cox et al. 2014).

Research data repository

A research data repository is the best place to store and share research data. "A repository is an online database that allows research data to be preserved across time and helps others find it." (Menchaka, 2019). It archives research data and assigns a digital object identifier (DOI) to the uploaded object. A research data repository can assign DOI number to any document, such as images, presentations, spreadsheets and data sets.

A research data repository serves as a long-term preservation archive and a platform for proposing research data sets (Manu et al., 2018, p.313). When researchers make their data public, they enable others to reproduce and validate their findings. It increases transparency in their work. The purpose of a research data repository is to offer a platform for storing, sharing, and accessing research data. It allows researchers to receive credit for their data. The primary benefits of sharing research data include the ability to validate the data and reuse it.

There are many research data repositories, such as institutional research data repositories, National data repositories, Multidisciplinary research data repositories and project-precise research data repositories (Manu et al., 2018, p.316).

Data archiving at various Indian Institute

Institute	Data Archiving	Responsible section	Data Policy
Bose Institute, Kolkata	Yes	Library	Being planned
INFLIBNET, Gandhinagar	Yes	other	Being planned
IIAP Bangloare	Yes	Other	No policy
IIM ,Ahmedabad	No	Library	No policy
IISER, Pune	No	No	No policy
IIT Gandhinagar	No	No	No policy
IPR Gandhinagar	No	Library	No policy
IUCAA Pune	No	No	No policy
NIO, Goa	Yes	Other	Yes
NRSC ,Hyderabad	No	No	No Policy
RRI, Banglore	Yes	Library	No policy
SAC Ahmedabad	Yes	Other	No policy
SINP, Kolkata	No	No	No policy
TIFR, Mumbai	No	No	No policy
Nirma University, Ahmedabad	No	No	No Policy

Source: http://dx.doi.org/10.1051/epjconf/201818603002

List of Research Data Repositories:

1) OLAC: Open Language Archive Community

(http://www.language-archives.org/)

This language archive provides a platform for the preservation and dissemination of endangered languages. It promotes knowledge exchange in language and research communities around the world.

2) TROLLing

(https://dataverse.no/dataverse/trolling)
It is an important resource for language research. It provides a platform for storing, sharing, and accessing research data in collaboration across different research fields.

3) DRYAD:

(https://datadryad.org/sta)
DRYAD is an international open access repository of research data. It was established in 2009 and associated with medical and scientific research (mainly focused on ecology, biology, and genetics). The repository accepts spreadsheets, tables and a wide range of data types.

4) Figshare:

(https://figshare.com/)
Figshare is "a repository where users can make all their research outputs available in a citable, shareable and discoverable manner." The researcher can upload datasets, figures, papers, posters and videos in figshare.

5) Zenedo:

(https://zenodo.org/)
It is a general-purpose repository established under the European OpenAIRE. It enables researchers to deposit datasets, reports, research software and any other research-related digital outputs. It creates a Digital Object Identifier (DOI) for every submission.

6) OSF (Open Science Framework):

(https://osf.io/4znzp/)
It is a free, open-source web application that supports researchers in archiving, sharing, and registering research data. It enables the research community to increase the efficiency and effectiveness of research.

7) Mendeley Data:

(https://data.mendeley.com/)
It is an accessible and cloud-based repository where researchers can store, share and access data. It can share data privately and publicly with colleagues and co-authors

8) ICPSR (Inter-University Consortium for Political and Social Research)

(https://www.icpsr.umich.edu/web/pages/)

It is a general repository specially focused on social science datasets. It is a paid service and requires a paid membership. It maintains a data archive for social and behavioural science research.

9) arXiv :

It is an open-access repository of electronic prints approved for posting after moderation in mathematics, physics, astronomy, electrical engineering, computer science, quantitative biology, and economics, which can be accessed online.

10) re3data (registry of Research Data Repository)

(https://www.re3data.org/)

It is a global registry that provides brief information about research data repositories. It is designed to help researchers, funding organizations, and libraries find appropriate repositories to store and share research data.

Advantages of Research data repositories

1. It ensures long-term preservation.
2. It enables the reuse of the data.

3. It reduces duplication of data.
4. It supports the reproducibility of research.
5. It provides secure storage and protection of data
6. It helps to meet funder and institutional requirement
7. It facilitates data sharing among researchers.

Conclusion: A research data repository is an online platform designed to preserve, manage and share research data. They ensure the long-term preservation and accessibility of research data. re3data is a valuable resource for researchers looking for repositories to manage their research data. Research data repositories support open science and enhance the impact of research. In today's modern era, RDM has become crucial to every institution. Sharing research data improves the ability to reproduce research findings, generate new knowledge and replicate findings.

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INSTITUTIONAL REPOSITORIES AND OPEN EDUCATIONAL RESOURCES: BENEFITS AND CHALLENGES

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Abstract

The landscape of scholarly communication is undergoing a significant transformation. Open access (OA) initiatives are gaining momentum, driven by a desire to democratize knowledge and enhance research impact. Institutional repositories (IRs) have emerged as crucial platforms within this movement, providing a centralized location for universities and research institutions to deposit and disseminate their intellectual output. This article explores the symbiotic relationship between IRs and open educational resources (OERs). It examines how IRs can serve as valuable repositories for OERs, promoting wider access to educational materials and fostering collaboration among educators. Additionally, the article discusses the potential benefits for both faculty and institutions in engaging with OERs through IRs.

Keywords: Institutional repositories, Open educational resources, Open access, Scholarly communication, educational materials

Introduction

The traditional model of scholarly publishing, characterized by high subscription fees and limited access, has been increasingly challenged in recent years. Open access (OA) publishing advocates for the free and unrestricted online access to scholarly research. This shift towards OA aims to democratize knowledge, accelerate scientific progress, and enhance the societal impact of research. Institutional repositories (IRs) play a vital role in this endeavor by providing a platform for researchers to deposit their scholarly works, including journal articles, conference proceedings, and datasets.

Open educational resources (OERs) represent another significant advancement in knowledge accessibility. OERs are freely available and openly licensed educational materials that can be used and adapted without restriction. This includes textbooks, course modules, simulations, and other learning objects. The adoption of OERs offers numerous advantages, including reducing the financial burden on students, promoting pedagogical innovation, and facilitating collaboration among educators.

Integrating OERs within IRs: Key Considerations:

While IRs offer a promising avenue for OER dissemination, successful integration requires careful consideration of several key factors:

- **Copyright and Licensing:** It is crucial to ensure that OERs deposited in the IR are openly licensed. This allows for adaptation, reuse, and distribution by others. Popular open licenses for OERs include Creative Commons licenses (Atkins et al., 2007). Institutions can provide guidance and resources to faculty on selecting appropriate open licenses for their OERs.
- **Metadata creation:** Descriptive metadata is essential for enabling effective search and discovery of OERs within the IR. Metadata should include information such as title, author, subject keywords, learning objectives, and target audience (Dublin Core Metadata Initiative, 2023). Libraries can offer workshops and training sessions to faculty on best practices for creating effective metadata for OERs.
- **User engagement strategies:** Promoting OER awareness among faculty and students is crucial. Libraries and IT departments can collaborate to develop targeted outreach programs and workshops to educate users about the benefits of OERs and how to access and utilize them within the IR (Chiu et al., 2018). Additionally, showcasing successful faculty OER projects and highlighting positive student experiences with OERs can further encourage adoption.

Institutional Repositories: A Hub for Scholarly Communication:

Institutional repositories serve as digital archives for the intellectual output of a university or research institution. They offer a centralized location for faculty, researchers, and students to deposit their scholarly works, ensuring long-term preservation and accessibility. IRs typically provide open access to a variety of materials, including:

- Peer-reviewed journal articles
- Conference proceedings
- Book chapters
- Technical reports
- Working papers
- Datasets

These resources are openly accessible, IRs contribute to the growth of the OA movement. They allow researchers to reach a wider audience, potentially leading to increased citations and research impact. Additionally, IRs can enhance the university's reputation for scholarship and foster collaboration with researchers from other institutions.

The Rise of OERs and the Role of IRs

Open educational resources (OERs) are transforming the educational landscape. By providing free and openly licensed educational materials, OERs have the potential to revolutionize access to quality education. This eliminates the financial barrier associated with traditional textbooks and course materials, promoting educational equity and opportunity.

There are several advantages to using OERs:

- **Cost-effective:** OERs significantly reduce or eliminate the cost of educational materials for students.
- **Flexibility and Adaptability:** Educators can easily adapt and modify OERs to fit their specific teaching styles and course needs.
- **Encourages Collaboration:** OERs foster collaboration among educators, allowing them to share and build upon existing resources.
- **Accessibility:** OERs are often available in multiple formats, catering to diverse learning styles and needs.

Institutional repositories can play a crucial role in supporting the use and dissemination of OERs. Here's how:

- **Preservation and Archiving:** IRs provide a secure and reliable platform for long-term preservation of OERs, ensuring their continued availability for future generations of educators and learners.
- **Discovery and Access:** IRs can be indexed by search engines, allowing educators and students to easily discover relevant OERs.
- **Version Control:** IRs can track different versions of OERs, enabling users to access the most up-to-date materials.
- **Metrics and Usage Statistics:** IRs can provide valuable data on the use and impact of OERs, helping educators assess their effectiveness and inform future development.

Benefits of Engaging with OERs through IRs

There are numerous benefits for both faculty and institutions who engage with OERs through IRs:

Faculty Benefits

- **Reduced Costs:** Faculty can utilize and adapt existing OERs, saving time and resources on developing course materials from scratch.
- **Improved Pedagogy:** OERs can encourage active learning and student engagement through interactive elements and diverse learning formats.

- **Increased Visibility:** Depositing OERs in IRs increases their discoverability and potentially leads to wider recognition of faculty expertise.
- **Collaboration:** Faculty can collaborate with colleagues from other institutions by sharing and adapting OERs through IRs.

Additional Benefits of IRs

- **Data Management:** IRs can serve as a centralized hub for managing research data, ensuring its accessibility, discoverability, and preservation.
- **Impact Measurement:** By tracking downloads, citations, and usage statistics, IRs provide valuable data for assessing the impact of research.
- **Education and Teaching:** IRs can be used to share teaching materials, such as syllabi, lecture notes, and assignments, fostering open educational practices.
- **Preservation of Cultural Heritage:** IRs can preserve and share digital collections of cultural heritage materials, making them accessible to a wider audience.
- **Open Innovation:** By providing access to research outputs, IRs can stimulate innovation and collaboration with industry and the public.

Potential Challenges and Considerations

- **Metadata and Discovery:** Ensuring high-quality metadata is essential for effective search and discovery of repository content.
- **Copyright and Licensing:** Understanding copyright and licensing issues is crucial for managing content in IRs.
- **Sustainability:** IRs require ongoing support and resources for maintenance, curation, and technological updates.
- **Researcher Engagement:** Encouraging researchers to deposit their work in the IR can be challenging.
- **Interoperability:** Ensuring compatibility with other systems and repositories is important for maximizing the impact of IRs.

Conclusion:

Institutional repositories (IRs) and Open Educational Resources (OERs) are synergistic tools that can revolutionize education and research**.** By providing open access to scholarly works and educational materials, these platforms foster a more inclusive and collaborative academic environment. IRs serve as digital treasure troves, preserving institutional knowledge and making it accessible to a global audience. When combined with the flexibility and affordability of OERs, they create a powerful ecosystem that empowers educators and learners alike.

To fully realize the potential of IRs and OERs, continued investment in infrastructure, digital literacy, and supportive policies is essential. By prioritizing open access and knowledge sharing, institutions can drive innovation, enhance student success, and contribute to the advancement of human knowledge. As technology continues to evolve, the integration of IRs and OERs will undoubtedly shape the future of education and research.

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LIBRARY BLOG: AN EFFECTIVE PLATFORM FOR ENHANCING ONLINE SERVICES

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Abstract

In today's digital era, libraries are evolving as dynamic hubs for learning, community engagement and digital resource access. Library blogs play an important role in this transformation, offering different communication channels and enhancing service delivery and online visibility. These blogs enable the dissemination of news, updates on new acquisitions, research tips and library services. They also provide literature search guides, access to e-resources and multimedia content. Using platforms like Blogger, WordPress, and Medium, libraries can effectively connect with patrons, providing timely updates and valuable information. As a result, library blogs enhance communication, service quality, and community interaction, becoming essential tools for modern libraries.

Introduction: Libraries in the digital age are moving beyond their traditional function of lending books and offering study spaces. They are evolving as dynamic hubs for learning, community interaction, and access to digital resources. The library blog is one of the most effective means to facilitate this change. The platform provides a diverse means of communication, outreach, and service enhancement with the potential to enhance the online presence and efficacy of library services. Weblogs are important Web 2.0 tools for exchanging information. Platforms like Blogger, which only requires a Google account, make it easy to create a blog. Libraries can adopt it as a primary media source. Blogs, acting as online diaries, allow expression through text, audio, video, and more. Other platforms include WordPress, Wix, Tumblr, Weebly, Medium, and Jimdo.

Library Blog: A library blog serves many purposes, such as providing news, information about new books, research suggestions, and links to recommended resources. They can also announce new services or resources in the library.

Review of Literature: Aacharya, H. (2021) Library blogs offer many benefits, especially to the library and information science industries. They give new readers access to information, reviews, event updates, articles, links, and interviews from the comfort of their own homes. The blogs also highlight important perspectives and upcoming technology, preparing readers for future improvements. They inform customers about new acquisitions and current services, as well as collect and respond to consumer feedback and criticisms. Overall, blogs improve communication, promote new technology, and gather user input, making them invaluable tools for libraries wishing to better serve and engage their audiences. (Marimuthu, R. & J, 2022) Library blogs establish a strong relationship with patrons through a cost-effective and efficient strategy. They highlight new arrivals, current awareness services, and special content. Easier to create than websites, blogs attract users with a familiar, narrative interface. As knowledge centers, libraries use blogs to stay up to date with emerging technologies, thereby encouraging users to seek information. While providing the latest news and entertainment, blogs serve as an affordable publishing technique, enhancing library services and user engagement.

(Volvaikar, 2018) Blogs serve as a centralized hub for resources that would otherwise flood the email inbox. They advocate positions, express personal viewpoints, and delve into specific topics that are not appropriate for traditional print media. Blogs also provide a platform to deliver timely news updates, insightful commentary, and ongoing discussions on topics that demand regular updates. This adaptability allows blogs to remain relevant and effective tools for communication, education, and community engagement in the digital age.

Library Blog: An Effective Platform for Enhancing Online Services

A library blog serves as an essential platform for boosting various online services. Here's how:

The library's blog: An effective platform for enhancing online services A library blog serves as an essential platform for promoting various online services. This is the way -

Library brochures and information: The blog can host digital versions of the library's brochures, annual reports, and essential information. This makes it easy for patrons to get details about library hours, policies, services, and contact information at any time. Libraries can also update this information quickly, ensuring that users always have the latest details.

1. **The library collection:**
   Through the blog, libraries can share detailed details and updates about their collections, including new acquisitions, special collections, and special items. It helps users discover new materials and explore different genres and topics, thereby promoting greater use of library resources.
2. **Web O.P.A.C.:**
   The blog can directly link to the library's web online public access catalog. (OPAC). This integration allows users to search for books, magazines, multimedia, and other resources from the convenience of their devices. Tutorials on using OPAC can also be included to help less tech-savvy users.
3. **The literature search service:**
   Blogs can provide guides and tools for conducting effective literature searches. This includes search strategies, database recommendations, and suggestions on the use of keywords. By providing these resources, libraries support students, researchers, and anyone doing in-depth research.
4. **E-Resources:**
   Regular blog posts can highlight the library's electronic resources, including e-books, databases, and online journals. Tutorials on accessing and using these e-resources can help mentors make the most of their digital options. Updates on new e-resources and test access to databases can also be shared.
5. **The Youtube channel:**
   The blog can embed videos from the library's YouTube channel, such as tutorials, recorded events, author talks, and library tours. This multimedia approach caters to different learning styles and keeps the community engaged with dynamic content.
6. **News and Programs:**
   Upcoming library events, such as workshops, book clubs, author visits, and community events can be promoted through the blog. News about library achievements, staff updates, and community involvement can also be shared, allowing patrons to stay informed and connected.
7. **The activities of the library:**
   The blog can provide updates on ongoing library activities, including children's story hours, teen programs, and adult education classes. Detailed descriptions and registration links can encourage more participation and community involvement.
8. **Research and Research Reference Tools:**
   Blogs can be a hub for research tools, including citation guides, reference management software, and research methodologies. By offering these resources, libraries assist in the academic and professional development of their patrons.
9. **List of online newspapers:**
   Links to online newspapers can be provided, giving patrons easy access to current news and historical archives. This service is especially valuable for researchers, students, and anyone interested in staying informed about current events.
10. **Online Educational Resources (OER):**
    Blog can curate and share valuable Open Educational Resources (OER) including textbooks, course materials and learning modules. It supports lifelong learning and provides free educational resources to the community.
11. **Selective information dissemination (SDI):**
    Blog can provide selective dissemination of blog information service, where customized updates are provided on new resources and materials based on user preferences. This personal approach ensures that patrons receive information relevant to their interests.
12. **The Current Awareness Service (CAS):**
    Blog can keep users updated on the latest developments and trends in various fields through the Current Awareness Service. Regular updates on new publications, industry news, and important developments help users stay current in their areas of interest.

13. **Digital Newspaper Clipping Service:**
    Important news clippings and articles can be stored and shared digitally. The service allows patrons to easily access curated news content, historical articles, and important reports.
14. **Display of new arrivals in the library**:
    Newly acquired books, magazines, and multimedia resources can be featured on the blog. This feature generates interest among the users and encourages them to explore new additions to the library's collection.
15. **Important links for competitive exams:**
    The blog can provide links to resources and information related to competitive exams, such as study guides, practice tests, and tips. This makes it effective for students and professionals for their examinations.
16. **Important Links to Government Websites:**
    Links to essential government websites, including local, state and federal resources, may be provided. It serves as a helpful resource for patrons seeking information about government services, policies, and regulations.

    By leveraging library blogs, libraries can significantly increase their online presence, improve user engagement, and provide a broader range of services to their community. This digital platform allows a centralized space for timely updates, interactive content and valuable information, making it an indispensable tool for modern libraries.

Conclusion : Library blogs are essential tools for modern libraries, transforming them into dynamic hubs of learning and community engagement. By providing news updates, information about new acquisitions, and research tools, blogs enhance communication and user engagement. They provide easy access to links to digital resources, online catalogs and tutorials, supporting mentors in their research and educational efforts. Additionally, blogs promote the library's programs, introduce new visitors, and provide links to government and educational resources. Overall, leveraging blogs enables libraries in the digital age to expand their online presence, improve service delivery, and better engage with their communities.

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MODERN TRENDS AND CHALLENGES IN LIBRARY AND INFORMATION SCIENCE

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Abstract: This article a detail analysis has been made on recent current trend in library information science. The field of library and information science is constantly evolving with new trends and innovations. The study examines key trends shaping modern libraries, such as the expansion of Digital Libraries, Data Management and Research Support, the adoption of User-Cantered Design principles, Community Engagement, the evolution of libraries into Lifelong Learning centres, the integration of Artificial Intelligence (AI) and Automation, the emergence of Mobile-based Library Services, and the incorporation of Virtual and Augmented Reality technologies. The examination of Digital Libraries underscores their key features, including the creation of extensive digital collections, improved accessibility, advanced search and retrieval mechanisms, integration of multimedia content, and the promotion of open access principles. Similarly, the study explores how libraries are actively involved in data management, employ user-centered design principles, engage with communities, promote lifelong learning, and incorporate AI and automation into their operations. The paper discusses various latest technological tools and their uses in Library and Information science.

Keywords*:* Digital Library, Artificial Intelligence (AI), User-Centered Design, Community Engagement, Lifelong Learning, Mobile-based Library Services, etc.

Introduction:

Libraries have been an important part of societies for centuries, serving as repositories of knowledge and providing access to information and resources. With the advent of Information and Communication Technology (ICT), libraries have undergone significant changes in the way they operate and provide services. One of the most significant impacts of ICT on libraries is the digitization of information. With the widespread use of the internet and digital technologies, libraries have been able to digitize their collections and make them available online. Libraries are universally recognized as important social institutions and no community is considered complete without a library system. However, libraries are facing change due to impact of ICT, changing patron needs, changing information environment. Use of technologies is resulting in transition from Print to Digital. There is a transformation in the need of library users and due to ICT, there is a change in the resources, services and products of the libraries. Every institution is now trying to compete in the national and international rankings and with the changed roles and services. Libraries and librarians are playing key role. So the purpose of this paper is discussing latest trends and challenges in Library and Information Science.

Objectives of the Study:

1. To recognize use of latest technological tools in libraries
2. To discuss the role of libraries using technology and latest trends.
3. To understand use of latest trends in technology in providing library services to next level
4. To discuss various challenges regarding recent trends in library and information science.

Recent Trends in LIS:

Digital Libraries: The digitization of collections and services continues to be a prominent trend. Libraries are expanding their digital resources, including e-books, online databases, and digital archives.

Digital Collections: Digital libraries house a wide range of digital content, including e-books, journals, audiovisual materials, images, and databases. These collections can be accessed and searched electronically.

Accessibility: One of the primary advantages of digital libraries is the accessibility they offer. Users can access resources remotely using computers, tablets, or smartphones, reducing geographical constraints.

Search and Retrieval: Digital libraries use advanced search functionalities and metadata to facilitate efficient retrieval of information. Users can search for specific topics, authors, or keywords to find relevant materials.

Multimedia Content: Digital libraries often include multimedia elements such as audio, video, and interactive materials, providing a richer learning experience compared to traditional print resources.

Interactivity: Some digital libraries incorporate interactive features, allowing users to engage with the content. This might include annotations, discussions, or collaborative tools.

Preservation: Digital libraries implement strategies for preserving digital content, addressing issues such as format obsolescence, digital asset management, and ensuring long-term access to resources.

Remote Learning: Digital libraries play a crucial role in supporting remote learning and online education by providing electronic resources and materials for students and educators.

Open Access: Many digital libraries support open access principles, making scholarly content freely available to users. Open access initiatives aim to increase the accessibility and dissemination of knowledge.

Data Management and Research Support: Libraries are playing a crucial role in assisting researchers with data management, curation, and providing support for data-intensive research projects.

Data Management Services: Libraries offer assistance in organizing, storing, and preserving research data. This includes providing guidance on data management plans, metadata creation, and ensuring compliance with data sharing policies.

Data Curation: Libraries curate research data to ensure its quality, reliability, and long-term accessibility. They employ best practices in data curation, including documentation, versioning, and maintaining data integrity.

Data Repositories: Libraries establish and maintain data repositories where researchers can securely store and share their datasets. These repositories often adhere to open access principles, fostering collaboration and knowledge dissemination.

Training and Workshops: Libraries conduct training sessions and workshops to educate researchers on best practices in data management. This includes training on data cleaning, formatting, and the use of specialized tools for effective data handling.

Research Software Support: Libraries provide support for research software and tools, aiding researchers in selecting, using, and managing software relevant to their projects. This support may involve training sessions, access to software repositories, and troubleshooting assistance.

Collaboration Spaces: Libraries create collaborative spaces where researchers can work together on data-intensive projects. These spaces are equipped with the necessary infrastructure and technology to facilitate collaborative research efforts.

Data Analysis Support: Libraries assist researchers in data analysis by providing access to statistical software, offering consultation services, and organizing workshops on data analysis techniques. This enhances the analytical capabilities of researchers.

Metadata Standards: Libraries adhere to metadata standards to ensure consistency and interoperability of research data. Standardized metadata facilitates the discovery and reuse of datasets across different research projects.

Ethical Considerations: Libraries play a role in guiding researchers on ethical considerations related to data management. This includes addressing issues such as informed consent, data privacy, and compliance with ethical standards in research.

Collaboration with Research Institutions: Libraries collaborate with research institutions to align their data management services with institutional policies and support the overall research infrastructure.

User- Cantered Design: User-cantered design (UCD) in libraries involves designing services, spaces, and resources with a primary focus on meeting the needs and preferences of library users. This approach is cantered around understanding the behaviours, expectations, and experiences of patrons to create more effective and user-friendly library environments. Here are some key aspects of user-cantered design in libraries:

User Research: Libraries employ various methods to gather insights into user behaviour and preferences. This may include surveys, interviews, usability testing, and observational studies. Understanding the diverse needs of the community helps in tailoring library services accordingly.

Space Design: UCD principles are applied to the physical layout of library spaces. Furniture arrangement, lighting, signage, and the overall atmosphere are designed with the user experience in mind. Spaces are often flexible to accommodate various types of activities, from quiet study to collaborative work.

Digital Interfaces: User-cantered design is crucial in the development of library websites, catalogs, and digital interfaces. Websites need to be intuitive, easy to navigate, and responsive to different devices. Digital catalogues should facilitate seamless searching and resource discovery.

Personalized Services: Libraries are increasingly adopting personalized services based on user preferences and behaviour. This may involve recommending books, resources, or events tailored to individual interests, enhancing the overall user experience.

Accessibility: UCD emphasizes accessibility to ensure that library services and resources are usable by everyone, including those with disabilities. This includes providing accessible technology, adaptive equipment, and ensuring that physical spaces are navigable for individuals with mobility challenges.

Feedback Mechanisms: Libraries actively seek feedback from users to continuously improve services. This can be done through surveys, suggestion boxes, and user feedback forms. User input is invaluable in identifying areas for improvement and innovation.

Training and Support: UCD extends to the provision of user education and support. Libraries design training programs and user guides that are user-friendly and accessible, ensuring that patrons can make the most of library resources and services.

Responsive Programming: Libraries design programs and events based on community interests and needs. By involving the community in the planning process, libraries can ensure that their offerings align with the diverse preferences of their user base.

Inclusive Collections: User-centered design also applies to the curation of library collections. Libraries strive to offer diverse and inclusive materials that cater to the interests and informational needs of all members of the community.

Adaptability and Iteration: UCD involves an iterative process. Libraries regularly reassess and adapt their services based on evolving user needs and technological advancements, ensuring ongoing relevance and effectiveness.

Overall, by adopting user-cantered design principles, libraries aim to create welcoming, accessible, and responsive environments that empower users and enhance their overall experience.

Community Engagement: Libraries are becoming community hubs, engaging with diverse communities through outreach programs, events, and partnerships. They aim to be inclusive spaces that cater to the needs of the entire community.

Lifelong Learning: Libraries are evolving into lifelong learning centres, offering a variety of educational programs and resources to support continuous learning and skill development.

Artificial Intelligence (AI) and Automation: Artificial Intelligence (AI) and automation are making significant impacts on various aspects of library operations, enhancing efficiency, improving services, and transforming the way information is managed and accessed. Here are several ways in which AI and automation are being employed in libraries:

Cataloguing and Metadata Management:
AI tools can assist in automating cataloguing processes, helping to create and manage metadata for library resources.

Automated metadata tagging can improve the accuracy of resource classification and enhance search capabilities within the library catalogue.

Collection Management:
AI algorithms can analyze usage patterns and user preferences to make data-driven recommendations for expanding or updating library collections.

Automation can streamline tasks related to inventory management, identifying missing or misplaced items more efficiently.

Chatbots and Virtual Assistants:
Libraries are implementing AI-powered chatbots or virtual assistants to provide instant assistance to users, answering queries, and guiding them through various library services.

These tools enhance user engagement and provide 24/7 support, improving the overall user experience.

Text and Data Mining:
AI technologies enable text and data mining, allowing libraries to extract valuable insights from large volumes of texts, academic articles, and research papers.

Researchers can benefit from AI tools that assist in analyzing and summarizing information, facilitating more efficient literature reviews.

Reference Services:
AI-powered tools can assist in automating routine reference tasks, helping users find relevant information more quickly.

Chatbots or virtual assistants can be programmed to provide information on library hours, locations, and other frequently asked questions.

Automated Circulation Systems:
Automation in circulation systems helps streamline the borrowing and returning of materials. Self-checkout machines and automated book return systems reduce queues and enhance the overall efficiency of library operations.

Predictive Analytics for Resource Demand:
AI can analyze historical data to predict future resource demand, allowing libraries to optimize their collections based on anticipated user needs.

This helps in allocating resources more effectively, ensuring that popular materials are readily available.

Facial Recognition for Security:
Some libraries are exploring the use of facial recognition technology for security purposes, allowing authorized access to restricted areas and enhancing overall safety.

Automated Patron Notifications:
AI can automate the process of sending notifications to patrons, reminding them of due dates, overdue items, or upcoming library events.

This improves communication and helps patrons stay informed about their library activities.

Accessibility Services:
AI technologies can assist in providing accessibility services, such as text-to-speech capabilities for visually impaired users or language translation services to cater to a diverse user base.

It's important for libraries to approach the integration of AI and automation with a focus on ethical considerations, user privacy, and ensuring that technology aligns with the mission of providing equitable access to information. Additionally, staff training and user education are essential to maximize the benefits of these technologies in library settings.

Mobile-based library services: Mobile-based library services leverage the ubiquity of smartphones to provide library resources and services directly to users' mobile devices. This approach enhances accessibility, convenience, and user engagement. Here are various mobile-based library services that libraries may offer:

Mobile Catalogues:
Libraries can provide mobile-friendly catalogues or apps that allow users to search, browse, and request library materials using their smartphones.

Features may include barcode scanning for quick searches, personalized recommendations, and real-time availability information.

E-books and Audiobooks:
Libraries can offer mobile apps for accessing e-books and audiobooks, allowing users to borrow and read or listen to materials directly on their mobile devices.

Integration with popular e-book platforms and audiobook services enhances the user experience.

Mobile Checkout and Renewal:
Implementing mobile checkout functionalities enables users to borrow materials directly from their smartphones.

Users may also be able to renew borrowed items, helping to manage their library accounts on the go.

Push Notifications:
Libraries can use mobile apps to send push notifications, alerting users about due dates, upcoming events, or new acquisitions.

Notifications help keep users informed and engaged with library services.

Virtual Library Cards:
Mobile apps can provide virtual library cards that users can easily access on their smartphones, eliminating the need for physical library cards.

This enhances convenience and streamlines the process of checking out materials.

Mobile Reference Services:
Libraries can offer virtual reference services through mobile apps, allowing users to ask questions, seek assistance, or get research help from librarians via chat or messaging.

Mobile Events and Workshops:

Libraries can promote events, workshops, and programs through mobile apps, allowing users to view schedules, register for events, and receive updates on their mobile devices.

Mobile Databases and Research Tools:
Mobile access to databases, academic journals, and research tools allows users to conduct research and access scholarly materials directly from their smartphones.

Optimized interfaces for mobile use enhance the user experience.

Interactive Maps:
Libraries with multiple branches or complex layouts can provide interactive maps within mobile apps to help users navigate the library spaces more easily.

Augmented Reality (AR) Experiences:
Some libraries experiment with AR features in mobile apps, offering enhanced experiences such as guided tours, interactive exhibits, or additional information about physical collections.

Language Translation Services:
Mobile apps may include language translation features to cater to diverse user populations, providing information and assistance in multiple languages.

Mobile Printing Services:
Libraries can integrate mobile printing services, allowing users to send print jobs from their smartphones and retrieve printed materials at designated library locations.

To successfully implement mobile-based library services, it's crucial for libraries to prioritize user-friendly design, security, and user education to ensure that patrons are aware of and comfortable using these services on their mobile devices.

Virtual and Augmented Reality: Some libraries are incorporating virtual and augmented reality technologies to create immersive learning experiences, such as virtual tours, educational simulations, and interactive exhibits.

Virtual Tours: Libraries can offer virtual tours, allowing users to explore library spaces and collections without physically visiting the location. This is particularly useful for remote users or those with accessibility constraints.

Digital Collections in VR: VR can provide immersive experiences for exploring digital collections, historical artifacts, and rare materials. Users can interact with 3D models or virtual replicas of items in the library's possession.

Virtual Classrooms and Training: Libraries can use VR to create virtual classrooms or training environments. This is especially valuable for conducting workshops, training sessions, or educational programs in a virtual space.

Interactive Storytelling: VR enables libraries to create interactive and immersive storytelling experiences. This can include virtual story sessions, historical reenactments, or interactive narratives that engage users in a new way.

Collaborative VR Spaces: Libraries can host collaborative VR spaces where users from different locations can meet virtually to work on projects, discuss research, or participate in shared activities.

Environmental Sustainability: Sustainability practices are gaining attention, with libraries implementing eco-friendly initiatives, energy-efficient technologies, and promoting environmental awareness.

Challenge

Budget Constraints: Many libraries face budget constraints, limiting their ability to invest in new technologies, collections, and infrastructure.

Digital Divide: The digital divide remains a challenge, with disparities in access to digital resources and technology affecting certain communities and individuals.

Privacy Concerns: The digital nature of many library services raises concerns about user privacy. Libraries must navigate the balance between providing personalized services and safeguarding patron privacy.

Information Overload: Coping with the abundance of information available in the digital age poses a challenge. Libraries must help users navigate through vast amounts of data and discern credible sources.

Staffing and Skill Gaps: Keeping library staff updated with the latest technologies and information management skills can be a challenge. There may be a need for ongoing professional development to bridge skill gaps.

Copyright and Licensing Issues: Libraries must navigate complex copyright and licensing issues, especially concerning digital resources and electronic content.

Adapting to Technological Changes: Rapid technological advancements require libraries to adapt quickly, which can be challenging for institutions with limited resources and staff.

Preservation of Digital Assets: Ensuring the long-term preservation of digital collections presents challenges, including issues related to format obsolescence, hardware/software dependencies, and data integrity.

Conclusion:

The identified trends include the proliferation of Digital Libraries, emphasizing features like extensive digital collections, enhanced accessibility, advanced search and retrieval mechanisms, integration of multimedia content, and the promotion of open access principles. The expansion of Data Management and Research Support is

highlighted, demonstrating library's pivotal role in assisting researchers with organizing, preserving, and sharing data. The adoption of User-Cantered Design principles is explored, emphasizing the importance of tailoring library services, spaces, and resources to meet the diverse needs of users. The integration of Artificial Intelligence (AI) and Automation is detailed, showcasing how these technologies enhance efficiency in cataloguing, collection management, reference services, and more. The emergence of mobile-based Library Services is highlighted, leveraging smartphone ubiquity to provide accessible and convenient library resources. Finally, the exploration of Virtual and Augmented Reality technologies in libraries showcases immersive learning experiences, virtual tours, and collaborative VR spaces. However, alongside these exciting trends, the challenges are recognize that libraries face. Budget constraints, the digital divide, privacy concerns, information overload, staffing and skill gaps, copyright and licensing issues, and the need to adapt to rapid technological changes are identified as significant challenges. Additionally, ensuring the preservation of digital assets poses ongoing challenges. To address these challenges and capitalize on emerging trends, libraries must prioritize ongoing professional development for staff, navigate complex copyright landscapes, and carefully balance personalized services with user privacy. As libraries continue to evolve, adapting to technological changes while maintaining a commitment to accessibility, inclusivity, and environmental sustainability will be paramount.

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THE IMPACT OF DIGITAL TECHNOLOGIES ON LIBRARIES AND INFORMATION SERVICES

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Abstract:

Digital technologies have revolutionized libraries and information services, reshaped traditional practices and expanded service offerings. This paper explores the multifaceted impact of digital technologies on libraries, focusing on enhanced access to information, improved resource management, increased user engagement, robust digital preservation, and strengthened collaboration and resource sharing. The integration of digital tools has democratized information access, streamlined administrative processes, and personalized user interactions, making libraries more efficient and user-centric. Digital preservation techniques ensure the longevity and accessibility of electronic resources, while collaborative digital platforms allow libraries to pool resources and share best practices. Despite the numerous benefits, challenges such as digital equity and privacy concerns persist. This study highlights the transformative effects of digital technologies on libraries and underscores the need for ongoing innovation and adaptation to maintain their vital role in the digital age.

Keywords:

Digital technologies, libraries, information services, access to information, resource management, user engagement, digital preservation, collaboration

Introduction:

The advent of digital technologies has profoundly transformed libraries and information services, redefining their roles in the digital age. Traditionally, libraries have been seen as custodians of physical collections, but the integration of digital tools has expanded their capabilities far beyond traditional boundaries. This evolution has enhanced access to information, streamlined resource management, and improved user engagement, making library services more dynamic and user-centric. Additionally, digital preservation efforts ensure that valuable digital content remains accessible for future generations. Furthermore, collaborative initiatives facilitated by digital technologies have fostered greater resource sharing and collective problem-solving among libraries and institutions. This paper explores the multifaceted impact of digital technologies on libraries, focusing on key areas of change and their implications for the future. By examining these advancements, we gain insights into how libraries can continue to evolve and thrive in an increasingly digital world, while maintaining their essential role as information hubs.

Objectives

1. Examine how digital technologies have transformed library catalogs and information retrieval systems.

2. Analyze the shift from physical to digital collections and its effects on library space utilization and user access.

3. Evaluate the role of libraries in promoting digital literacy and providing technology-based services to consumers.

4. Assess the challenges and opportunities presented by emerging technologies such as artificial intelligence and virtual reality in library settings.

5. Investigate how digital technologies have influenced the skillsets required for information professionals and librarians.

Enhanced Access to Information:

Digital technologies have profoundly enhanced access to information by enabling the digitization and online availability of library collections. Digital libraries, electronic journals, and databases now offer users the convenience of accessing vast amounts of information from anywhere, at any time. This shift has broken down geographical barriers, making resources available to a global audience. Initiatives like open access and digitization projects have democratized information, ensuring that rare and valuable materials are accessible to the public. Additionally, the integration of advanced search tools and metadata has improved the discoverability of resources, allowing users to efficiently locate relevant information. These technological advancements have facilitated

research and learning by providing immediate access to a diverse range of materials, from historical archives to the latest scientific studies. Consequently, digital technologies have transformed libraries into dynamic hubs of information, significantly broadening the scope and reach of their services.

Improved Resource Management:
Digital technologies have revolutionized resource management in libraries, making processes more efficient and accurate. Integrated library systems (ILS) and digital asset management (DAM) systems streamline cataloging, acquisitions, and circulation, reducing manual errors and administrative burdens. These tools enable libraries to manage vast collections with ease, ensuring that resources are systematically organized and easily retrievable. Additionally, data analytics play a crucial role in understanding user behavior and preferences, allowing libraries to make informed decisions about collection development and resource allocation. By analyzing usage patterns, libraries can optimize their collections to meet the evolving needs of their patrons. Furthermore, automated inventory management and tracking systems enhance the efficiency of resource management, reducing the time and effort required for inventory checks and updates. Overall, digital technologies have significantly improved the management of library resources, contributing to a more responsive and user-focused library service.

Enhanced User Engagement:
Digital technologies have significantly enhanced user engagement in libraries by creating new, interactive ways for users to connect with resources and services. Virtual reference services, online tutorials, and social media platforms facilitate real-time communication and support, making libraries more accessible and responsive to user needs. Personalized services, such as recommendation systems and user-specific content alerts, cater to individual preferences, enhancing the user experience. Additionally, digital platforms provide remote access to library resources, enabling users to engage with library materials from the comfort of their homes, a crucial advantage during times of crisis like the COVID-19 pandemic. Interactive features like live chats, webinars, and virtual events further enrich the user experience, fostering a sense of community and continuous learning. Through these digital innovations, libraries can offer more tailored and engaging services, meeting the diverse needs of their patrons in a dynamic and user-centric manner.

Digital Preservation:
Digital preservation is crucial for safeguarding electronic resources for future generations. Libraries employ various strategies such as migration, emulation, and digital repositories to ensure the longevity and accessibility of digital content. Migration involves regularly updating digital files to current formats to prevent obsolescence, while emulation recreates the original software environment for accessing older digital materials. Digital repositories provide secure, stable storage environments, protecting data from loss or degradation. These technologies are essential for maintaining the integrity of digital collections, including historical documents, research data, and cultural artifacts. Digital preservation also involves metadata creation to enhance discoverability and context. By implementing comprehensive digital preservation practices, libraries ensure that valuable digital resources remain accessible and usable, supporting ongoing research, education, and cultural heritage preservation efforts in an increasingly digital world.

Managing the transition from print to digital formats:
Managing the transition from print to digital formats presents libraries with both challenges and opportunities in adapting to the evolving information landscape. Digital technologies offer unprecedented access to a vast array of resources and enhance the user experience through features like remote access and interactive content. However, this shift requires libraries to navigate issues such as digital preservation, format compatibility, and access equity. Libraries must strategically allocate resources to digitize and maintain existing print collections while acquiring new digital materials. They also face the challenge of ensuring digital content remains accessible and usable over time, employing preservation strategies like migration and emulation. Additionally, libraries must address the digital divide by providing equitable access to digital resources for all patrons, regardless of socioeconomic status or technological proficiency. Despite these challenges, the transition presents opportunities for libraries to expand their reach, improve service delivery, and innovate in how information is accessed and utilized by diverse user groups in a rapidly evolving digital environment.

Collaboration and Resource Sharing:
Digital technologies have significantly bolstered collaboration and resource sharing among libraries and information institutions. Shared digital repositories, consortia, and interlibrary loan systems enable libraries to pool

their resources, providing users with broader access to information. These collaborative platforms allow libraries to offer a wider range of materials without the need for extensive individual collections. Digitization projects and partnerships with academic, cultural, and research institutions enhance the quality and scope of available resources. Furthermore, collaborative initiatives facilitate the sharing of best practices, expertise, and technological advancements, fostering a culture of continuous improvement and innovation in library services. By working together, libraries can address common challenges, such as digital preservation and access to rare materials, more effectively. This collective approach not only expands the availability of information but also strengthens the library community, ensuring that resources are used efficiently and that users benefit from a rich, diverse, and interconnected network of information services.

Conclusion:

Managing the transition from print to digital formats presents significant challenges and opportunities for libraries. As digital technologies continue to advance, libraries must carefully navigate the complexities of preserving existing print collections while embracing new digital resources. Strategies include digitization initiatives to convert print materials into digital formats, ensuring continued access and preservation. Libraries also face decisions regarding collection development, balancing the acquisition of digital resources with the maintenance of physical collections based on user needs and preferences. Furthermore, training staff and users in digital literacy and access skills becomes crucial to effectively utilize and navigate digital resources. Collaboration with publishers, technology providers, and other libraries can facilitate smoother transitions and enhance access to diverse digital content. Ultimately, managing this transition requires libraries to adapt their infrastructure, policies, and services to meet evolving information demands in an increasingly digital landscape while maintaining the core mission of preserving knowledge and supporting research and education.

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3. Managing Digital Cultural Objects: Analysis, Discovery and Retrieval by Allen Foster and Pauline Rafferty. P – 77-81.
4. Digital Libraries: Principles and Practice in a Global Environment by G. G. Chowdhury and Schubert Foo. P 202-205.
5. Information Services Today: An Introduction by Sandra Hirsh. P – 159-161.
6. The Portable MLIS: Insights from the Experts edited by Ken Haycock and Brooke E. Sheldon. P – 311-313.
7. Modern Library Services: For the Digitised Society by Dr. M. P. Satija. P 187-190.
8. Digital Libraries by Jagtar Singh P – 41-44.

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DIGITAL TRANSFORMATION & EMERGING TECHNOLOGIES

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Abstract
This paper examines the idea of digital transformation in the field of education and how emerging technologies might help to bring about this change. The introduction of the essay defines digital change and emphasizes its significance in relation to education. Next, it looks at numerous cutting-edge technologies and how they can be used in education, including artificial intelligence, virtual and augmented reality, block chain, and the internet of things. The advantages of digital transformation for students, teachers, and institutions are highlighted in this paper. This research examines the impact of emerging technologies' use in the digital
transformation of the education sector.

Keywords: Introduction, Digital Transformation, Human Factors, Goals, Benefit of Digital Transformation, Conclusion.

Introduction

Digital transformation is the process of integrating digital technologies into various aspects of a business or organization, with the aim of improving operations, increasing efficiency, and delivering better value to customers. It involves a fundamental shift in how an organization operates, as it seeks to harness the power of digital technologies to achieve its strategic goals and objectives. Digital transformation can involve a wide range of technologies, including cloud computing, artificial intelligence, big data analytics, the internet of things and block chain. By leveraging these technologies, organizations can streamline their processes, automate routine tasks, gather and analyze data more effectively, and make more informed decisions.
Digital transformation can have significant implications for an organization, including changes to its business model, culture, and workforce. It requires a strategic approach, with a clear understanding of the potential benefits and risks, and a willingness to embrace change and innovation

Objectives:

1. Analyze the impact of key emerging technologies on business models and organizational structures.
2. Evaluate the challenges and opportunities presented by digital transformation across various industries.
3. Explore the role of data analytics and artificial intelligence in driving innovation and decision-making processes.
4. Assess the importance of cybersecurity and data privacy in the context of widespread digital adoption.
5. Examine the skills and competencies required for professionals to thrive in a digitally transformed workplace.

What is digital Transformation:

Because digital transformation will look different for every company, it can be hard to pinpoint a definition that applies to all. However, in general terms, we define digital transformation as the integration of digital technology into all areas of a business resulting in fundamental changes to how businesses operate and how they deliver value to customers. Beyond that, it's a cultural change that requires organizations to continually challenge the status quo, experiment often, and get comfortable with failure. This sometimes means walking away from long-standing business processes that companies were built upon in favor of relatively new practices that are still being defined.
Digital transformation is the incorporation of computer-based technologies into an organization's products, processes and strategies. Organizations undertake digital transformation to better engage and serve their workforce and customers, and thus, improve their ability to compete. In challenging economic times, operational efficiency and cost optimization can also become important transformation objectives.

- **Factors to Consider Before Setting Digital Transformation Goals**

Before you start setting digital transformation goals, you need to assess how prepared your team is to take on such a large endeavor. Here are six factors to consider before beginning your digital transformation process.

1. Digital maturity

How prepared is your company to undergo a digital transformation journey? Is your team experienced and educated enough to adopt new technologies, or what additional training or resources will they need to adjust? There are several digital transformation models to choose from, and knowing your company's digital maturity and digital readiness will help you determine which one is right for your business.

Understanding your limitations or weaknesses can help you better prepare to overcome them when implementing new tools and technologies.

2. Technological requirements

Digital transformation is a broad concept. What it looks like will vary from company to company, depending on the unique goals they need to achieve. However, there are there main technological areas of advancement:

- **Connected technologies.** Implementing cloud or lot software that can make data more accessible or transparent for employees or customers.
- **Autonomous technologies.** Introducing artificial intelligence or machine learning to automate tasks and improve productivity.
- **Programmable technologies.** Use of application programming interfaces (APIs) to connect apps and break down silos.

Your digital transformation journey might focus on one of these technological areas, or it might cover all three. But understanding what you're trying to accomplish and the requirements of the technology you're introducing is crucial for a smooth implementation. To make things even smoother, you could also bring in an external digital transformation consulting company to assist with implementation.

3. Stakeholder buy-in

Stakeholder buy-in has to go deeper than just getting senior management to approve your digital transformation budget. If employees impacted by the change don't understand the importance of switching up the way they do things, it can create resistance and make change harder to hold. Get the entire team on board from finance and IT to marketing and customer-facing employees. Digital transformation is often an organization-wide initiative, so convincing employees from the start that the change will be good for everyone can help you see returns on your investment faster.

4. IT strategic planning

A strategic plan created by your IT team can make undergoing digital transformation easier but it needs to go deeper than just setting guidelines and tool rollout dates. Here are things you need to include in

- **Establish your "why."** Make it clear the intentions behind this transformation journey. What problems are you looking to solve or what goals do you want to achieve? It should be easy for your team to understand, regardless of their role or position within the company.
- **Prioritization plan.** Establish what the most important components of your transformation are. Who needs to be trained first? What initiatives will have the biggest impact? Prioritize your plan to complete the journey in small yet strategic steps.
- **Feedback loops.** As you start to implement your plan, you'll want to get feedback and insights from your team on how well the new technology is working. Work feedback loops into the process to ensure everyone is on the same page as you go. It's typical for your strategic plan to change as you start digging deeper into your digital trapsformation goals and even as you start implementing new processes and technologies, but make sure you have the capabilities and resources necessary to create a strong plan before you get started.

5. Impact on different departments

Digital transformation typically impacts all departments of an organization, but some will face greater changes and challenges than others. If you're treating all departments equally, some teams might be getting too much attention while others are getting too little. It's important to understand how different departments will be impacted so you can create personalized implementation plans for each. Creating a unique approach to the digital transformation project will give everyone access to the information they need most, without wasting their time or creating confusion by introducing them to processes or concepts they don't need- and ultimately, will help

➢ The benefits of digital transformation

Digital transformation is not just about adding new technologies to be trendy. When done right, it can help improve your business. Discover all the benefits below:

1. Greater protection for your systems:

Security is one of the main issues that every head of IT has to deal with. In a time in which new devices, applications and programs emerge on a daily basis, ensuring a company's users that their identities are not threatened by cyber-attacks is hard... but not impossible! Discover our guide on "Identity and Access Management", the best solution to manage identities and accesses in your company.

2. Increased productivity and efficiency:

If there is anyone who benefits from the implementation of new technologies in companies, it is undoubtedly the employees. Having digital solutions and/or tools at their disposal significantly helps them with their tasks, allowing them to obtain not only better, but also faster results. Decision-making and internal processes are streamlined and the employees' efficiency is multiplied thanks to digital transformation. It is, without a doubt, the best way to get rid of those obsolete processes or technologies that added nothing to the company's positive growth.

3. Greater profitability:

When companies set their digital transformation strategy in motion, they need to be clear on the cost savings they will obtain. If your organization engages in some current digital transformation trends such as Big Data, loT. Artificial Intelligence or Cloud Computing, you will see its profitability climb thanks to its great innovative component.

4. Increased customer satisfaction

The implementation of technology especially in those processes related to customer experience will significantly help with their retention, as well as the achievement of better satisfaction rates. If you see competitors adopting new technologies, you are likely to find it very difficult to keep up with them if you are still using old, legacy systems in your business. Digital transformation offers new opportunities and allows you to adapt to change more quickly, allowing you to stay ahead of the competition.

➢ The Impact of Emerging Technology:

With emerging technology established as a strategic way for IT leaders to build solutions on a new platform, the focus turns to the practical applications of emerging technology in IT and business operations. It is well accepted that digital transformation is less about the new technology being introduced into an organization and more about a cultural shift in the way business gets done. Successfully implementing emerging technology demands a rethinking of previous practice

As stated previously, individual technologies will eventually become important in tactical discussions around building systems. Broadly speaking, though, emerging technology is already reshaping other activities. Evaluating new technology shifts from a side activity to a formal cross-departmental initiative. The role of IT in the decision-making process has been evolving over the past several years, and awareness of emerging technology is part of that redefinition. Changes to workflow have followed technology adoption since the first mainframe systems, and those changes are tied more tightly than ever to success in implementation, most importantly, the skills needed to maximize new trends are in high demand, and properly understanding the dynamics of today's workforce is key to filling the skill gaps.

➢ Conclusion

Digital transformation has had an unprecedented influence on all sectors of business over the last decade. We are now entering an era characterized by the extensive digital transformation of businesses, society, and consumers. Therefore, digital transformation has become a pivotal focus for organizations across various sectors in recent years. Despite differing scholarly perspectives on the concept and elements of digital transformation, a consensus exists that it significantly impacts consumer decisions and necessitates organizational adaptation.

Recent challenges such as the COVID-19 pandemic have further accelerated the need for digital transformation and its effects on consumers. This necessitates an editorial perspective on this most important topic to establish future research agenda encompassing the various dimensions of digital transformation. The purpose of this editorial perspective is to review research on digital transformation from a multidisciplinary viewpoint and provide insights into several key domains Internet-of-Things, social media, mobile apps, artificial intelligence, augmented and virtual reality, the meta verse, and corporate digital responsibility that are poised to fuel the pace of digital

transformation. Each domain is analyzed through a lens of introduction, role, importance, multifaceted impact, and conclusions. Future research directions are suggested.

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DATA ENVELOPMENT ANALYSIS TECHNIQUE FOR EVALUATION OF ACADEMIC LIBRARIES

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Abstract

Libraries these days face more demand to demonstrate that they spend their resources wisely on meaningful services and benefits to their users as well as the parent organization. This article used a method called data envelopment analysis (DEA) to compare the relative technical efficiency of university libraries. Instead, it can provide an efficient score for each library in addition to peer group best practices with proper library input-output models itself than just the average performance across libraries. This study also explores how DEA is applied in library settings.

Keywords: Data Envelopment Analysis, Academic Library, Efficiency, Library Activity

Introduction

The growing use of information and communication technology in academic libraries in the digital age presents librarians with both opportunities and challenges. The challenge lies in meeting the precise and time-bound needs of consumers, but there are opportunities to alter data readily available to satisfy users.

The value of library services to both the user and parent organizations has made libraries more aggressive in their bid to prove that their resource utilization will result in such benefits. The present study employed a method called Data Envelopment Analysis (DEA) to determine the relative technical efficiency of university libraries. Through DEA, the technical efficiency scores of each library may be shown using an appropriate model for library inputs and outputs as well as best practices within peer groups rather than just computing average performance across libraries. Furthermore, it explores how DEA methodology is applied within a library environment.

"Effectiveness" and "efficiency" are two key terms used to assess library performance. The term 'effectiveness' is used in this context to refer to how well library services meet the institution's goals or standards. Measuring the impact of library services on users is becoming increasingly important in the subject of libraries.

The second element of measuring library performance is "efficiency," which determines how well a library can change its resources (inputs) into services (outputs) or its ability to generate a given level of outputs from a certain number of inputs. Although there has not been extensive discussion about it within the library literature, those who make decisions within the parent organization express immediate concern about efficiency as an aspect of library performance.

Like other organizations, the library's success is based on its capacity for both effective and efficient behaviour. Enhancing performance necessitates meticulous observation and evaluation of library operations and activities. Thus, the creation of appropriate measuring instruments or equipment is necessary.

Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is used to measure the relative efficiency of organizations with multiple outputs and inputs (Charnes et al., 1978). The analysis deals with decision-making units (DMUs) which can be teams, groups or even departments. DEA's primary aim is to find efficient frontier within a set of DMUs for comparing them. This means that each unit on the frontier runs at full capacity. Analysts use DEA scores to provide an efficiency score and compare it with benchmarking data from efficient units. The results of DEA analysis can be used in libraries' performance evaluation and benchmarking purposes. Since its inception in 1978 by Charnes, Cooper, and Rhodes, the DEA technique has found extensive use in a wide range of industries and organizations, including banking, education, health care, and transportation. DEA lets each DMU's individual input and output weights change until the optimal combination is found for the focal library. Each DMU in the DEA computations is given weights based on mathematical optimization that maximize its efficiency score. In doing so, DEA grants "the

benefit of the doubt" to all other DMUs by granting them the same weights to compare to the library under evaluation, also referred to as the "focus" DMU. The focus DMU is given an efficiency value of 1 if its appearance is at least as excellent as that of any other DMU. Even when the weights are determined in a way that is most advantageous to the focus, if another DMU appears better than the focus DMU, it will obtain an efficiency score lower than 1. Every DMU in DEA has its own computation made for it.

Interdisciplinary Relevance

Different service organizations can reap different benefits from DEA, and it can be customized to enhance service productivity. Service managers' increased usage of DEA will reveal its shortcomings as well as new opportunities for gains and advantages. The latter will assist identify situations where this methodology is inappropriate and ineffectual, enabling librarians to recognize these kinds of uses of DEA. It can also establish the agenda for future research on adapting DEA. In comparison to other productivity management tools, DEA is very potent because of its underlying linear programming methodology. DEA has been extensively researched, utilized, and examined by scholars who possess knowledge of linear programming. The ability to comprehend linear programming and the accompanying mathematical notation is necessary in order to use DEA.

Review of Literature

The DEA technique is extensively studied in operations research and economics literature. It has been applied to various settings, including libraries, according to a bibliography compiled by Seiford (1994).

Easun's dissertation work is on determinant-based evaluation (DEA) in libraries. Some studies including all university and college libraries in Taipei, Taiwan, while others included all U.S. academic libraries. Most of these studies were published outside the library and information science literature, making them difficult to access for library managers. All studies had multiple inputs and outputs, with four out of seven including nondiscretionary input variables. Output variables were most often total circulation and reference transactions. Easun's approach was unique, using a three-stage model where output variables were used as input variables in later stages. The final outputs were student performance in standardized tests, which may be overly aggressive as they are school-related outcomes outside the context of digital media centers (DMUs).

Usefulness of the study:

Study is useful to identify the most efficient units or best practice units (branches, departments, individuals) and the inefficient units in which real efficiency improvements are possible.
Study is useful to calculate the amount and type of cost and resource savings that can be achieved by making each inefficient unit as efficient as the most efficient best practice unit.
Study is useful to identify amount of additional service an inefficient unit can provide without the need to use additional resources.

Methodology:
After reviewing the literature on the efficacy of resources in libraries, the factors for evaluation were determined as the inputs and outputs of DEA and the evaluating model was designed accordingly. The study population will be the Teachers, Researchers and Students of Colleges. An empirical study was conducted to examine the feasibility of this method. The phases of the study were as follows:

1. Determination of a Decision Making Unit (DMU)

This study referred to the purchase list of the library to determine the purchase method for Books, Printed Journals and electronic databases and used single purchased items as the baseline for a DMU.

2. Selection of Inputs and Outputs

The study evaluated the efficiency of e-databases using the evaluation method of DEA, which is based on input and output data of a Digital Library Management Unit (DMU). Five output variables were selected, including sign-on sessions, reference transactions, total circulation, and library instruction. The study also included discretionary and nondiscretionary variables, which are used to determine the library's service capacity. The DEA model accommodates these variables as a special type of input variable, avoiding manipulation of user populations.

Output Variables:

• Total number of circulations including renewals.

• Number of reference transactions excluding directional questions

• Total number of full text downloads of the database in 2 years.

• Total number of searches conducted in Electronic Database in 2 years.

• Total number of reprographic copies counter.

Input Variable:

Collection Characteristics (Discretionary)

• Total collection held

• Net volumes of books added during the period.

• Total number of electronic database subscribed

• Total number of Printed Journal Subscribed.

Staff Characteristics (Discretionary)

• Number of full-time, professional staff.

• Number of full-time, support staff.

• Number of full-time equivalents of hourly student employees.

3. Selection of Evaluation

The study will focus on the input model. First, technical efficiency will be obtained by the CCR model and pure technical efficiency and returns to scale will gathered by the BCC model. The direction and range of improvement for the inputs and outputs of resources in the library will be identified from a slack variable.

4. Result Analysis can be carried out with the help of following analysis.

(1) Efficiency Analysis

The most efficient units or best practice units (branches, departments, individuals) and the inefficient units in which real efficiency improvements are possible.

(2) Slack Variable Analysis

SVA provided the direction for improvement and margin for inefficient DMUs (with efficiency rates less than one) by calculating how many inputs should be diminished and how many outputs should be produced.

(3) Sensitivity Analysis

Sensitivity analysis showed variations in efficiency rate after adjusting input and output items.

Conclusion: In conclusion, it appears that Data Envelopment Analysis is highly helpful for the evaluation of academic libraries when combined with other evaluation methods. to determine which inefficient units' branches, departments, or individuals are the most efficient or best practice units, and which inefficient units—individuals or departments—can actually become more efficient. Determines the quantity and kind of resource and expense reductions that may be attained by increasing each inefficient unit's efficiency to that of the best-practice unit. to determine how much more service an inefficient unit can offer without requiring the usage of more resources.

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THE USE OF MESSAGING TOOLS BY LIBRARIES: ENHANCING COMMUNICATION AND USER ENGAGEMENT

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Abstract

This research article investigates the adoption and impact of messaging tools in libraries, examining how these tools facilitate communication with users, enhance service delivery, and promote engagement. The study synthesizes existing literature and explores case studies to highlight best practices, challenges, and future trends in leveraging messaging tools within library settings.

Keywords: Messaging tools, libraries, communication, user engagement, technology adoption, service delivery

Introduction: Libraries have traditionally served as vital information hubs, adapting continuously to meet the evolving needs of users in a digital age. The integration of messaging tools represents a significant advancement in library communication strategies, offering libraries new avenues to engage with patrons efficiently and effectively. This article explores the theoretical underpinnings and practical implications of utilizing messaging tools in libraries to foster enhanced communication and user engagement. By examining existing literature and theoretical frameworks, this study aims to provide insights into how libraries can strategically deploy messaging tools to enrich user experiences and improve service delivery.

Communication theory perspective:

- **Social Presence Theory:** Discusses how messaging tools enhance social presence by facilitating real-time interactions between librarians and users, thereby reducing perceived distance and enhancing communication effectiveness.
- **Usage and Gratification Theory:** Examines how users' needs for information and interaction drive their engagement with messaging tools, emphasizing the role of user preferences and motivations in shaping library communication strategies
- **Unified theory of acceptance and use of technology:** Analysis factors influencing the adoption and usage of messaging tools by library staff and patrons, including perceived usefulness, ease of use, and social influence.

Types of Messaging Tools Used in the Library

- **SMS (Short Message Service):** The role of SMS in delivering timely notifications, reminders, and alerts to library users, enhancing communication efficiency and improving service accessibility.
- **Chatbot:** the implementation of chatbots in libraries to provide instant responses to user inquiries, automate routine tasks, and extend service availability beyond traditional operating hours
- **Social Media Messaging platforms:** the use of platforms like Facebook Messenger, Twitter Direct Messages, and WhatsApp for engaging with users on familiar social media channels, promoting outreach and enhancing user interaction

Benefits of Messaging Tools

- **Instant Communication:** Messaging tools enable libraries to provide real-time assistance and support to users. Patrons can quickly ask questions, get information about library services, or receive help with research inquiries without needing to visit the library in person or wait for an email response.
- **Convenience and Accessibility:** Users can access library services and support from anywhere with an internet connection. This accessibility is particularly beneficial for users who may have mobility issues or live in remote areas, expanding the reach of library services.

- **Enhanced User Engagement:** Messaging tools facilitate interactive communication that can lead to deeper engagement with library resources and services. Librarians can engage users in discussions, recommend resources, and provide personalized assistance based on individual needs and interests.
- **Promotion of Library Events and Services:** Libraries can use messaging tools to promote upcoming events, workshops, new book releases, and other library services. This direct communication channel helps to increase awareness and participation among library patrons.
- **Improved Customer Service:** By offering prompt responses and personalized assistance, libraries can enhance their overall customer service experience. Users appreciate the convenience of receiving help in a timely manner, which can improve satisfaction and loyalty to the library.
- **Efficient Resource Sharing:** Messaging tools can streamline the process of sharing digital resources such as articles, e-books, and research guides. Librarians can send direct links or provide instructions on accessing resources, making it easier for users to find and utilize library materials.
- **Data Collection and Analysis:** Messaging tools provide libraries with valuable data on user inquiries, preferences, and behaviours. This data can be analysed to understand user needs better, improve service offerings, and tailor marketing efforts to specific user segments.
- **Cost-Effectiveness:** Compared to traditional methods of communication (e.g., phone calls, in-person visits), messaging tools can be more cost-effective for libraries. They reduce the need for extensive telephone support and can optimize staff time by handling multiple inquiries simultaneously.
- **Integration with Existing Systems:** Many messaging tools can integrate with library management systems (LMS) and other digital platforms. This integration facilitates seamless access to library catalogues, databases, and other resources directly from the messaging interface.
- **Promotion of Digital Literacy:** Using messaging tools encourages patrons to engage with digital technologies and develop digital literacy skills. Libraries can provide guidance on using these tools effectively, empowering users to navigate information resources independently.

Challenges and Consideration

- **Technical Challenges:** Addresses issues related to interoperability, integration with existing library systems, and data security concerns associated with messaging tool adoption in libraries.
- **User Acceptance and Training:** Discusses challenges in promoting user acceptance of messaging tools and the importance of staff training to ensure proficient use and effective communication practices
- **Privacy and Security Concerns:** Libraries handle sensitive user data, including borrowing history and personal information. Messaging tools need to comply with privacy regulations (like GDPR) and ensure secure transmission and storage of data.
- **User Authentication:** Verifying the identity of users and ensuring that only authorized individuals receive sensitive information can be challenging. Libraries need robust systems to authenticate users securely.
- **Integration with Library Systems:** Messaging tools often need to integrate with existing library management systems (LMS). Ensuring seamless integration can be complex and may require technical expertise.
- **Managing User Expectations:** Users may expect instant responses through messaging platforms. Libraries need to manage these expectations and set clear guidelines for response times and availability.
- **Staff Training:** Library staff may require training to effectively use messaging tools and handle user inquiries or issues appropriately. This includes understanding how to maintain professionalism and confidentiality in written communications.
- **Resource Allocation:** Using messaging tools effectively requires allocating resources for staff to manage inquiries promptly. This can strain limited staffing resources, especially for smaller libraries.

- **Accessibility:** Ensuring that messaging tools are accessible to all users, including those with disabilities, requires attention to usability standards and providing alternative communication methods when necessary.
- **Language and Cultural Considerations:** Libraries serving diverse communities need to consider language barriers and cultural differences in communication styles when using messaging tools.
- **Data Analysis and Metrics:** Measuring the effectiveness of messaging tools in enhancing communication and user engagement requires collecting and analysing relevant data. Libraries may need to invest in tools and expertise for data analytics.
- **Maintenance and Updates:** Like any technology, messaging tools require maintenance and periodic updates to ensure functionality and security. Libraries need plans for regular updates and backups to prevent disruptions in service.

Future Directions and Recommendation: The use of messaging tools by libraries presents numerous opportunities to enhance communication and user engagement, both now and in the future. Here are some future directions and recommendations for leveraging messaging tools effectively:

1. **Personalized User Engagement**: Libraries can utilize messaging tools to provide personalized recommendations, updates on borrowed items, and notifications about upcoming events or new arrivals tailored to individual user interests. Implementing AI-driven chatbots can further enhance this by providing instant assistance and information retrieval.
2. **Interactive Virtual Assistants**: Develop interactive virtual assistants that can guide users through library resources, help with research queries, and provide real-time assistance via messaging platforms. These assistants could also integrate with library catalogues and databases to facilitate seamless access to information.
3. **Community Engagement and Outreach**: Messaging tools can be used to foster community engagement by creating groups or channels where users can discuss books, share recommendations, and participate in virtual book clubs or discussions. Libraries can also use messaging for outreach to underrepresented groups or communities who may benefit from library services but face barriers to access.
4. **Real-Time Support and Feedback**: Provide real-time customer support through messaging platforms, allowing users to ask questions, report issues, or provide feedback on library services. This not only improves user experience but also helps libraries identify areas for improvement and respond promptly to user needs.
5. **Promotion of Library Events and Services**: Use messaging tools to promote library events, workshops, and programs directly to users who have opted in to receive such notifications. This targeted approach can increase attendance and engagement with library activities.
6. **Integration with Library Systems**: Integrate messaging tools with existing library management systems to automate routine communications such as due date reminders, hold notifications, and overdue notices. This streamlines operations and ensures timely delivery of important information to users.
7. **Data Privacy and Security**: As messaging tools involve direct communication with users, libraries must prioritize data privacy and security. Implement robust protocols for handling user data, obtaining consent for communications, and ensuring compliance with relevant regulations such as GDPR or CCPA.
8. **Accessibility Considerations**: Ensure that messaging platforms and virtual assistants are accessible to all users, including those with disabilities. Provide alternative communication channels and assistive technologies to accommodate diverse user needs effectively.
9. **Continuous Evaluation and Adaptation**: Regularly assess the effectiveness of messaging tools through user surveys, analytics, and feedback mechanisms. Use insights gained to refine communication strategies, improve user engagement, and adapt to evolving user preferences and technological advancements. Strategically leveraging messaging tools, libraries can not only enhance communication and user engagement but also adapt to the changing needs and expectations of their communities in the digital age.

Conclusion: The adoption of messaging tools by libraries represents a transformative shift in how they engage with users and deliver services. By leveraging these tools effectively, libraries can enhance communication and user engagement in several impactful ways such as Personalization and User-Centric Services, Community Building and Outreach, Efficiency and Automation, Feedback and Continuous Improvement. technology evolves and user behaviours change, libraries must continue to innovate and adapt their use of messaging tools to remain relevant and responsive to the needs of their communities. By maintaining a user-centric approach and prioritizing data privacy and accessibility, libraries can maximize the benefits of messaging tools in enhancing communication and user engagement, ultimately enriching the overall library experience for all users.

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EXPLORING THE IMPACT OF DIGITAL TECHNOLOGIES ON LIBRARIES AND INFORMATION SERVICES

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Abstract

The rapid advancement of digital technologies has profoundly impacted libraries and information services, transforming the way knowledge is accessed, shared, and preserved. As we explore this evolving landscape, it is crucial to understand the far-reaching implications of these technological advancements. on the role of libraries in modern society. Digital resources have expanded access to information beyond physical boundaries, allowing users to retrieve vast amounts of data from anywhere at any time. This shift has necessitated a reimagining of library spaces and services, with many institutions now offering digital literacy programs, e-book collections, and online research tools. Moreover, the integration of artificial intelligence and machine learning in library systems has revolutionized cataloguing, search capabilities, and personalized recommendations. These technologies enable libraries to better understand and anticipate user needs, enhancing the overall experience and relevance of their services. However, this digital transformation also presents challenges, such as ensuring equitable access to technology, protecting user privacy, and preserving digital content for future generations. Libraries must navigate these issues while continuing to serve as trusted community hubs and guardians of knowledge.

Keywords: Changing Landscape, Spaces and Services, Empowering Patrons, Digitizing Collections

Introduction

As we explore the impact of these transformative technologies, it becomes evident that libraries are no longer confined to physical spaces, but have expanded their reach into the digital realm. The changing landscape has empowered patrons, providing them with unprecedented access to a wealth of information, resources, and services at their fingertips. This digital evolution has not only enhanced accessibility but also revolutionized the way knowledge is consumed and shared. Libraries now offer virtual reference services, e-book collections, and online databases, catering to the diverse needs of a tech-savvy generation. Furthermore, these advancements have fostered a more inclusive environment, breaking down geographical barriers and accommodating patrons with varying abilities. The integration of artificial intelligence and machine learning algorithms has enabled libraries to personalize user experiences, recommending relevant resources based on individual interests and research patterns. This tailored approach not only streamlines information retrieval but also encourages intellectual curiosity and lifelong learning. Moreover, the digital transformation has positioned libraries as community hubs for digital literacy, offering workshops and training programs to bridge the technological divide. By embracing these innovations, libraries have reinvented themselves as dynamic centres of knowledge exchange, adapting to the ever-changing needs of their patrons while preserving their fundamental role as guardians of information and intellectual freedom.

The digitization of collections has been a game-changer, allowing libraries to preserve and make accessible a vast trove of knowledge that was once confined to the physical realm. This digital transformation has not only enhanced the user experience but has also opened up new avenues for collaboration, resource sharing, and global connectivity. By embracing digital technologies, libraries have significantly expanded their reach and impact. Researchers can now access rare manuscripts and historical documents from anywhere in the world, breaking down geographical barriers and democratizing information access

Objective

1. To find the changing landscape of libraries in the digital age.
2. To find from physical to virtual: how libraries are adapting their spaces and services.
3. To find empowering patrons through digital literacy and access.
4. To find the challenges and opportunities of digitizing collections and archives.

The Changing Landscape of Libraries in the Digital Age

The rise of digital technologies has undoubtedly transformed the way we access and consume information. In this rapidly evolving landscape, libraries have had to adapt and reinvent themselves to remain relevant and valuable to their communities.

No longer confined to physical spaces, libraries are now embracing the digital realm, offering a wealth of online resources and services that cater to the needs of modern information seekers. From e-books and digital archives to virtual reference desks and online learning platforms, libraries are leveraging technology to expand their reach and impact.

This digital transformation has not only enhanced the user experience but has also empowered libraries to become hubs of digital literacy and innovation. By providing access to cutting-edge technologies and digital tools, libraries are equipping patrons with the skills and knowledge necessary to navigate the digital world effectively.

Moreover, the integration of technology has enabled libraries to streamline their operations, optimize resource management, and enhance the overall efficiency of their services. This, in turn, has allowed them to allocate more resources towards curating and delivering high-quality content, fostering community engagement, and supporting lifelong learning.

As we move forward, the role of libraries in the digital age will only continue to evolve, with new and exciting opportunities on the horizon. By embracing technological advancements and adapting to the changing needs of their communities, libraries can cement their position as indispensable institutions that enrich our lives and shape the future of knowledge and information access.

From Physical to Virtual: How Libraries are Adapting their Spaces and Services

Libraries are undergoing a profound transformation, evolving from traditional physical spaces to dynamic virtual environments that cater to the changing needs of their patrons. As technology continues to reshape the way we access and consume information, libraries are adapting their spaces and services to remain relevant and accessible in the digital age.

One of the key trends driving this transformation is the increasing demand for online library resources. Patrons now expect to be able to access a wide range of digital materials, from e-books and audiobooks to scholarly journals and databases, from the comfort of their own homes. Libraries are responding by investing in robust digital collections and user-friendly platforms that make these resources easily accessible.

Beyond just providing digital content, libraries are also leveraging technology to enhance their physical spaces and services. Interactive kiosks, virtual reality experiences, and collaborative workspaces are just a few examples of how libraries are integrating cutting-edge technologies to create engaging and immersive experiences for their visitors.

As the digital landscape continues to evolve, libraries must stay ahead of the curve to remain relevant and valuable to their communities. By embracing the power of technology and adapting their spaces and services accordingly, libraries can ensure that they remain the cornerstone of knowledge and learning for generations to come.

Empowering Patrons through Digital Literacy and Access

Libraries play a vital role in empowering patrons through digital literacy and access. By providing technology resources and training, libraries are bridging the digital divide and ensuring all community members can thrive in the modern, tech-driven world.

Digital literacy is a critical skill in today's society, yet many lack access to the tools and knowledge needed to develop this competency. Libraries are stepping up to fill this gap, offering patrons opportunities to learn essential digital skills, from online research to coding. Through workshops, one-on-one guidance, and innovative programs, libraries are empowering users to navigate the digital landscape with confidence.

Moreover, libraries are expanding access to technology, making devices, high-speed internet, and specialized software available to those who may not have these resources at home. This access is a game-changer, enabling patrons to apply digital skills, explore new opportunities, and participate fully in the digital economy and civic life.

By championing digital literacy and access, libraries are transforming lives and communities. They are ensuring that all individuals, regardless of socioeconomic status or background, have the tools and support needed to succeed in the 21st century.

The Challenges and Opportunities of Digitizing Collections and Archives

Digitizing library collections and archives presents both challenges and opportunities. While the benefits of increased access and preservation are clear, the process of digitization requires careful planning and execution.

One of the primary challenges is the sheer scale of many library and archival holdings. Digitizing entire collections can be a monumental task, requiring significant resources and specialized expertise. Institutions must also grapple with issues of copyright, metadata management, and long-term digital preservation to ensure the integrity and accessibility of their digital assets.

However, the opportunities presented by digitization are vast. By converting physical materials to digital formats, libraries can make their collections available to users around the world, breaking down geographic barriers. Digitization also enables new modes of research and discovery, allowing users to search, annotate, and interact with materials in ways previously impossible. Moreover, digital preservation offers a safeguard against the deterioration of fragile physical items. By creating high-quality digital surrogates, libraries can protect their collections for generations to come, ensuring that cultural heritage remains accessible for years to come. As libraries and archives continue to navigate the complexities of digitization, it is clear that this transition presents both obstacles and possibilities. With strategic planning, dedicated resources, and a commitment to best practices, institutions can harness the power of digital technologies to transform the way we engage with and preserve our shared cultural legacy.

Leveraging Data Analytics and AI to Enhance Library Services

Libraries can leverage data analytics and AI to enhance their services and better meet the needs of their patrons. By harnessing the power of data and intelligent technologies, libraries can gain valuable insights to optimize operations, personalize user experiences, and drive innovation. Data-driven decision making is crucial for modern libraries. Advanced analytics can help identify usage patterns, popular resources, and areas for improvement. This data-centric approach enables libraries to allocate resources more effectively, tailor collections and programming to user preferences, and proactively address evolving patron needs. Integrating AI-powered tools into library management can streamline workflows and elevate the user experience. AI-driven recommendation engines can suggest personalized book selections, while chatbots can provide instant assistance to patrons. Automating repetitive tasks through AI also frees up librarians to focus on high-value, human-centric services. By embracing data analytics and AI, libraries can transform themselves into dynamic, technology-enabled hubs that deliver unparalleled value to their communities. This strategic use of innovative tools empowers libraries to stay relevant, responsive, and essential in the digital age.

Conclusion

The future of libraries lies in embracing the digital age and adapting to the changing needs of patrons. As technology continues to evolve, libraries must position themselves as indispensable hubs of information, knowledge, and community engagement. By leveraging digital tools and platforms, libraries can expand their reach, enhance user experiences, and remain relevant in the 21st century. From offering e-books and online databases to hosting virtual events and providing digital literacy training, libraries can seamlessly integrate technology into their services. Moreover, libraries must redefine their role as curators of information, guiding users through the vast sea of digital content and ensuring the reliability and accuracy of the resources they provide. By becoming trusted partners in navigating the digital landscape, libraries can cement their position as essential community institutions.

Ultimately, the future of libraries lies in their ability to adapt, innovate, and meet the evolving needs of their patrons. By embracing the digital future, libraries can continue to serve as beacons of knowledge, learning, and community, solidifying their status as indispensable pillars of our society.

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MOBILE TECHNOLOGY: INNOVATIVE TOOL FOR LIBRARIES.

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Abstract

The purpose of this paper is to compile and explain the mobile services developed in the world over libraries. The paper will be useful for libraries searching new and innovative technological channels to communicate and deliver their services

Keywords: Academic libraries, Mobile communication systems, Reference services

Introduction

The Internet and global mobile technology have made it possible for libraries to reach communities in ways that were not possible before. Mobile technology is "IT" technology& is trend of generating innovations for library services. Great shift is achieved due to this, for librarians and libraries. Librarians are preparing for the future & implementation has slashed travel budget of the community. Academic community users' smart phone drastically rising, so the demand for mobile library services is becoming stronger and more diversified. The rapid increase in the internet and mobile penetration helping library professionals to keep innovating newer ways of effectively reaching their targeted users and create relevant favorable relationship with them. Especially, in the university libraries because of teenage users, the demand for mobile based library services that facilitate the library educational resources and services provided is indispensable. The widespread mobile technology is emerging the need to integrate mobile library resources (e-resources, digital content.)

Need to Use Mobile Phones to provide library services: The users need information but do not have sufficient time to visit libraries. Rather they expect the libraries to reach them. In changing information environment, librarians need to think about the range of services and methods to outreach the users to way out for managing change. Libraries in other countries of the world are successfully providing library services through mobile phones. User can move or be moved freely and easily& the ability to move between different levels in society or employment. Mobile services are considered here as more than the access to the information and the library from a mobile device but as also encompassing those services that facilitate access to information resources from anywhere or any device, and, moreover, those that exploit the capabilities of these devices to facilitate access to information to the users. Academic librarians can leverage this usage of mobile devices to effectively deliver products and services to students and faculty

Types of Mobile Services

Mobile Web site- can be accessed and used from portable devices which are able to connect to the internet and to display contents through a browser. A mobile web, in contraposition with a traditional one, is characterized by: content simplification, tending to show only essential content due to the small screens of mobile devices; graphic design, avoiding pictures and graphics; and real-time publication of content -the user gets data about the availability of resources which can help him/her to make decisions regarding their information needs.

General information - Here, patrons can find general information on library including address, operating hours, maps and telephone numbers of the Library's main services. **Directory** - The Directory includes a list of names and information about the staff working - name, profile, e-mail address and phone number. From this list users can call directly to any phone number or incorporate as a contact in their phone lists by simply clicking.

Mobile OPAC - Users can link to the mobile version of the catalog of the library.

Laptops-Library can offer a laptop loan service that users can borrow for a maximum period hour, extendable in the case of no pending reservations.

Group study rooms - The Library rooms for group study that can be reserved in advance. Users can make a reservation through the main web site and then ask for access to the room at the counter of the corresponding floor

showing their university ID card. Program for videogames consider as a powerful tool both for the professors and the students. This opens the door to a more social use of the library which has room for recreation.

Mobile information resources - users can find subscribed newspapers and other e-resources like subscribed information resources from digital library.

Survey feature - Survey scan be published on homepage in order to better ascertain users' opinions regarding library issues, and corresponding section of mobile web site, users can participate in those polls and track its results, in the same way they can through their computer.

Ask a librarian - Any user can complete a form and send questions, opinions and suggestions via mobile web site. In the case of suggestions, if an answer is desired, the user can choose to have the response sent via email message or an SMS from the library. In addition, to improve our local service, a chat reference service

Help - consists of brief and simple explanations about the mobile web site and the sections and information the user can find there.

Mobile OPAC- allow the users to search the catalog from their cell phone or PDA as they would do on any computer, facilitating access to all available information on it.

Data extraction - the whole content of the catalog can be extracted daily and downloaded into a MySQL database.

Search-The mobile catalog and from here users can launch their searches.

Electronic book readers lending service- delivering e-books through web site

SMS notifications-considered and it was decided to complement services with text messaging when requested.

QR codes- is a system to store information within a dot matrix or two-dimensional bar code

Mobile apps: Dedicated applications for accessing library catalogs, reserving books, and managing accounts [4].

SMS notifications: Sending alerts for due dates, available holds, and library events [6].

Mobile payment systems: Allowing patrons to pay fines or fees using their mobile devices [7].

Augmented Reality (AR): Enhancing the physical library experience with digital overlays of information [8].

Location-based services: Providing personalized recommendations based on a user's location within the library [9].

Conclusion:

Academic libraries today immersed in a new context where commercial and communicational interaction is held more and more through mobile devices. Every moment new feature are to the technology and the advantage is for the users can interact with library professionals, faculty and colleagues without restriction of time and place. They can actually access library resources and services at the place and time that they need it, Library users can directly download the notes, course reserve e-books, research articles and other materials in to the mobile phones/ devices. User needs can be delivered on demand. Mobile libraries help to raise self-esteem and self-confidence of library users. Limitation of devices capacities such as small screens, memory size and computing power, lack of common operating system and application programs like browsers. Wireless networks may down with a large no. of users when using it.

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CHALLENGES AND OPPORTUNITIES OF DIGITAL TRANSFORMATION IN ACADEMIC LIBRARIES

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Abstract

To give fastest, better and accurate service digital transformation is very important. Now a day's digital initiatives have become increasingly common in libraries. The digital transformation of libraries is a dynamic process that has imperative in the face of rapidly evolving technological landscape. Current emerging technologies like Cloud computing, mobile computing, e-readers, e-books, and virtual technologies like Gamification and virtual reality is very important for academic libraries. Present article explores the challenges faced by libraries adapting to digital transformation in academic libraries. It also discusses the digital transformation of academic libraries, focusing on automation, digital library etc.

Keywords: Digital Transformation, Transformation, Elements of digital transformation, Challenges in digital transformation.

Introduction: Today's age digital transformation has become a defining aspect of the contemporary library landscape, reshaping the way information is accessed, stored and disseminated. In this era libraries are compelled to undergo significant changes to meet the evolving needs of users and to remain relevant in an increasingly technology- driven society. Now day's every fields, sectors are moving towards digital transformation. In this situation library should transform into digital library to satisfy the information needs of the users. It is only possible through the proper utilization of emerging technologies or ICT. Today world is recognized as digital world. Now a day's most of the sectors are providing e- services like E-Commerce, E-Banking, E-Learning etc. So there is need of this era to move forward for the modernization of library activities. so that it would be possible to share and collaborate at national and international levels so as to fulfill the divorce information needs of the users at almost level. Digital transformation involves strategy, processes, vision, people and technology. The traditional concept of library as a store house of knowledge is lagging behind giving rise to rapidly emerging concepts like Electronic Library, Digital Library, Virtual Library. Today that time are changing. With Internet access and E- Reading devices, visiting the library is no longer necessity for today users. The library has changed a great deal over the past decade, due to changing demands from Student, teachers, researchers and the onset of digital revaluation of library holdings. digital transformation is powered by disruptive, digital technology insights and processes.

Objectives of Digital Transformation in Libraries:

1. To do improvement in digital access to information collections for online access, remote access to digital resources, user-friendly search and discovery tools.
2. Enhance User Experience Develop intuitive digital interfaces for catalog browsing offer personalized recommendation systems, implement mobile-friendly services and apps.
3. Expand Resource Availability Subscribe to and integrate e-books and e-journals Participate in digital lending networks create and manage institutional repositories.
4. Modernize Library Operations implement automated circulation systems, Use RFID technology for inventory management, adopt cloud-based library management systems.
5. Foster Digital Literacy provide training programs on digital tools and resources, offer workshops on information literacy and research skills, create online tutorials and learning materials
6. Support Research and Collaboration, implement data management and curation services, provide digital tools for collaborative research, offer virtual research consultation services
7. Preserve Digital and Cultural Heritage, develop digital archiving strategies, implement systems for long-term digital preservation, participate in collaborative digitization projects
8. Enhance Community Engagement use social media for outreach and communication, organize virtual events and webinars create online community spaces and forums.

9. Improve Data-Driven Decision-Making implement analytics tools for usage statistics, use data to inform collection development, track user behavior to improve services
10. Ensure Accessibility and Inclusivity implement assistive technologies for users with disabilities. provide multilingual interfaces and resources, ensure digital resources meet accessibility standards
11. Support Distance Learning integrate with Learning Management Systems, provide online research guides and subject portals, offer virtual reference services
12. Enhance Information Security, implement robust cybersecurity measures ensure patron privacy in digital transactions, develop policies for ethical data use and storage
13. Optimize Resource Allocation, use data analytics to inform budget decisions, implement demand-driven acquisition models, automate routine tasks to free up staff time.

These objectives aim to transform libraries from traditional book repositories into dynamic, digital-first information hubs that can meet the evolving needs of their users in the digital age. The specific priorities may vary depending on the type of library (academic, public, special, etc.) and the communities they serve.

Digital Transformation: Digital transformation in libraries are not just about adopting new technologies, but also about rethinking the role and value of libraries in the digital age. Libraries have been innovating and adapting to meet the changing needs and expectations of their readers, partners and communities.

Challenges in Digital Transformation: The digital transformation of academic libraries introduces a lot of challenges that demand strategic solutions. Here are some key challenges faced by libraries in their journey towards digital transformation.

1. Information Accessibility: Ensuring equitable access to digital resources for diverse user groups, addressing the digital divide to promote inclusivity in information access.

2. Technological Obsolescence: Managing and updating technology infrastructure to keep pace with rapid advancement. Balancing the integration of emerging technologies with budgetary constraints.

3. **Resistance to Change:** Many employees and even management may resist new digital processes, preferring familiar methods. This can slow adoption and reduce the effectiveness of digital initiatives. Overcoming this often requires cultural change and strong change management strategies.

4. Legacy Systems: Older, outdated IT systems can be difficult to integrate with new digital technologies. Replacing these systems can be costly and time-consuming. Sometimes, critical business processes rely on legacy systems, making transitions complex.

5. Lack of Internet Connectivity: In many areas, especially rural or developing regions, reliable high-speed internet is not available. This limits the ability to implement cloud-based solutions or real-time data analytics. It can create a digital divide within organizations or between businesses and their customers.

6. Lack of Power Supply: Unreliable electricity supply can disrupt digital operations. This is particularly challenging in developing countries or remote areas. It necessitates investments in backup power solutions, adding to costs.

7. Lack of Trained Manpower: Digital transformation requires specific technical skills that may not be readily available. Existing staff may need extensive retraining. Attracting and retaining skilled IT professionals can be difficult and expensive.

8. Lack of Funds: Digital transformation often requires significant upfront investment. Small and medium enterprises may struggle to allocate sufficient budget. Ongoing costs for maintenance, upgrades, and training can be substantial.

9. Lack of Infrastructure: Both physical (e.g., data centers, servers) and digital (e.g., cloud services, software platforms) infrastructure may be inadequate. Developing this infrastructure can be time-consuming and expensive. In some regions, basic technological infrastructure may be entirely absent.

10. Lack of Guidance: Many organizations struggle with developing a clear digital strategy. There may be a lack of leadership or expertise in managing digital transformation. Without proper guidance, digital initiatives can become fragmented or misaligned with business goals.

11. Data Security and Privacy Concerns: Digital transformation often involves handling more data, increasing cybersecurity risks. Compliance with data protection regulations (e.g., GDPR) can be complex. Building customer trust in digital systems can be challenging.

12. Integration Challenges: Ensuring new digital systems work seamlessly with existing processes can be difficult. Different departments or branches may use incompatible systems. Creating a unified digital ecosystem often requires significant effort and expertise.

13. Rapidly Evolving Technology: The fast pace of technological change can make it hard to choose the right solutions. Investments in technology may become obsolete quickly. Continuous learning and adaptation are necessary.

14. Measuring ROI: Quantifying the benefits of digital transformation can be challenging. Some benefits may be intangible or long-term. This can make it difficult to justify ongoing investments.

Addressing these challenges typically requires a comprehensive strategy that considers technology, people, processes, and organizational culture. Successful digital transformation often involves strong leadership, clear communication, adequate resources, and a willingness to adapt and learn throughout the process.

Conclusion: The fifth law of library and information science is , “Library is a growing organism” day by day its collection and users will increase. We cannot store universe of knowledge in a single building or library. and we cannot provide services to the N number of library users in the library but it can be possible only through digital library system so the libraries need to transform into digital library. To perform well in today ICT world there is a need of transformation in digital form. Adopting digital technology is essential for keeping up with the needs of the modern world.

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THE ROLE OF INNOVATIVE TECHNOLOGIES IN SHAPING MODERN DIGITAL LIBRARIES

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Abstract

Innovative technologies have significantly transformed digital libraries, impacting their development, accessibility, and functionality. This paper explores how technologies such as artificial intelligence (AI), machine learning, blockchain, and cloud computing are reshaping digital library environments. By examining current trends and technologies, the paper highlights their role in enhancing library services, improving resource management, and increasing user engagement. The analysis provides insights into how these technologies contribute to the evolution of digital libraries, addressing both the opportunities and challenges they present.

Keywords: Innovative Technologies, Digital Libraries, Artificial Intelligence, Machine Learning, Blockchain, Cloud Computing, Library Services, Resource Management

1 Introduction

In the digital age, libraries are transitioning from traditional, physical repositories of information to dynamic digital environments. This transformation is driven by the integration of innovative technologies that enhance how libraries operate and interact with users. Traditional libraries, once focused primarily on physical collections, are now evolving into digital hubs that offer a wide array of electronic resources and services. This shift reflects broader trends in information management and dissemination, where the demand for instant access to information and personalized user experiences is ever-increasing.

The advent of technologies such as artificial intelligence (AI), machine learning, blockchain, and cloud computing has had a profound impact on digital libraries. These technologies not only streamline operations but also revolutionize user interactions, making information more accessible and manageable. For instance, AI enables automated cataloging and personalized recommendations, while blockchain ensures secure management of digital rights. Cloud computing provides scalable storage solutions, allowing libraries to handle vast amounts of data efficiently.

The integration of these technologies into digital libraries is significant for several reasons. First, it enhances the efficiency of library operations by automating routine tasks and optimizing resource management. Second, it improves the user experience by providing more accurate search results, personalized recommendations, and remote access to resources. Finally, it supports the growth of digital collections and facilitates collaboration among libraries and research institutions.

2.2 Objectives

- Analyze the impact of innovative technologies on digital library systems.
- Examine how AI, machine learning, blockchain, and cloud computing are utilized in modern digital libraries.
- Discuss the benefits and challenges associated with these technologies.

Review of Innovative Technologies

3.1 Artificial Intelligence (AI)

AI technology has become a cornerstone of modern digital libraries, offering capabilities that enhance user interaction and resource management. AI applications in digital libraries include automated cataloging systems, which use machine learning algorithms to classify and tag digital materials accurately. Additionally, AI-driven recommendation systems analyze user behavior and preferences to provide personalized suggestions for books, articles, and other resources.

One notable example of AI in action is the implementation of AI-powered chatbots. These chatbots assist users by answering queries, guiding them to relevant resources, and providing help with library services. By utilizing natural

language processing (NLP), AI chatbots can understand and respond to user requests in a conversational manner, improving overall user satisfaction (Smith, 2020).

3.2 Machine Learning

Machine learning, a subset of AI, involves training algorithms to recognize patterns and make predictions based on data. In digital libraries, machine learning enhances various aspects of resource management and user services. For instance, machine learning algorithms can optimize search functionalities by improving the accuracy of search results based on historical user data and contextual information (Brown, 2021).

Machine learning is also used to analyze usage patterns and predict future trends. By examining user interactions with library resources, machine learning models can identify emerging interests and preferences, allowing libraries to proactively adjust their collections and services to better meet user needs.

3.3 Blockchain Technology

Blockchain technology offers a secure and transparent method for managing digital records, including digital rights and content integrity. In digital libraries, blockchain can be utilized to track ownership and licensing information for digital materials, ensuring that all transactions are recorded in an immutable ledger (Johnson, 2022).

The application of blockchain technology in digital rights management helps prevent unauthorized access and modifications to digital content. By providing a decentralized and tamper-proof system for managing digital rights, blockchain enhances the security and transparency of digital libraries.

3.4 Cloud Computing

Cloud computing has revolutionized the way digital libraries store, manage, and access information. Cloud-based solutions offer scalable storage options, allowing libraries to accommodate large volumes of digital content without the need for extensive physical infrastructure.

In addition to storage, cloud computing facilitates remote access to library resources, enabling users to access e-books, journals, and databases from any location with an internet connection. This increased accessibility supports collaboration and information sharing among libraries and research institutions, further enhancing the value of digital library services (Smith, 2020).

Impact on Digital Libraries

4.1 User Experience

The integration of innovative technologies in digital libraries has significantly improved the user experience. AI-driven recommendation systems and machine learning algorithms enhance search functionalities and personalize resource suggestions, making it easier for users to find relevant information. Cloud computing enables users to access digital resources from anywhere, while blockchain ensures secure and transparent transactions, building trust in digital content management (Doe, 2023).

4.2 Improved Resource Management

Technologies such as AI and machine learning contribute to more efficient resource management by automating routine tasks and optimizing workflows. Automated cataloging systems reduce the manual effort required for organizing digital materials, while machine learning algorithms help libraries manage and analyze large datasets more effectively.

Cloud computing provides scalable storage solutions, allowing libraries to handle and manage extensive digital collections without the need for physical storage space. Blockchain technology enhances digital rights management, ensuring that access to digital content is controlled and monitored in a secure manner (Johnson, 2022).

4.3 Accessibility and Inclusivity

Innovative technologies have expanded the accessibility and inclusivity of digital libraries. AI-driven tools can assist users with disabilities, such as providing text-to-speech functionalities or adapting content for various accessibility needs. Cloud-based platforms ensure that digital resources are available to users in remote or underserved areas, bridging the gap between different communities (Smith, 2020).

Blockchain technology can also support equitable access to digital content by providing transparent and fair systems for content distribution and licensing. This inclusivity helps democratize access to information and supports the diverse needs of global users (Brown, 2021).

Challenges and Opportunities

5.1 Challenges

- **Privacy and Security:** Ensuring the privacy and security of user data remains a significant challenge with the integration of innovative technologies. Libraries must implement robust security measures to protect sensitive information and comply with data protection regulations (Doe, 2023).
- **Cost and Resources:** The financial and technical resources required for adopting new technologies can be a barrier for some libraries. Budget constraints and the need for specialized staff can limit the ability of libraries to fully integrate and leverage these technologies (Johnson, 2022).
- **Staff Training:** Effective implementation of new technologies requires staff training and development. Libraries must invest in training programs to ensure that staff members are proficient in using and managing innovative technologies (Smith, 2020).

5.2 Opportunities

- **Enhanced Service Offerings:** Innovative technologies provide opportunities for libraries to offer new and improved services, such as personalized recommendations, automated cataloging, and remote access to resources (Brown, 2021).
- **Increased Collaboration:** Cloud computing and blockchain facilitate collaboration among libraries and research institutions, enabling the sharing of resources and expertise. This collaboration can lead to more comprehensive and accessible library services (Johnson, 2022).
- **Future Innovations:** Ongoing advancements in technology present new possibilities for the future development of digital libraries. Libraries that embrace these innovations can stay ahead of emerging trends and continue to meet the evolving needs of users (Doe, 2023).

Conclusion

In conclusion, the integration of innovative technologies such as AI, machine learning, blockchain, and cloud computing has revolutionized the landscape of digital libraries. These technologies have not only improved the efficiency of library operations but have also transformed the way users interact with library resources. As digital libraries continue to evolve, it is essential for libraries to embrace these technologies to stay relevant and meet the changing needs of their users. By leveraging these technologies effectively, libraries can enhance their services, optimize resource management, and foster greater user engagement, ultimately shaping the future of digital libraries in a rapidly advancing technological landscape. (Smith, 2020).

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NEED AND CHALLENGES FOR LIBRARY COMPUTERISATION: AN OVERVIEW

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Abstract

This article provided an overview of library automation as well as an analysis of the evolving library management landscape. The study refutes the notion that it is a global requirement, stating that it has effectively bridged the educational development gap between developed and developing countries. Overall, library computerization offers significant benefits that enhance the accessibility, efficiency, and management of library resources. It improves user experience, facilitates resource discovery, provides valuable data for decision-making, and promotes collaboration among libraries. By embracing computerization, libraries can adapt to the digital age and better meet the evolving needs oftheir patrons.

Keywords: Library, Computerisation, automation, accessibility, efficiency, and management of library resources

Introduction

Libraries are undergoing major transformations. These adjustments may be inescapable and persuasive. Libraries are evolving beyond their traditional duty of preserving knowledge and incorporating new information storage, retrieval, and transmission mechanisms into their services. Organizations are adapting to the impact of new technology on their structures and personnel roles. Libraries are undergoing technological transitions in terms of service delivery and offerings. Literature suggests three primary causes for these changes: The information boom, rising expenses, and technological advancements. Computer and communication technology have significantly impacted library operations in recent years. Computer technology enables efficient information organization and manipulation, while communication technology allows for fast and accurate information delivery.

The use of computers for library activities is no longer a contentious subject. Several writers have explained why automated library systems (computer-based) were developed. This Unit covers library automation and the use of computers in libraries.

Gopinath (1992)[1] points out the scenario of public libraries in 19th century and the need to shape the libraries with existence of information technology. Ramesh Babu (1995)[2] studied the development of thepublic libraries in India outlining the role of computers in day to day library functionality. Gadalwad (2015)[3] addressed the concern of the public library development and library automation history in India. This paper briefed about the history about the library automation,

its need and growth structure, pre and post implementation issues etc.Adhe (2014)[4] Further, Singh (2008)[5] in his study “Library automation in modern age” explained about the various techniques and tools developed using automation of the libraries for simple accessibility delivering high professional services. Ingale (2014) [6] in her paper highlights the importance of ICT in automating library services like acquisition, cataloguing, circulation, OPAC, Web OPAC for public access and Serials management. Shuji (2007) [7] focused on the contribution of the latest technologies like RFID, Smart card etc. to deliver services.

The notion of library computerization started decades ago in technologically sophisticated countries including the United States, Canada, and Great Britain [9]. The movement has spread globally, particularly in developing third-world nations like Africa, Asia, and the Caribbean. Uses of computers worldwide are primarily for communication data in networkedenvironments”.

Computerizing the library functions andservices encompasses the initial:

- planning processes;
- Selection of hardware and software;
- Training of library personnel;
- Maintenance of system;

- Networking of computer terminals;
- Retrospective translation of library holdings, including printed materials and artifact records, into machine-readableformats using computer software.

The increase in publications due to social, economic, industrial, and educational development has led to challenges in information management, particularly in Africa and Asia. This is a global issue for libraries. Inadequate information availability and management hinders the advancement of education standards in underdeveloped nations.In recent years, there has been an increase in library use among students and staff in academic institutions. This includes computer applications for information management, teaching in library schools, and increased educational funding.

Additionally, libraries rely on information technology and communication to provideInternet access. Libraries have created websitesto organize and share information, both within and outside. Computerization has allowed libraries worldwide to create internationally accessible pages with hours, locations, and resources, as well as web design in several languages.

It is hardly an overstatement to say that library computerization is a positive improvement. According to Kline (2003), academic library patrons face a new information landscape that blurs the lines between scholarly, popular, and misinformation. [8]

Benefits Of Library Computerization

Library computerization offers numerous benefits that enhance the efficiency, accessibility, and overall management of library resources. Here are some key advantages of implementing computerizationin libraries:

1. **Improved Accessibility**: Computerization enables libraries to provide digital access to their collections, allowing users to search for and access resources remotely. Online catalogs and databases make it easier for patrons to find materials, check their availability, and place holds or requests. This enhances the accessibility of libraryresources and improves user satisfaction.
2. **Efficient Resource Management**: Computerized systems streamline various library processes, including cataloging, acquisitions, and circulation. Automatedcataloging tools facilitate the organization and indexing of materials, making it easier for library staff to manage and retrieve items. Integrated acquisition systems simplify the ordering and tracking of new materials, while circulation systems automate tasks such as check-in, check-out, and overdue notifications. These efficiencies save time and reduce manualerrors.
3. **Enhanced User Experience**: Library computerization enhances the user experience by providing self-service options. Users can independently locate andborrow materials using self-checkout kiosks, reducing wait times and improving convenience. Additionally, digital resources, such as e-books and online databases, can be accessed remotely,expanding the library's offerings beyond physical collections.
4. **Advanced Search Capabilities**:Computerized library systems offer powerful search functionalities, allowing users to perform detailed and customizedsearches based on various criteria, such as author, title, subject, or keyword. This enables users to quickly and accurately find the resources they need, promoting efficient research and information retrieval.
5. **Data Management and Analysis**: Computerization enables libraries to collect and analyze data on library usage, resource popularity, and borrowing patterns. This data can be leveraged to make informed decisions regarding collection development, resource allocation, and service improvements. It also aids in identifying trends, evaluating the effectiveness of library programs, and planning future initiatives.
6. **Preservation and Security**: Digital library systems facilitate the preservation and protection of valuable and fragile materials. Through digitization efforts, libraries can create digital copies of rare or deteriorating resources, ensuring their long-term accessibility. Additionally, computerized systems offer data backup and security measures to safeguard against loss or damage to library records and resources.
7. **Collaboration and Resource Sharing**: Library computerization promotes collaboration and resource sharing among libraries. Networked systems allow librariesto share cataloging records, interlibrary loan. services, and electronic resources. This expands the range of materials available to library users and fosters cooperative relationships among libraries.
8. **Digital Preservation and Archiving**: Computerization allows libraries to digitize and preserve valuable historical materials, manuscripts, photographs, and other unique resources. Digital preservation ensures that

these materials are protected from deterioration and can be accessed by future generations. Additionally, computerizedarchiving systems provide efficient storage, retrieval, and management of digital collections.

9. **Automation of Administrative Tasks**: Library computerization automates various administrative tasks, such as generating reports, managing memberships, tracking fines and fees, and handling interlibrary loan requests. This automation reduces the workload on library staff, allowing them to focus more on providing personalized services, assisting users, and developing innovative programs.
10. **Enhanced Collection Management**: Computerized library systems offer tools for collection assessment, analysis, and planning. Libraries can track the usage and popularity of specific resources, identify gaps in their collections, and make informed decisions about acquisitions and deselection. This helps optimize the collection to meet the needs and interests of library users.
11. **Integration with Digital Technologies**: Library computerization enables integration with various digital technologies and services. Libraries can provide access to e- books, online databases, digital repositories,and multimedia resources. They can also offer services like online renewals, reservations, and virtual reference assistance, expanding their reach and meeting the changing expectations of digital-savvy users.
12. **Efficient Interlibrary Cooperation**: Computerized systems facilitate interlibrary cooperation and resource sharing. Libraries can participate in consortia or networks, allowing users to access materials from multiple libraries through a unified system. Interlibrary loan processes can be streamlined, enabling efficient borrowing and lending of resources between libraries, which expands the range of materials available to users.
13. **Data-driven Decision Making**: Library computerization enables data collection, analysis, and reporting. Libraries can gatherinformation on user preferences, resourceusage, and program attendance. This data helps in assessing the impact of library services, identifying areas for improvement, and making evidence-based decisions regarding resource allocation and service enhancements.
14. **Streamlined Financial Management**: Computerized systems assist in financial management by automating tasks such asbudget tracking, invoice management, and expenditure analysis. This facilitatesaccurate financial reporting, improves transparency, and aids in the efficient management of library finances.
15. **Data Analytics and User Insights**: Computerized library systems enable the collection and analysis of data on user behavior and preferences. By tracking user interactions with the library's digital resources and systems, libraries can gain insights into user needs, interests, and usage patterns. This information can be used to personalize services, recommend relevant resources, and improve the overall user experience.
16. **Enhanced Communication and Outreach**: Library computerization facilitates efficient communication and outreach to library users. Libraries can utilize email notifications, SMS alerts, and automated messaging systems to inform users about new resources, upcoming events, due dates, and other importantupdates. This helps keep users engaged and informed about library services and activities.
17. **Remote Access and Virtual Services**:Computerized library systems enable remote access to digital resources, allowing users to access e-books, journals, databases,and other online materials from anywhere atany time. This is particularly beneficial for distance learners, researchers, and individuals who may not be able to physically visit the library. Virtual services such as virtual reference assistance and online chat support further enhance accessibility and convenience.
18. **Preservation of Library Heritage**: Librarycomputerization contributes to the preservation of library heritage and cultural artifacts. Through digitization efforts, libraries can create digital archives of rare books, manuscripts, photographs, and other historical materials, ensuring their long- term preservation and accessibility to a wider audience.
19. **Improved Resource Utilization**: Computerized library systems provide insights into resource utilization metrics such as circulation statistics, resource popularity, and demand patterns. Libraries can use this information to optimize resource allocation, identify underutilized materials, and make informed decisions about collection development, ensuring that resources are effectively utilized to meet user needs.
20. **Efficient Staff Collaboration and Workflow**: Computerization enables efficient collaboration and workflow management among library staff. Digital systems streamline communication, task assignment, and tracking, facilitating effective teamwork and information sharing. This leads to improved efficiency, productivity, and coordination among library staff members.
21. **Enhanced Reporting and Assessment**: Computerized library systems simplify the generation of reports and statistical analysis. Libraries can generate various reports on resource usage, circulation patterns, user demographics, and other key metrics. This data aids in performance assessment, benchmarking, and demonstrating the library's value to stakeholders such asfunders, administrators, and governingbodies.

22. **Integration with Discovery Services**: Library computerization allows integration with discovery services, which provide aunified search interface for accessing various library resources. These services enable users to search across multiple databases, catalogs, and digital collections simultaneously, providing a seamless and comprehensive search experience. It simplifies the discovery of relevant resources and promotes efficient research.
23. **Automation of Serials Management**:Computerized library systems automate the management of serials, such as journals andperiodicals. This includes subscriptionmanagement, tracking of issues, and handling renewals. Automated systems helpstreamline workflows, reduce manual errors, and ensure timely access to the latest issues of subscribed serials.
24. **Integration with RFID Technology**: RadioFrequency Identification (RFID) technologycan be integrated into library computerization. RFID tags on library materials enable efficient check-in and check-out processes through self-service kiosks. It reduces the need for manual scanning of barcodes, speeds up circulation,and enhances inventory management.
25. **Enhanced Interactivity and User Engagement**: Computerized library systems offer opportunities for interactive and engaging user experiences. This includes features such as virtual bookshelves, personalized recommendations, user reviews, and ratings. These interactive elements create a sense of community, encourage user participation, and enhance the overall user engagementwith library resources.
26. **Cost and Space Savings**: Librarycomputerization can lead to cost and space savings. Digital resources, such as e-books and electronic journals, eliminate the need for physical storage space and reduce costs associated with purchasing and maintaining print materials. Additionally, automated systems reduce the need for manual labor and paperwork, resulting in operational efficiencies and potential cost savings.
27. **Integration with Learning Analytics**: In educational institutions, library computerization can integrate with learning analytics platforms. This integration enables the analysis of library usage data in conjunction with student performance data, providing insights into the relationship between library resources and academic outcomes. It supports evidence-based decision-making and targeted interventions to enhance student success.
28. **Accessibility for Persons with Disabilities**: Computerized library systems can be designed to support accessibility for persons with disabilities. This includes features such as screen reader compatibility,adjustable font sizes, and alternative formats for visually impaired individuals. Accessibility enhancements ensure that library resources and services are available to all users, promoting inclusivity.
29. **Scalability and Flexibility**: Computerized library systems are scalable and adaptable to evolving needs. As the library grows or undergoes changes, the system can be easilyexpanded or customized to accommodate new requirements. This scalability and flexibility ensure that the library's technology infrastructure can keep pace with its evolving needs and future developments.
30. **Integration with Institutional Systems**: Library computerization can integrate with other institutional systems, such as student information systems, research management systems, and digital learning environments. This integration allows seamless information exchange, simplifies workflows, and enhances the integration of library services into the broader institutionalframework.
31. **Streamlined Copyright Management**: Computerized library systems can assist in copyright management and compliance. They can help track usage rights, manage licenses, and ensure that library resources are used within the boundaries of copyright regulations. This simplifies copyright compliance and reduces the risk of copyright infringement.
32. **Enhanced Data Security**: Computerized library systems provide robust data security measures to protect sensitive user information and library resources. Thisincludes encryption, user authentication,access controls, and backup systems. By implementing stringent security measures, libraries can ensure the confidentiality, integrity, and availability of their digital assets.
33. **Personalized Services**: Library computerization enables the delivery of personalized services to users. By analyzinguser data and preferences, libraries can tailor recommendations, notifications, andoutreach efforts to individual users. Personalization enhances user satisfaction, promotes relevant resource discovery, and strengthens the connection between users and the library.
34. **Gamification**: Computerized library systems can incorporate gamification elements to engage and motivate users. Gamification techniques, such as points, badges, leaderboards, and challenges, can be applied to encourage reading, participation in library programs, and exploration of resources. Gamificationfosters a sense of achievement, competition,and enjoyment, ultimately enhancing userengagement.

35. **Collaboration with External Partners**: Library computerization facilitates collaboration with external partners, such asother libraries, educational institutions, and community organizations. By sharing data and resources through interconnected systems, libraries can expand their reach,offer a broader range of services, and foster cooperative initiatives that benefit the community at large.
36. **Preservation of Indigenous Knowledge**: Computerized library systems contribute to the preservation of indigenous knowledge and cultural heritage. Libraries can digitize and provide online access to indigenous materials, ensuring their preservation, wider dissemination, and protection against loss or degradation. This promotes cultural diversity, inclusivity, and the preservation of valuable cultural traditions.
37. **Support for Research and Innovation**: Computerized library systems support research and innovation by providing access to scholarly resources, research databases, and collaborative tools. These systems enable researchers to discover relevant literature, access specialized databases, and engage in scholarly communication. They also facilitate the creation of digital researchrepositories and support data management and sharing practices.
38. **Digital Literacy and Skills Development:** Library computerization plays a vital role in promoting digital literacy and skills development among users. Libraries can offer training programs, workshops, and resources to enhance digital literacy,information literacy, and technological proficiency. By providing access to digital technologies and resources, libraries empower users to navigate the digital world effectively.
39. **Environmental Sustainability:** Computerized library systems contribute to environmental sustainability by reducing the consumption of paper and other physical resources. By transitioning to digital collections and online services, libraries canminimize their ecological footprint andpromote sustainable practices. This aligns with the broader goal of creating a greener and more sustainable society.
40. **Real-time Availability and Updates**: Computerized library systems provide real- time information on the availability of resources, such as books, journals, and multimedia materials. Users can check the availability, location, and status of items online, ensuring efficient resource utilization and reducing disappointment dueto unavailability.
41. **Enhanced Data Visualization**: Library computerization enables the visualization ofdata in meaningful and interactive ways. Data visualization tools and dashboards can present library statistics, usage trends, and other information in visually appealingformats. This makes it easier for library staff and stakeholders to understand and interpret complex data, facilitating informeddecision-making.
42. **Integration with Mobile Devices**: Computerized library systems can be designed to be mobile-friendly and compatible with smartphones and tablets. Mobile applications and responsive web interfaces allow users to access library resources, search catalogs, and perform various library functions on the go. Mobile integration enhances convenience and accessibility, meeting users' expectations for anytime, anywhere access.

Overall, library computerization offers significant benefits that enhance the accessibility, efficiency, and management of library resources. It improves user experience, facilitates resource discovery, provides valuable data for decision-making, and promotes collaboration among libraries. By embracing computerization, libraries can adapt to the digital age and better meet the evolving needs of their patrons.

Computerizing libraries facilitates knowledge transmission across borders and improves citizens' access to information in international nations.

Challenges:

While library computerization offers numerous benefits, there are still some challenges and impediments that libraries may face in the process. Here are a few examples:

Financial Constraints: Implementing library computerization can require significant financial investments. Libraries may face budget limitations that hinder their ability to acquire the necessary hardware, software, and infrastructure upgrades. Additionally, ongoing maintenance and subscription costs for digital resources and systems can strain limited budgets, making it challenging for some libraries to fully embrace computerization.

Technological Infrastructure: Libraries may encounter obstacles related to their existing technological infrastructure. Outdated or incompatible systems may not support the integration of new computerized library systems. Insufficient network capacity or unreliable internet connectivity can hinder the seamless access and delivery of digital resources. Upgrading infrastructure andresolving compatibility issues can be time- consuming

and costly.

Staff Training and Support: Library computerization requires training staff members to effectively use and manage the new systems. Staff members need to develop digital literacy skills, understand the functionalities of computerized library systems, and learn how to troubleshoot common issues. Providing comprehensive training programs and ongoing support can be resource-intensive and may require additional staffing or professional development opportunities.

Digital Divide: The digital divide refers to the gap between individuals and communities who have access to digital technologies and those who do not. Libraries play a crucial role in bridging this divide by providing equitable access to information and technology. However, disparities in internet access, computer skills, and digital literacy can pose challenges to implementing computerized library systems, particularly in underserved areas or among marginalized populations.

Resistance to Change: Introducing new technologies and workflows can meet with resistance from library staff and users. Staff members may be apprehensive about learning new systems or fear that automation might replace their roles. Users accustomed to traditional library practices may be reluctant to adopt new digital tools and services. Overcoming resistance to change requires effective communication, training, and addressing concerns to ensure a smooth transition.

Data Privacy and Security Concerns: Computerized library systems involve the handling and storage of user data, raising concerns about privacy and security. Libraries must implement robust data protection measures, including encryption, secure authentication, and adherence to data protection regulations. Safeguarding user privacy while delivering personalized services requires careful balance and compliance with privacy laws and ethical guidelines.

Accessibility Considerations: Libraries must ensure that computerized systems and digital resources are accessible to users with disabilities. This includes compatibility with assistive technologies, adherence to accessibility standards, and providing alternative formats for individuals with visual or auditory impairments. Ensuring accessibility requires ongoing attention and investment in user testing, accessibility audits, and continuous improvement efforts.

Digital Divide in Access: The digital divide extends beyond individual access to also encompass disparities in infrastructure and connectivity at the community level. Some regions may have limited or unreliable internet access, making it difficult for libraries to fully leverage computerized systems and provide online resources to their users. Addressing this divide requires investments in broadband infrastructure and initiatives to ensure equitableaccess for all communities.

Vendor Lock-in and System Compatibility: Libraries often rely on third-party vendors for their computerized systems. However, vendor lock-in can be a concern, as libraries may face challenges in migrating to different systems or integrating with other platforms. Incompatibilities between different library systems and technologies can hinder interoperability and data sharing, limiting the efficiency and effectiveness of library operations.

Data Migration and Legacy Systems: Libraries with long-standing collections and systems may encounter challenges when migrating data to computerized systems. Legacy data formats, inconsistent metadata, and complex cataloging practices cancomplicate the migration process. Libraries must invest time and resources in data cleanup,normalization, and mapping to ensure a smoothtransition to computerized systems.

Staff Resistance and Training: Library staff members may exhibit resistance to new technologies due to factors such as fear of job displacement, unfamiliarity with digital tools, or a preference for traditional methods. Overcoming staff resistance requires comprehensive training programs, clearcommunication about the benefits of computerization, and opportunities for staff involvement in the planning andimplementation process.

Digital Preservation: Libraries have a responsibility to preserve digital resources for future generations. However, digital preservation presents unique challenges compared to physical materials. Technological obsolescence, file format changes, and the rapid evolution of digital media can pose long- term preservation risks. Libraries must establish robust digital preservation strategies, including regular data backups, format migration, and ongoing monitoring and management of digital assets.

Copyright and Licensing Complexity: Copyright and licensing issues continue to posechallenges for libraries in the digital age. Libraries must navigate complex licensingagreements, fair use provisions, and copyright restrictions when providing access to digitalresources. The complexities of copyright law and the need for ongoing monitoring and compliance can be time-consuming andresource-intensive.

Sustainability and Long-term Funding: Continuous funding is essential for the sustainability and ongoing development of computerized library systems. Libraries must secure long-term funding sources to supporthardware and software upgrades, maintenance, staff training, and the acquisition of digital resources. Without adequate funding, libraries may struggle to keep pace with technological advancements and maintain the quality of their computerized services.

Addressing these impediments requires a multi-faceted approach involving collaboration among libraries, policymakers, technology providers, and other stakeholders. It involves investment in infrastructure, training programs, policy advocacy, and ongoing research to develop innovative solutions that empower libraries to successfully navigate the challengesof library computerization.

CONCLUSIONS

So far, the exploration focused on the global impact of library computerization. Even if it is less expensive, the ultimate result is seen as attractive. Libraries aim to free people from illiteracy and misinformation by educating them to extract and use information effectively. Proper library computerization is necessary to properly enhance librarians and users' information consciousness, as described in this study. Maintaining a balance between technology knowledge and conventional library practices is crucial. Improving information literacy can promote globalbalance.

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LIBRARY MANAGEMENT: AN OVERVIEW OF ITS PAST, PRESENT AND FUTURE

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Abstract

In the light of understanding the complex process of library Development and the future of the field, this article proposes to capture the key elements of organizing libraries in the past and present, so that we can develop a prognosis along the way. They will look similar. Is there any way that a tablet guard in a Babylonian library from 700 BCE, an armerius who looked after an eighth-century cathedral-school library in York, and a director of academic resources at a university could recognize each other as belonging to the same profession? The main aim of the article is to monitor the development of library management, using several objectives to look at it from different perspectives.

Keywords*:* library management; library history; library associations; digital library projects

Introduction

The ancient librarian who, at best, built shelves and invoked various gods for the protection of tablets, the medieval librarian who compiled catalogs and chained books through the library tables, and the XXI century librarian who had the duty Enter online cataloging and installing anti-theft systems, they all have something in common. The use of digital information also did not completely disturb the librarians of the last XXI century as they noted the triumph of codices over papyrus scrolls, the evolution of paper and the invention of printing. However, "Who manages the library "What does he/she manage" How "With what technology?", "For whom and with what management ideas?" History has seen changes in answering questions like these. One of the most important changes in the management of libraries is the shift from an inward focus, from an outward focus, from individual leadership to collective leadership.

Library management in the past

From the third millennium BC, Mesopotamian kings collected writings on cuneiform inscribed clay tablets, which were used mainly by temple priests and scribes of schools. This acquisition was made by further confiscation, at the time of conquest, or, in the case of the most peaceful, by gifts from emissaries who submitted to the voyagers. Librarians who were scribes had the task of translating or copying certain works, arranging and placing them in boxes and shelves, keeping an inventory of their contents in each room. Moreover, they had bibliographic control and were responsible for preserving them as evidence even in Ashurbanipal's library in Assyria.

Similar libraries were built in ancient Egypt, although there is little evidence to support this fact, as the favorite material for storing information at the time was papyrus, and it deteriorated much faster than clay tablets. However, there is evidence to support the fact that libraries were praised, for example an inscription which states that the library was a "place of purification of the soul". In Egypt and ancient Greece, an additional task given to librarians was to maintain faithful copies of religious texts, but also in Athens, of acclaimed theater plays. In ancient Greece, which had many libraries, their administration, like many other things, received Aristotle's full attention. He devised a system for organizing his own large library, which system was later passed on to others.

Ancient librarianship developed from the 3rd century BC onwards, with the famous Library of Alexandria, its administrators assumed extensive responsibilities. They had to at least collect works in the Greek language thoroughly and give access to all eminent scholars. The Ptolemaic government named chief librarians, who often managed slaves, whose duty it was to teach the children of the royal family. Many of Alexandria's librarians were scholars who produced bibliographies, commentaries, dictionaries, and grammatical works. Perhaps the most important thing to remember is that they developed the administration of the library using alphabetical order and created easy ways to use and store the scrolls on which the work was written.

In Rome, library directors, known at the time as bibliothecarum procurators, oversaw budgets, handled acquisitions, and served as heads of individual libraries and their staff. These included copiers, catalogers, translators, custodians,

clerks, restorers. The codex, with its book-like parchment pages, gradually replaced papyrus scrolls on bookshelves. Therefore, the management of libraries has become easier. Codices had storage and referencing advantages, and to find information, one had to browse the pages rather than unroll delicate scrolls and retrace them.

Rome's libraries suffered its decline, surviving only in the eastern part of the empire, such as the palaces and universities of Constantinople, and the growing number of Christian monasteries. Cassiodorus, who lived in the sixth century, was the one during which it was determined how manuscripts should be altered, corrected, copied, and corrected. He also established a substantial library and promoted the value of copying both pagan and religious works by allowing interlibrary loan. During his time and after him, the proliferation of duplicates enabled the preservation of manuscripts despite the frequent destruction of libraries during wars, natural disasters, and political or religious intolerance. Thanks to Cassiodorus' efforts, many classical works survived to become the intellectual basis of the Western Renaissance.

In the Western Middle Ages, schools near cathedrals developed small libraries, each housed in a cabinet called an armarium. The rules of English monastic libraries were emphasized: “The first task of a librarian, in his time, is to endeavor as much as possible to increase the library entrusted to him. Make him realize that the library doesn't hold him back… fix him books that have been destroyed by time. Let him know the names of their authors”

Probably the first record of a peace or silence in a library was made by the Bishop of Seville in the seventh century (Harris, 1999 p. 94). When the Christian Council of the Church met, they found the papal library so well organized that they congratulated their librarian. It was not until the fifteenth century that Augustine Monk had the first idea of creating a true catalog of the books of all the monasteries of England.

The invention of the printing press in the fifteenth century helped library management by multiplying copies of books to make their acquisition process cheaper and easier, but their new size made them easier to store. Printing freed libraries from the need to continue copying as a major activity, but the multiplication of the number of books available made librarianship a more complex task.

In the nineteenth century, after the French Revolution, national libraries appeared, including the Bibliotheque Nationale de France. Many of these national libraries grew out of the Royal Library, through the Acts of Gift, Confiscation, Conquest and Legal Deposit. Managers had to organize a large flow of information and give access to it to users. Among the most important managers who influenced the library system was Sir Antonio Panizzi, bookkeeper of the British Library. He promoted the development of the catalog and added a new management function - he lobbied Parliament to raise funds.

Managerial professionalism had also increased. In the United States, the mid-1880s meant the formation of the American Library Association, the publication of a library journal, and the publication of articles in a report (Public Libraries in the United States of America) became the norm. Librarian's Handbook. Also, at the end of the nineteenth century, higher librarians developed library education courses and subsequently library schools. With new causes—public moral upheaval, educating Democratic voters, and the Americanization of immigrants—professional library managers expanded library patronage, opened deposits, extended work schedules, provided reference services, and moved into new fields in the twentieth century. Building expansion also took the form of traveling libraries, through which Canadian librarians could reach people living in remote or scattered settlements.

In Europe, unfortunately, the management of libraries in the twentieth century meant something different, the need to deal with growth and decline, destruction and reconstruction, diffusion and reconstruction, due to economic crisis and two world wars. In some countries, management was perceived as controlling what people read, state propaganda or party ideology became the basis of purchasing decisions. In America, the refusal to increase budgets during the Great Depression (1929–1933) complicated their management, but library managers improved by developing tools such as microformat storage, cooperative purchasing, unit cataloging, and the interlibrary loan system. After the end of World War II, academic libraries along with their academic institutions faced a new managerial challenge—educating the thousands of military veterans who served on the G.I. took advantage of Bill (Murray, 2014) to receive schooling. For example, such a collective bounty was unthinkable to King Ashurbanipal, and certainly encouraged librarians to abandon the centuries-old concept in which libraries were founded on the protection of a privileged few.

Modern library management

A librarian monologue, beginning in the late twentieth century, would sound like this: “If we want to survive and compete in the new environment, we have to work smarter, reorganize, engineer ourselves. Work processes become proactive rather than reactive and, above all, orient themselves strategically” would mean a strategic plan, clear vision, measurable results and a common mission to identify objectives, inputs and outputs. Also, a plan for risk assessment, impact assessment, feedback and network/circuit of responsibilities should be developed within the organization.

This shift in management has led to new ways of thinking. The old “patrons” of the library have become “customers” with whom the library must connect and whose expectations librarians must meet.

"While the duties of a library executive are in no way different from those of a joint stock company manager, the librarian can benefit from the methods of a businessman" In the second half of the twentieth century librarians began to hear the ideas of "scientific management" manifested in industry through research on the efficiency of production planning, standardization, personnel selection, and academic studies. made As time passed, librarians came up with ideas to improve the system and created organizational charts, job descriptions, policy manuals, and procedures. Librarians have also considered the influence of human factors on productivity, the study of work conditions, reward recognition methods, opportunities for personal fulfillment, and new perspectives on how employees respond to social workplace relationships. Most libraries have adopted professional concepts such as "customer service". Cost analysis, systems analysis, and decision theory have also attracted some library managers.

Faced with this “jungle of management theory” (Koontz, 1961 p. 174), modern library management can often be forgiven for creating confusion within its organization.

There is, of course, no unity of approach to the question of modern management of libraries. Library managers have opposing views on issues such as “all books are equal”, or “increasing workloads increase library use”, or “all children know how to use computers” (Holt, 2005, p. 87). Survival thus requires familiarity with library change methods, commonly accepted methods, and methods offered by the IT industry.

In the USA, librarians receive support from several professional associations grouped under the American Library Association (ALA), including the Library Administration and Management Association (now the Library Leadership and Management Association - LLAMA), founded in 1957. It helps librarians keep abreast of issues and management techniques through publications, meeting programs, and special interest sections. In addition to other ALA divisions that assist managers, the Public Library Association (PLA) offers library administration and certification programs.

Librarians at major universities receive assistance from the Association of Research Libraries (ARL), which created the Bureau of Management Studies in 1970, which is responsible for drafting library resource guides in response to ongoing changes in management issues.

In the US, professional journals such as American Libraries, Library Administration and Management, Library Hotline, Library Journal, and Library Trends provide information on and promote professional library management, and federal and state libraries, library consortia, the Council on Libraries and Information Resources (CLIR) and private institutions such as libraries and schools of information science, which launch specialists in the future.

By the end of the twentieth century, economic problems and the development of IT technology led to some library education schools closing down and others being absorbed by larger library or information science schools. MLS or MLIS are master's degrees in library or information science, diplomas that have become the recognized foundation for aspiring librarians, and in 2006, Simmons College received a grant to develop a doctoral program in "managerial leadership in the information profession" (Hernon & Schwartz,). 2006 p. 1). Leadership in general has become a specialized field of study where librarian publications have begun to pay attention since the late 1980s, arguing for the existence of successful library management characteristics.

It is therefore appropriate to raise a series of questions about the current management of libraries, such as:

a) Can educational programs in library management produce enough new library leaders?

b) Can they replace old ones?

c) Do they have the broad enough vision, openness to change, flexibility and strategy needed for long-term success?

Future library management

Libraries have changed radically in response to the Development of digital information technology. By the beginning of the twenty-first century, all kinds of librarians had automated business functions and logs, created web pages, created online catalogs, participated in the integration of online catalogs, subscribed to electronic databases, installed computers for users, added CDs to audio-visual collections. And they worry whether the Internet will make their jobs, buildings, and books obsolete.

In large institutions, librarians have digitized some of their information-documentation materials, put digital resources on their web pages, collected digital products of scientists in electronic warehouses, provided reference services by e-mail, collaborated to create digital educational resources. Libraries strengthened with electronic curricula, IT and educational technology, have sought to find ways to preserve digital resources in the long run, and are beginning to wonder whether digital creations fall under intellectual property laws. All these have become major managerial concerns.

Hence, many changes will occur in library management, while the creation of digital library collaborations, libraries that share their collections of information-document materials with worldwide access, will further increase the storage capacity of information media. It all began with the evolution of digital collections, such as the Digital Collection of American Books, which Cornell and the University of Michigan have pioneered in creating: America's Digital Memory Collection at the Library of Congress, in which other American libraries have participated. ; and the Global Gateway Bilingual Collection on the Library of Congress webpage that combines digitized materials about some foreign countries with materials from national libraries and other libraries in those countries.

More importantly, a group of major research libraries (including the Library of Congress) and other related institutions in the United States have established digital libraries. Federation (DLF). It aims to collect digital information documents that are accessible to students, researchers and citizens everywhere. The Federation later expanded to library institutions in other countries such as the British Library and launched the DLF Aquifer project which promotes efficient use of distributed digital library materials for teaching, learning and research. Aquifer will provide a web page with a portal for digital libraries across multiple libraries' collections and use this content to develop "best discovery, identification and use of digital resources".

Europeans have created TEL - the European Library which provides universal online access to digital collections from 47 national libraries. In 2006, UNESCO, IFLA (International Federation of Library Institutions and Associations) and the Library of Congress began planning the WDL - World Digital Library "to make important primary materials from cultures around the world accessible, free and multilingual" (World Digital Library, 2010). Google Corporation was started. Digitizing at least parts of the largest libraries and archiving them for access through search engines, declaring its intention to "organize the world's information and make it universally accessible and usable" (Thompson, 2017). In short, libraries collaborate with each other, develop professional search services, and other organizations, non-profit and for-profit, to digitize personal resources and universalize access to them in a permanent expansion of their activities.

Conclusions

In the twenty-first century, financial, storage, and access collaborations are essential for the specific process of constructive collaboration of digital library systems. Depending on how long digitization takes, improving interoperability tools, solving copyright problems, solving storage problems, increasing Internet accessibility, increasing the organization of resources, refining, as the present article wants to prove, this process can be gradual. Designing search capabilities and business partnerships that will act as connecting nodes rather than enclaves defined by walls. These are major concerns of twenty-first century managers, and all require external collaboration. Visionary librarians will be less concerned about preserving the "king's consent", and more concerned about sharing what is useful to the world. Therefore, further research in the current field will be about new ways that librarians can share their knowledge about developing library management practices, especially Because this is a

drawback of the current theme, new methods of leadership in this field are always questioned until their validity is proven and common practice.

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THE IMPACT OF DIGITAL TECHNOLOGIES ON ACADEMIC LIBRARIES

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Abstract

Libraries have long been a source of information for students, and over the centuries this has included columns and pillars. But as content moves to digital platforms and Internet access becomes a human need rather than a privilege, libraries are changing. This article evaluates the impact of digital technologies on the development of library services. It begins with a brief overview of the historical development of academic libraries, followed by a discussion of current challenges and opportunities for academic libraries. Additionally, the development of new technologies for learning and information management and their impact on academic libraries is discussed, including the need for librarians to create new skills and roles (such as "established" librarian roles). The article concludes with thoughts on the future development and impact of technology. It is true that libraries have been useful institutions since the birth of the pen. But there is no doubt that libraries and their role in academic research are changing in the 21st century.

Introduction: Now in the 21st century, with the emergence of ICT and Web 2.0 technologies, libraries play a new and stronger role in the information society. Just as people are affected by ICT, people can also influence technology. Libraries are starting to realize their online presence and use these services to create a new environment for library users where interaction plays an important role. "Interaction means that technology interacts with the social world through values. These services are also replacing academic libraries, which have greater needs for access to resources library. For this reason, the school library will be renewed and transferred to the digital environment.

Digital libraries, home archives and open data are today's innovations that meet the accurate information needs of users to access electronic information for different purposes, such as education or research. According to Fabunmi, Paris and Febunmi (2006), digitization of libraries has become part of the work of libraries and libraries are frequently involved in digitization services. . Librarians learn to use digital technology to manage user services, communications facilities, maintenance, and the design and development of library operations. Academic librarians must respond growing and diversifying information needs of the end-users.

The beginning of the digital age in libraries has created the need to use computers in most of the work. Technology has changed the traditional way libraries operate. Today, libraries use technology to acquire, catalogue, store, publish and provide reference services. This does not mean that traditional libraries should be abandoned. Traditional libraries will continue to host and support digital libraries in the coming years. Therefore, traditional libraries and digital libraries coexist. This means that librarians play and will continue to play an important role in libraries. It is important for libraries to strike a balance between practical and digital activities.

Research Objective:

1. Learn how librarians and library users interact with digital information, electronic resources, and online services and analyze them for the benefits and problems of academic libraries.
2. Use and impact on library services and operations. and operations in the digital environment of academic libraries.
3. Evaluate and discuss their implications for the role and work of librarians, Finally, consider the future of academic libraries and academic librarianship.

Scope of the Study: This study covers the development, implementation and problems of technology in academic libraries in India. This study focuses on the use of technology products and services by teachers and researchers in academic libraries in India. Information technology has brought many changes to the way library users identify, acquire, process and disseminate information. Digital technology has also created a crisis for library users and libraries themselves. Academic libraries have seen a new trend. These changes include: Transfer of information and systems from paper to radio.

As we all know, technology affects all the foundations of libraries: information, services, human resources and users.

Academic libraries in the digital age: In the 21st century, academic libraries have taken on a new role in information sharing. A library is no longer a stack of books; The entire environment of the library has transformed from analogue to digital. Library automation systems help libraries easily access their collections by using computerized library catalogues (Online Public Access Catalogues - OPAC), which have recently transitioned to digital libraries (IFLA, 2013). Schools, cultural centres and research centres have always had information as one of their main goals, but in the digital information age they must expand these functions and are no longer repositories of published data. Instead, academic libraries should update their services and provide quality education by storing resources in different formats and making them easily accessible for online learning. This can be done by implementing digitalization projects. Hughes (2004) defines the concept of digitization as "the process of converting analogue data into segments of 1s and 0s (these 1s and 0s are called bits) and placing them into computer-readable binary code" (p. 4). So, in general, we can say that digital information is any material that can be read on a computer, scholarships, literature, and public service.

Quality, performance and efficiency. Evaluation plays an important role in developing information service standards. The digital age has brought many changes to society, such as the proliferation of social goods and services; Therefore, library managers should carefully analyze the quality and value of library materials and plan services for better performance, revealing deficiencies. More models and services are as follows:

A. Conclusions: Digital libraries work well.
B. Productivity: What are the operating costs? (Costs can be financial costs, time costs or labor costs)
C. Available: Service and consumption
D. Accessibility: Characteristics of digital systems (efficiency, speed, time, error rate)
E. Quality: Best Product
f. User satisfaction: User interaction with digital libraries.

The approach to digitization of academic libraries varies depending on each institution's policy. Most schools have different views on what data to digitize, depending on the parent organization's goals and vision. Brindley (2009) stated that academic librarians with digital responsibility should abandon their responsibility of being a good guide in environmental education, learning and research, and enable expert teachers and students to know information more broadly, faster and better. the foundation of all learning. organization and the same source of information. It also highlights the need for planning, vision and strategy. Libraries in the Digital Age, Educational institutions must be versatile in order to serve students. We will talk about the most important skills a writer should have.

Information literacy in a digital environment means:

1. The ability to find, evaluate, use, and create information using technology, communications tools, or the Internet.
2. Information in a variety of formats from a variety of sources.

Challenges Facing University Libraries in the Digital Age

The following are the challenges facing university libraries in the digital age

1. **Make services attractive to researchers and students**: Google is not the answer to everything. In doing so, libraries are involved in the needs and desires of students and researchers to create big changes and participate in their future work.
2. **Use research tools for knowledge management**: The library should be a place for knowledge management and research in the school. Libraries need the support of teachers and administrators to achieve this goal, but libraries need to be aware of advances in knowledge management so that research does not become a waste of time.
3. **Demonstrate the value of libraries**: Academic libraries always have budgets. That means libraries must find information that is important to their work, and often has consequences, every month, every year. But according to the American Library Association, research has shown a positive correlation between student

GPA and library information use. Staff should discuss this connection and show why the library needs more attention and public engagement.

4. **Preserve information digitally**: Not only are there good products to help libraries do this, it's become the norm, even for the largest collections. Growth and greater customer base: The 20th century witnessed a revolution in technological development that affects people every day. According to 21st Century Libraries, libraries must serve multiple generations of patrons, from children to millennial, on any given day.
5. **Clarify library policies:** As the use of online tools increases, administrators will need to address many issues. For example, universities should purchase e-books in addition to traditional print books. Or, as many modern schools are discovering, textbooks may not be needed at all. These are just a few examples of library policies that staff and administrators should consider going forward.
6. **Role development:** Open access requires librarians to be knowledgeable about more topics than ever before. Even though no organization can process information regarding computer speed, it will feel that way at the time. Increasing funding and resource constraints may contribute to this problem.
7. **Digital License**: Although each research institution is different, education and This means that the digital license should be more stable and easier to understand.
8. **Skills**: As information enters the library rapidly, schools must play an important role in library management. Great progress has been made across the country, such as the National Digital Library of India. Realize the diversity of digital content. By clearly seeing what formats, print works and e-books are used by students and researchers, libraries can understand all the concepts they need to know in this world. While the digital world also provides good resources.

Opportunities in the digital age:

1. **Expanding access by sharing information:** Digital libraries enable interaction between information and users and the freedom to spread information internationally. The United Nations Educational, Scientific and Cultural Organization (UNESCO) Information for All Programs (IFAP) highlights the importance of public knowledge today by providing access and sharing of online connectivity to connect the world. A new opportunity in the digital age is to create equity through better access to information. This is a powerful goal. Sharing knowledge has the power to promote equity in education around the world.
2. **Libraries suffer from budget cuts**: Although public use of libraries is increasing, budget constraints continue to plague libraries and limit their potential growth and change.
3. **Libraries play an important role in society**: libraries provide resources that give "everyone a chance to succeed", libraries play an important role in improving literacy, and academic libraries improve the quality of life in school. Libraries are increasingly making room for e-books, but they have not yet reached the point where they can replace books. While the proportion of users reading e-books continues to increase, time and information are still consumed by reading books.
4. **Despite the growth of e-books, printed books are still popular**: e-books are increasing in use but have not yet reached the point where they will replace printed books. While the share of users reading e-books continues to grow, the number of readers reading books is also increasing. E-books are growing, but paper books are still the mainstay of many readers. This view will change as reading expands.

Conclusion: Rapid advances in technology are changing the way libraries operate and interact with library users. Much research has been done on digital technologies (including digital information) in library education and the interaction between libraries and library users. Most libraries today are a mix of traditional and digital libraries. Academic libraries are being modernized using digital technology. Most libraries operate using digital technology. Libraries teach library users to use digital information appropriately. Drawing on personal experiences, this study attempts to explore the benefits of this new technology in academic libraries and the issues librarians and library users face every day.

Nowadays, digital information is increasing due to many departments creating digital information. With the internet becoming a part of our lives, people started to access information from online sources (e.g. electronic resources). New information and communication technologies have also changed the current structure of libraries and user behaviour. Since the information needed by users can be obtained online, they have new needs and better expectations. Technology is already incorporated into academic libraries and is part of the librarian's job. In order for universities to best serve their users, they need to adapt to new technologies and develop their skills. Providing adequate training to librarians on new technologies is the best way to improve their skills and relieve the stress that

new technologies can put on them. Many libraries house digital records and are responsible for their preservation. However, due to severe economic problems, libraries have repeatedly faced difficulties and weaknesses in the use or preservation of technology. This means that academic libraries do not have sufficient funds to hire new staff, purchase new equipment and subscribe to electronic resources, resulting in a significant impact on good service. Education for users is also important. If users are well educated, they will gain important information on how to use the library correctly. In order to achieve the goal of educating users, libraries need to educate users and teachers must encourage them to use the library. Librarians and the role of librarians define users' interactions with themselves and with information in general. Digital libraries should be accessible not only to end users (e.g. students, researchers, readers) but also to actual users (e.g. librarians, professionals and librarians).

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REFERENCE SERVICE AND EFFECTIVE WAY TO DELIVER PROPER USER

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Abstract

Digital reference service is the example of the use of the technology is library related services there by enabling a user-friendly atmosphere and creating a library environment suiting the individual user profile. Teaching, learning research etc. are facilitated by the use of digital reference service thus making it an important in the contest of 12th century librarianship. With the help of Digital reference service, the reference librarian of today is much better equipment to deal with varied needs of the users and provide them with the appropriate services. This research paper explores the development of digital reference services in libraries and examines how these services are effectively provided to users. As libraries transition into the digital age, the evolution of reference services from traditional face-to-face interactions to digital platforms has become crucial. This study investigates the various forms of digital reference services, their implementation strategies, and the tools used to ensure proper user engagement. Through a comprehensive literature review and analysis of case studies, the paper aims to provide insights into best practices, challenges, and future trends in digital reference services.

Keyword: - Digital Reference, Web forms, Genealogy, Family Research, Virtual reference, Online, Historical background Networking.

Introduction: Digital reference is a service by which library services is conduced online and the reference transaction is a computer-mediated communication. The word "reference" in this context refers to the task of providing assistance to library users in finding information, answering question and otherwise fulfilling users' information need. Reference work often but not always involve using reference work such as dictionaries' encyclopedia, etc. This form of reference work expands reference services from the physical reference desk to a virtual reference desk where the Parton could be writing from homework or a variety of other location.

The earliest digital reference service was launched in the mind 1980's primarily by medical and academic libraries and provided by e-mail. These early adopter libraries lunched digital reference services from two main reasons. To extend the hours that question could be submitted to the reference desk. To export the potential of compose wide networks, which of that time was a new technology. With the advent of the geographical World wide web libraries quickly adopted web form for question submission since then percentages of question submitted to service via web form has outstripped percentage submitted via email. Libraries have long been bastions of knowledge, with reference services playing a pivotal role in connecting users with information. The advent of digital technologies has transformed the landscape of library services, particularly in the realm of reference provision [1]. Digital reference services, also known as virtual reference or online reference, encompass a range of methods through which libraries assist users in finding information using digital communication channels [2].

The transition from traditional to digital reference services has been driven by several factors, including the increasing prevalence of digital resources, changing user expectations, and the need for libraries to remain relevant in an increasingly online world [3]. This shift has not only expanded the reach of library services but also presented new challenges in terms of technology adoption, staff training, and user education. As libraries continue to evolve, understanding the development of digital reference services and their effective provision to users becomes crucial for maintaining the library's role as an essential information resource in the community.

Definition

Digital reference (or virtual reference) is a service by which a library reference service is conducted online, and the reference transaction is a computer-mediated communication. It is the remote, Next computer-mediated delivery of reference information provided by library professionals to users who cannot access or do not want face-to-face communication. Virtual reference service is most often an extension of a library's existing reference service program. The word "reference" in this context refers to the task of providing assistance to library users in finding information, answering questions, and otherwise fulfilling users' information needs. Reference work often but not always involves using reference works, such as dictionaries, encyclopedias, etc. This form of reference work

expands reference services from the physical reference desk to a "virtual" reference desk where the patron could be writing from home, work or a variety of other locations.

Objectives:

The primary objectives of this research paper are:

1. To trace the historical development of digital reference services in libraries.
2. To identify and analyze various models of digital reference service provision.
3. To examine the tools and technologies used in implementing digital reference services.
4. To assess the effectiveness of digital reference services in meeting user needs.
5. To explore challenges and best practices in providing digital reference services to proper users.

According to the American Library Association's Glossary of Library Terms:

'Reference Service is that phase of library work which is directly concerned with assistance to readers in securing information and in using resources of the library in study and research". Ranganathan defines Reference Service as 'Personal Service to each reader in helping him to find the documents answering his interest at the moment pin-pointedly, exhaustively and expeditiously. Both definitions convey that reference service means 'process of establishing contact between a reader and his documents in a personal way'. 'His documents refer to those who will serve his requirements precisely.

Advantages: Psychological barrier that stops shy users asking questions face to face is removed. Useful for the users who are poor in oral communication Physical boundaries are removed It does not require extra software and no extra training Reference librarian find more time to think, chalk and plan out a strategy and finally search and give the answer. No restrictions of working time, user can ask query any time. This mode of receiving and answering questions is cost-effective.

Disadvantages: As face-to-face interaction is not possible, reference librarian not able to get clarification about his doubts arising in his mind after receiving the query. Speed of receiving and answering questions depends on the volume of e-mail traffic and communications link over the internet. It is difficult for reference librarian to judge

Form of Digital reference

E-mail: Email is most preferred means of communication in responding to users reference queries as it is widely available and does not require extra software. Users can either click directly on the email address on the library web page which activate email software, or send a message to the email address using their software.

Webforms: Webform are created to digital reference service in order to help the patron more productive and in asking their question. This document helps the librarian locate exactly what the patrons asking for creation of webform requires design consideration. Because webform substitute for the reference interview, receiving as much information as possible from the patron is a key function.

Abstract commonly found within webform

- A return e-mail address to send the answer to question.
- The question being asked.
- What sources have been consulted by the patron.
- How the patron is planning to use the information.
- Location of the patron.
- A name to personalize the information.
- A date by which the information.
- The type of source being requested (print or electronics)

Methodology

This study employs a mixed-methods approach, combining qualitative and quantitative research techniques to provide a comprehensive understanding of digital reference services. The methodology includes:Literature Review,Case Studies, Survey, Data Analysis, Comparative Analysis

Tools Used for Digital Reference Services in Libraries:

Libraries employ various tools to provide effective digital reference services:

1. Chat Software: Real-time communication platforms for instant messaging between librarians and users [4].
2. Email Systems: Asynchronous communication tools for handling more complex queries that require research [5].
3. Video Conferencing Tools: Platforms like Zoom or Microsoft Teams for face-to-face virtual consultations [6].
4. Co-browsing Software: Tools that allow librarians to navigate websites simultaneously with users, providing guided assistance [7].
5. Knowledge Bases and FAQs: Searchable databases of commonly asked questions and answers [8].
6. Artificial Intelligence and Chatbots: Automated systems for handling routine queries and providing 24/7 service [9].
7. Social Media Platforms: Channels like Twitter or Facebook for quick queries and service announcements [10].
8. Virtual Reality (VR) and Augmented Reality (AR): Emerging technologies for immersive reference experiences [11].

Development of Digital Reference Services:

The evolution of digital reference services can be traced through several key stages:

1. Email-based services (1980s-1990s): Libraries began offering reference services via email, allowing for asynchronous communication [12].
2. Chat-based services (late 1990s-2000s): Real-time chat services emerged, enabling immediate assistance to users [13].
3. Collaborative networks (2000s): Libraries formed consortia to provide 24/7 reference services through shared staffing [14].
4. Mobile-friendly services (2010s): The rise of smartphones led to the development of mobile-optimized reference services [15].
5. AI-enhanced services (2010s-present): Integration of artificial intelligence and machine learning to improve service efficiency and availability [16].

Provision to Proper Users:

Ensuring that digital reference services reach and effectively serve the intended users involves several strategies:

1. User Education: Providing training and guides on how to access and use digital reference services [17].
2. Targeted Marketing: Promoting services through channels most likely to reach the intended user groups [18].
3. Personalization: Tailoring services to meet the specific needs of different user segments [19].
4. Accessibility: Ensuring that digital reference services are accessible to users with disabilities [20]
5. Multi-lingual Support: Offering services in multiple languages to serve diverse communities [21].

Conclusion:

The development of digital reference services represents a significant evolution in how libraries fulfill their mission of connecting users with information. From early email-based systems to current AI-enhanced platforms, these services have continuously adapted to meet changing user needs and technological advancements. While digital reference services offer numerous benefits, including increased accessibility and efficiency, challenges remain. These include bridging the digital divide, maintaining the human touch in virtual interactions, and keeping pace with rapidly evolving technologies. Libraries must continue to innovate and adapt their digital reference services to ensure they remain relevant and effective. Future research should focus on the long-term impact of digital reference services on information literacy, the potential of emerging technologies like VR and AR in reference provision, and strategies for balancing automated and human-mediated services. By continuing to refine and expand their digital reference offerings, libraries can maintain their crucial role as information mediators in an increasingly digital world. Library should be collaborating to achieve work, faster & accurate and most listen to the members and

represent their views. The library cam maximizes the influence and provides value for money if it works hand in hand with the research community to promote excellence in support of its current research & anticipate future needs. The library should increase its value by the richness of its collection & work to ensure that researchers can exploit them to the full. The library should be proud of the most & confident of the future. Thus, by applying Golden Laws. The libraries can give a opportunity Experience to the researchers and keep them.

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DIGITAL LIBRARY AT RAMESH PHIRODIA ARTS, COMMERCE AND SCIENCE COLLEGE, SAKUR

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Abstract

Users can access ICT-based services at the Commerce Science College Sakur, Ramesh Phirodia Arts. Users of the library are becoming more accustomed to using technology and are utilising new ICT such as computers, the Internet, the Web, intranets, extranets, and other technologies. Consequently, patrons of libraries are putting further expectations on them. They need to have access to ICT resources, the most recent information, and updated information resources so they can do their jobs. This paper presents a case study that demonstrates how ICT is used in libraries to improve user happiness. It offers many advantages to library patrons, including quick and simple access to information, remote login capability, limitless access to information from multiple sources, enhanced information adaptability, and the ability to reformat and aggregate data from multiple sources.

Keyword: Library ICT-based services, User Satisfaction.

Introduction

Here's an introduction of approximately 200 words for the topic "Emerging Technology Trends for Libraries and Library Professionals":

Introduction

In the rapidly evolving digital landscape, libraries stand at the forefront of a technological revolution that is reshaping the way information is accessed, managed, and disseminated. As traditional bastions of knowledge, libraries are embracing emerging technologies to reinvent their roles and services for the 21st century. This transformation is not merely about digitizing collections or providing internet access; it represents a fundamental reimagining of how libraries operate, engage with users, and contribute to their communities. The pace of technological advancement has accelerated dramatically in recent years, presenting both opportunities and challenges for libraries and library professionals. From artificial intelligence to virtual reality, these emerging technologies have the potential to revolutionize information access, enhance user experiences, and streamline library operations (Johnson et al., 2021). However, they also raise important questions about privacy, digital equity, and the changing skill sets required of library professionals. As libraries navigate this technological frontier, it is crucial to understand the current trends and their implications. This article aims to provide a comprehensive overview of the most significant emerging technologies affecting libraries, exploring their applications, benefits, and potential drawbacks. By examining these trends, we can better prepare for the future of libraries and ensure they continue to fulfill their vital role in society as centers of learning, innovation, and community engagement.

Objective of the Study

1. To study the Varies Services Provided.
2. To study the Varies benefits of ICT based Services by Library.

Types of Data

Secondary Data: - Secondary data are used for the present Research Paper. The data are collected from Visionary Books, Journals, and Magazines, web Portals and other Printed Materials.

College Information

Users at Ramesh Phirodia Arts, Commerce, and Science College Sakur can access ICT-based services from this organisation. Web-based online public access catalogues (OPAC), digital library services, electronic document delivery services, institutional repository services, current awareness services, online user education, readers advisory and e-reference services, e-books, e-journalnals, reprographic services, document scanning services,

library network services, open source software services, etc. are just a few of the ICT-based and digital library services that may be used by students and teachers to their fullest academic advantage.

ICT Based Services Provide by Library

Libraries are also providing various ICT-based services to their users, including the following.

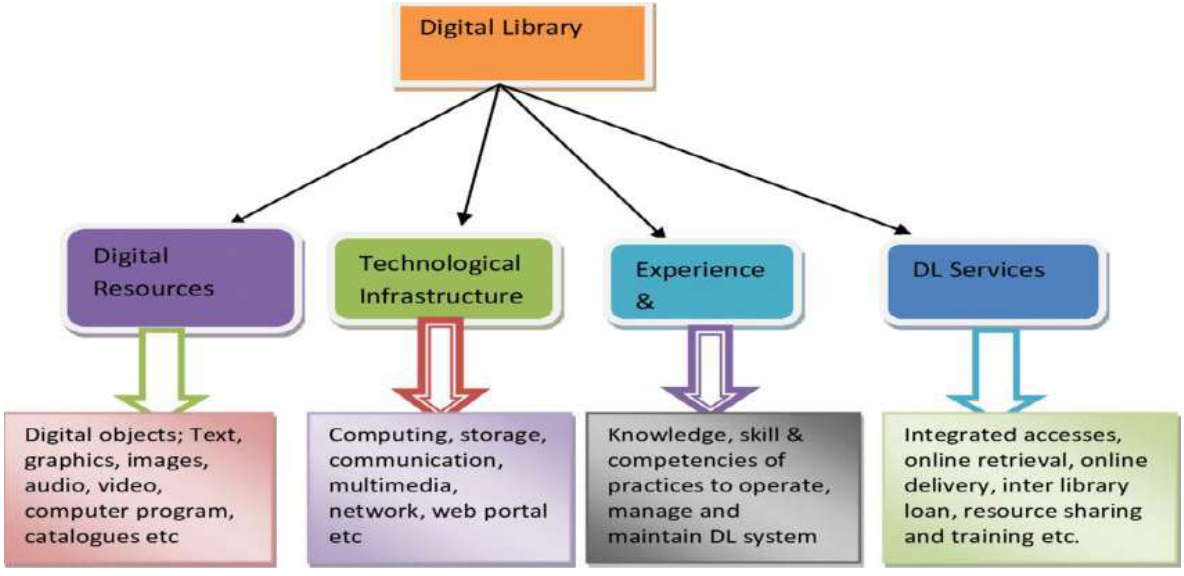
1. Web-based Online Public Access Catalogues (Web-OPAC)

Libraries can now offer global access to their catalogues thanks to the internet and web-based technology. When OPAC is accessible online, it facilitates library patrons' access to information from anywhere in the globe. The OPACs from various library systems are also simpler for patrons to understand and utilise. Linking to additional information resources, including tables of contents, full-text documents, author, title, publisher, publication year, etc., is possible with web-based OPACs.

2. Digital Library Service

A range of digital information sources are available through digital libraries. It gives access to dispersed information resources, minimises physical space, and allows remote information access for the user. The fact that it can handle multilingual content is one of its advantages. By using ICTs, librarians are able to create digital libraries, which are collections of materials that are partially or entirely available online, together with services that are regularly made available electronically via the Internet so that users can access them from a distance. Digital libraries consist of digital collections that include full-text documents, videos, and photographs, some of which cannot be reproduced or transmitted in printed formats, as well as document surrogates like bibliographic information and indexes.

Both internal and external materials are included into these digital compositions. In an academic setting, a digital library can give students access to instructional resources like problem sets, both solved and unsolved, courseware modules (drills, simulations, models, virtual lab benches, and class presentation materials), and information resources that can be accessed by library users nationwide through digital libraries. Due to the fact that national libraries are typically found in major cities, only those with the means to go there may truly use their collections. Even from faraway locations, national libraries' digital materials are accessible.



3. Electronic Document Delivery Service

Through the use of networks, the libraries are introducing ICT-based Inter-Library Lending (ILL), which allows users to access digital copies of journal articles and other publications on their computers in formats like PDF (Portable Document Format). It facilitates users' access to information that isn't offered by their local libraries. It is among the most beneficial services for consumers, particularly for researchers who are located in remote places.

4. Service for Institutional Repositories

A university's institutional repository (IR) is a collection of services it provides to the community for the management and sharing of digital content by both the institution and the community.

Most university libraries have special collections of local materials such as theses and dissertations, research reports, examination papers, conference papers, newsletters and seminar papers, journal articles by academic members of staff. ICTs have made it possible to provide access to these resources in full text, accessed via the institution's intranet, extranet or over the Internet. This is being done through Institutional Repositories (Ws). An institutional repository is defined as a database with a set of services to capture, store, index, preserve and redistributes an institutions research output in digital formats.

The objectives of an institutional repository are

- To provide open access to institutional materials, i.e. research reports, articles, technical reports, annual reports, seminar papers, etc.
- To offer the opportunity for long-term storage and preservation of digital assets
- To aid the management of often easily forgotten (grey) literature such research reports, technical reports, etc.

Institutional repositories involve different stakeholders, each bringing different contributions to the repository, and librarians are among the key stakeholders in institutional repository projects. Librarians bring skills and standards required to manage digital information resources and work towards continued preservation of and access to digital resources.

5. Current Awareness Service- CAS

Keeping users informed about developments in their areas of interest has been made possible in large part by Current Awareness Services. A current awareness service could be as basic as a copy of the table of contents or a bulletin with bibliographic records of selected articles from journals' current issues and additional content, typically arranged according to subjects. Libraries now use a predetermined search technique to generate current awareness bulletins, which they then run periodically either online or on a CD-ROM to obtain the appropriate results. The result may also be saved locally and distributed offline (by print, CD-ROM, email) as well as online (via the internet and intranet), subject to copyright restrictions. Most journals' tables of contents can be found for free on the websites of the publishers. Even free email updates of the table of contents are provided by certain publishers. Currently, a great deal of electronic publishing sites or portals provide registered customers with up-to-date information by email. For instance, one can sign up to receive a daily news summary from the New York Times publications.

6. Online User Education

Libraries are employing ICTs, particularly the Web, to target their patrons with online bibliographic or library use (library literacy) activities. These programmes, which are mostly available via intranets, extranets, or the Internet, include, among other things, virtual tours of library collections and online or CD-ROM based tutorials on exploring online resources. Libraries can avoid issues related to the employment of lecture-based approaches or library orientation workshops by utilising ICTs. issues including managing big class sizes, lacking enough personnel to run the programmes, or not having enough time to provide pupils all the information they need. ICTs also give pupils the option to watch the programming on their own schedule and at their own speed.

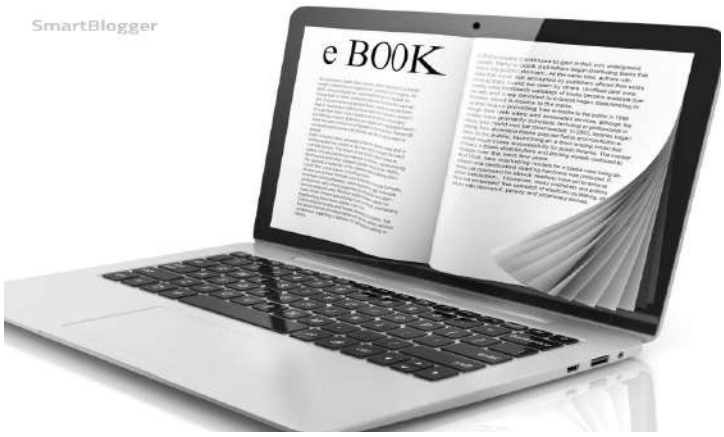
7. Readers Advisory and E-Reference Services

Libraries can now offer Web-based versions of their reference and readers' advice services thanks to ICTs. These include of services like providing users with information over the Web about new books or additions to the library collection, announcements, and tools for readers to communicate with reference workers (Virtual Reference Desks). Libraries in academic institutions that offer distance learning courses can assist their students by providing ICT-based advisory services.

8. Electronic Books Service

Content, Software and Hardware Standards, Protocols, Digital Rights Management, Access, Archiving, privacy, market, price, and features are all deemed essential for the usage of e-books in academic libraries. One technique to

improve the digital library is through electronic books, or e-Books. They provide users with easy, rapid, and efficient access to authoritative knowledge around the world, twenty-four hours a day.



9. Electronic Journals

Provision of services Any journal, magazine, newsletter, or other kind of electronic serial publication that is accessible online and can be accessed by various technologies including the World Wide Web, Gopher, FTP, telnet, e-mail, or listserv can be widely referred to as an electronic journal. In addition to providing subscriptions for print journals, many publishers occasionally provide free subscriptions for the electronic edition of the journal. Publishers including Emerald, Elsevier, Sage, Springer, EBSCO, J-Gate, John Wiley, and others are offering e-journals.

10. Reprographic & Micrographic Service

These technologies are still often utilised in libraries all around the world. A reprographics machine is present in the majority of research libraries, and photocopies of any document can be obtained upon request. The term "microform" refers to any type of information carrier that records and stores optically encoded data in high density using bit patterns, holograms, or microimages of printed documents using microfilm or other comparable optical media (including studies).

11. Document Scanning Services: A scanner is a crucial piece of equipment for libraries who are modernising. It is helpful for creating a digital and virtual library and may be used to scan the text, picture, and content pages of books.

12. Library Network Service: One of the main purposes of the network is to instantaneously transport data from one area to another by connecting computers and other communication devices. Through networks, numerous people can communicate with one another and share a shared pathway. The networks include the wide area network (WAN), which spans a small geographic region like a campus or building, and the local area network (LAN), which is used for resource sharing and housekeeping in libraries. Other networks include the DELNET, ADINET, INDONET, and INFLIBNET. Major WAN in India include MALIBNET, NICNET, ADINET, and others.

13. Open-Source Software Service: Also known as the OSS, open-source software is computer software that is made accessible without charge and that can have its source code changed to suit the needs of anyone. A number of ILS products, including integrated library systems (ILSs) like Koha, digital library software like Greenstone, digital repository software like DSpace, and content management systems (CMSs) like Moodle, have been developed in the open source community in recent years.

Benefits: -

Use of ICT in libraries enhances users' satisfaction. It provides numerous benefits to library users. Some the benefits are

- Provide speedy and easy access to information
- Provides remote access to users
- Provides access to unlimited information from different sources
- Provides information flexibility to be used by any individual increased flexibility

- Provides increased flexibility
- Facilitates the reformatting and cumbering of data from different sources.

Conclusion:

The implementation of Information and Communication Technology (ICT) in library services at the Commerce Science College Sakur, Ramesh Phirodia Arts, represents a significant shift in how libraries meet the evolving needs of their users. This case study demonstrates that the integration of ICT-based services has fundamentally transformed the library experience, aligning with the increasing technological proficiency of users and their growing expectations.

The adoption of computers, internet connectivity, web-based services, intranets, and extranets has enabled the library to offer a more dynamic and responsive information environment. Users now benefit from quick and easy access to a wide range of information resources, overcoming traditional barriers of time and location through remote login capabilities. This shift not only enhances the accessibility of information but also expands the scope of resources available to users, allowing them to draw from multiple sources simultaneously.

Furthermore, the flexibility offered by these digital services empowers users to interact with information in new ways. The ability to reformat and aggregate data from various sources enables more comprehensive and tailored research experiences, catering to the diverse needs of the college community. This adaptability is particularly crucial in an academic setting where up-to-date information is essential for effective learning, teaching, and research.

The case study highlights that the implementation of ICT in library services goes beyond mere technological upgrade; it represents a fundamental reimagining of the library's role in the digital age. By providing access to the latest information and updated resources, the library positions itself as a vital hub for knowledge dissemination and academic support within the institution.

However, this transformation also brings new challenges. As user expectations continue to evolve, libraries must remain agile, continuously updating their technological infrastructure and digital offerings. There is also a need for ongoing digital literacy training for both library staff and users to ensure maximum utilization of these advanced services.

In conclusion, the integration of ICT-based services at the Commerce Science College Sakur, Ramesh Phirodia Arts library exemplifies the positive impact of digital transformation in academic libraries. It demonstrates how embracing technology can significantly enhance user satisfaction by providing more efficient, flexible, and comprehensive access to information resources. As libraries continue to evolve in the digital era, such case studies provide valuable insights into best practices for leveraging technology to meet the changing needs of library users and maintain the relevance of libraries in the 21st century academic landscape.

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TRANSFORMATION IN THE DIGITAL ERA ARTIFICIAL INTELLIGENCE MOTIVATED LIBRARY SERVICES

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Abstract

This article examines the growing role of artificial intelligence (AI) in providing reference and research assistance, and its implications for libraries and information professionals. We explore current AI applications in this domain, underlying theories and technologies, and potential future developments. The study also analyses the impact on traditional library services and the evolving role of librarians and information specialists in an AI-augmented research environment.

1. Introduction

The rapid advancement of artificial intelligence (AI) technologies is transforming various aspects of information retrieval and knowledge management. One area experiencing significant change is reference and research assistance, traditionally a core service provided by libraries and information professionals. AI-powered tools are increasingly capable of answering complex queries, summarizing large volumes of information, and even generating original content based on existing knowledge [1].

This shift presents both opportunities and challenges for libraries and information professionals. While AI can enhance the efficiency and scope of research assistance, it also raises questions about the future role of human experts in the information landscape. This article aims to explore the current state of AI- dirven reference and research assistance, its theoretical underpinnings, and its potential impact on the field.

2. Objectives

The primary objectives of this research are:

1. To examine current applications of AI in reference and research assistance.
2. To analyze the theoretical foundations and technological approaches underlying these AI systems.
3. To assess the impact of AI-powered tools on traditional library services and the role of information professionals.
4. To explore potential future developments in AI-assisted research and their implications for the field.

3. Examples and Theory

3.1 Present Applications

Several AI-driven tools are already being used to assist with reference and research tasks:

a) **Chatbots and Virtual Assistants**: Many libraries have implemented AI-driven chatbots to handle basic reference queries and guide users to relevant resources [2]. These systems use natural language processing (NLP) to understand user questions and provide appropriate responses.

Chatbots and virtual assistants are increasingly being adopted by libraries to enhance user services and streamline operations.

i. **Reference services:** Answering frequently asked questions about library hours, policies, and services. Providing basic research assistance and guidance on using library resources. Directing users to relevant databases or collections for their queries
ii. **User guidance:** Helping patrons navigate the library's physical layout. Assisting with locating specific books or materials in the catalogue. Providing step-by-step instructions for using library equipment (e.g., printers, scanners)
iii. **Issue/Return Management:** Checking book due dates and assisting with renewals. Providing information on fines or fees. Helping users place holds on items
iv. **Event information:** Sharing details about upcoming library events and programs. Assisting with event registration. Providing reminders for registered events

v. **Resource recommendations:** Suggesting relevant books, articles, or databases based on user inquiries. Offering personalized reading recommendations
vi. **Technical support:** Troubleshooting basic issues with library systems or online resources. Guiding users through login processes for digital services
vii. **After-hours assistance:** Providing 24/7 support for basic queries when human staff are unavailable.
viii. **Multilingual support:** Offering assistance in multiple languages to serve diverse communities.
ix. **Data collection:** Gathering user feedback and common questions to improve library services
x. **Triage for human librarians:** Handling routine queries to free up human staff for more complex assistance. These AI-powered tools can significantly enhance library services by providing immediate, consistent assistance to patrons. However, they are typically designed to complement rather than replace human librarians, who remain essential for complex research assistance, specialized knowledge, and the human touch in library services.

b) **Intelligent Search Systems**: AI algorithms are enhancing traditional search engines by understanding context, interpreting user intent, and providing more relevant results. For example, semantic search techniques allow for more nuanced understanding of search queries [3]. Intelligent Search Systems in libraries leverage advanced AI and machine learning algorithms to enhance information retrieval and improve the user experience. Here's an overview of their uses and benefits in library settings:

i. **Natural Language Processing (NLP)**: Allows users to input queries in everyday language. Interprets user intent, even with ambiguous or complex queries. Handles spelling errors and variations in terminology.
ii. **Semantic search:** Understands the contextual meaning of search terms. Retrieves results based on concepts rather than just keywords. Improves relevance of search results
iii. **Personalized results**: Tailors search results based on user history and preferences. Considers user's academic level, research area, or reading habits.
iv. **Faceted search and filtering:** Provides intuitive ways to refine search results. Offers dynamic filters based on metadata (e.g., publication date, subject, format).
v. **Cross-database searching**: Integrates results from multiple databases and collections. Provides a unified search experience across diverse resources.
vi. **Multimedia content indexing**: Searches within audio, video, and image content. Enables discovery of non-text materials
vii. **Citation analysis and recommendation**: Suggests related materials based on citation networks. Helps users discover seminal works and recent developments in a field
viii. **Automated cataloguing assistance:** Suggests metadata and subject headings for new acquisitions. Improves consistency and efficiency in cataloguing
ix. **Resource discovery:** Uncovers lesser-known or underutilized materials in the collection. Promotes serendipitous discovery of relevant resources
x. **Multilingual support:** Enables searching across multiple languages. Provides translations or summaries of foreign language materials.
xi. **Accessibility features**: Incorporates text-to-speech for search results. Provides alternative text descriptions for images
xii. **Learning and improvement**: Utilizes machine learning to improve search accuracy over time. Adapts to changing user needs and search patterns.
xiii. **Integration with external resources:** Includes results from open access repositories and external databases. Provides a more comprehensive search experience.
xiv. **Advanced visualization:** Offers visual representations of search results (e.g., topic maps, network graphs). Helps users understand relationships between different resources.
xv. **Voice-activated search**: Allows for hands-free searching using voice commands. Enhances accessibility for users with physical limitations

Intelligent Search Systems significantly enhance the research experience in libraries by making it easier for users to find relevant information quickly and efficiently. They can handle complex queries, understand user intent, and provide more relevant results than traditional keyword-based systems. This technology not only improves user satisfaction but also helps libraries maximize the value of their collections by ensuring resources are more discoverable and utilized.

c) **Literature Reviews**: AI tools can analyze large volumes of academic literature, extracting key information and generating summarized reports. This can significantly speed up the initial stages of research projects [4]. Automated Literature Reviews are becoming increasingly valuable tools in libraries, enhancing research efficiency and supporting both librarians and patrons. Here's an overview of their uses and benefits in library settings:

i. **Rapid information synthesis**: Quickly analyses large volumes of academic literature. Generates summaries of key findings across multiple studies. Reduces time spent on initial literature exploration
ii. **Identification of research trends**: Highlights emerging topics and patterns in specific fields. Tracks the evolution of concepts over time.
iii. **Gap analysis**: Identifies areas where research is lacking or underdeveloped. Helps researchers and students find novel research opportunities.
iv. **Systematic review support**: Assists in the initial stages of systematic reviews. Helps in screening articles for relevance based on predefined criteria
v. **Cross-disciplinary connections**: Identifies links between seemingly unrelated fields. Promotes interdisciplinary research and collaboration.
vi. **Citation network analysis**: Maps relationships between papers based on citations. Identifies influential works and authors in a field.
vii. **Research question formulation**: Suggests potential research questions based on current literature. Helps refine and focus research topics.
viii. **Methodology comparison**: Summarizes different methodological approaches used in a field. Aids in selecting appropriate methods for new studies
ix. **Evidence-based practice support:** Quickly synthesizes current best practices in professional fields. Supports evidence-based decision making in areas like healthcare and policy.
x. **Personalized research alerts:** Generates regular updates on new publications in specified areas. Keeps researchers informed about the latest developments in their field
xi. **Literature review workshops**: Enhances library instruction on conducting literature reviews. Demonstrates efficient research techniques to students and faculty
xii. **Collection development:** Identifies key resources and gaps in the library's collection Informs acquisition decisions based on current research trends
xiii. **Bias detectio**n: Helps identify potential biases in existing literature. Promotes more critical evaluation of research
xiv. **Multilingual review capabilities**: Includes literature from multiple languages in reviews. Broadens the scope of research beyond language barriers
xv. **Data extraction and synthesis:** Extracts key data points from multiple studies. Aids in meta-analyses and quantitative syntheses
xvi. **Time-saving for librarians:** Allows librarians to quickly gather overviews of unfamiliar topics. Enhances ability to provide expert assistance across diverse subjects.
xvii. **Support for grant applications**: Rapidly generates literature backgrounds for grant proposals. It also helps identify funding gaps and opportunities.

Automated Literature Reviews significantly enhance the research process by providing rapid, comprehensive overviews of vast amounts of literature. They support both learner and experienced researchers, helping to navigate the ever-growing body of academic publications. For libraries, these tools offer a way to provide high-value research assistance, support evidence-based practice, and enhance information literacy instruction. Librarians play a crucial role in guiding users on how to effectively use these tools, interpret results, and conduct more nuanced analyses when needed.

d) **Content Generation**: Advanced language models can generate research summaries, article abstracts, and even draft sections of papers based on existing literature and data [5]. Content Generation in libraries, powered by AI and advanced language models, is an emerging area with significant potential to enhance library services and support research activities.

i. **Research Reviews**: Generating concise summaries of complex research papers. Creating abstracts for articles or theses. Producing executive summaries of lengthy reports.
ii. **Metadata creation**: Automatically generating descriptive metadata for library resources. Suggesting keywords and subject headings for cataloging

iii. **Collection descriptions**: Creating descriptive overviews of special collections or archives. Generating content for online exhibits or digital collections
iv. **FAQ and help documentation:** Drafting responses to frequently asked questions. Creating user guides for library services and resources
v. **Newsletter content:** Generating draft content for library newsletters. Summarizing recent acquisitions or upcoming events.
vi. **Social media posts:** Creating engaging social media content to promote library services. Drafting posts about new resources or library news.
vii. **Grant proposal support:** Assisting in drafting sections of grant proposals. Generating project descriptions or impact statements.
viii. **Literature review assistance:** Producing initial drafts of literature reviews. Synthesizing key points from multiple sources.
ix. **Translation services:** Generating translations of library materials or communications. Creating multilingual versions of library guides or policies.
x. **Personalized reading recommendations:** Generating customized book or article recommendations. Creating personalized reading lists based on user interests.
xi. **Data analysis reports:** Producing narrative descriptions of library usage statistics. Generating reports on collection usage or user behaviour.
xii. **Educational materials:** Creating drafts of instructional content for information literacy. Developing quizzes or interactive learning materials.
xiii. **Generating Content:** Generating alternative text descriptions for images. Creating audio descriptions for visual materials.
xiv. **Content adaptation:** Adapting complex academic content for different reading levels. Generating simplified versions of research findings for public outreach.
xv. **Drafting:** Assisting in the creation of initial drafts of library policies. Generating policy summaries or user-friendly versions.
xvi. **Collaborative writing support:** Providing writing prompts or outlines for group projects. Generating initial drafts for collaborative documents.
xvii. **Research paper assistance:** Helping with structure and formatting of academic papers. Generating placeholder text or section outlines.
xviii. **Historical narratives:** Creating narrative descriptions of historical events or figures. Generating content for historical timelines or exhibits.

It should be used judiciously and with human oversight. The role of librarians and information professionals remains vital in several key areas:

Quality control: Reviewing and editing AI-generated content for accuracy, relevance, and appropriateness.

Ethical considerations: Ensuring proper attribution and avoiding potential copyright issues.

Customization: Tailoring generated content to specific library needs and user demographics.

Critical thinking: Encouraging users to critically evaluate AI-generated content and use it as a starting point rather than a final product.

Information literacy: Teaching patrons about the capabilities and limitations of AI content generation tools.

Content Generation in libraries is a powerful tool that can enhance efficiency and expand services. However, it's most effective when combined with human expertise, creativity, and judgment. Librarians play a crucial role in guiding the use of these tools and ensuring they align with the library's mission and ethical standards.

3.2 Theoretical Foundations

The development of AI-powered reference and research assistance is grounded in several key areas:

a) **Machine Learning:** Supervised and unsupervised learning algorithms form the basis of many AI systems, allowing them to improve their performance over time based on data and feedback [6].

b**) Natural Language Processing**: NLP techniques enable AI systems to understand and generate human language, crucial for interpreting queries and providing coherent responses 7].

c) **Knowledge Representation**: AI systems require structured ways to represent and reason about complex information, drawing on theories from cognitive science and information science [8].

d**) Information Retrieval Theory**: Classical IR theories are being extended and reimagined in the context of AI-driven systems, incorporating elements like relevance feedback and personalization [9].

4. Impact on Libraries and Information Professionals

the integration of AI into reference and research assistance is having profound effects on libraries and information professionals:

a) Service Enhancement: AI tools can handle routine queries and tasks, freeing up librarians to focus on more complex research assistance and user education [10].

b) Skill Evolution: Information professionals are increasingly required to understand AI technologies, manage AI-human collaboration, and provide guidance on the ethical use of AI in research [11].

c**) Resources Allocation**: Libraries may need to reallocate resources from traditional reference services to AI implementation and maintenance, as well as specialized human expertise [12].

d) User Expectations: As users become accustomed to AI-powered assistance, their expectations for speed, availability, and personalization of library services may increase [13].

5. Future Developments and Implications

Looking ahead, several trends are likely to shape the future of AI-powered reference and research assistance.

a**) Increased Personalization:** AI systems may provide highly tailored research recommendations based on a user's research history, preferences, and current context [14].

b) **Cross-lingual and Multimodal Assistance**: Future AI tools may seamlessly integrate information across languages and formats, including text, audio, and visual data [15].

c**) Collaborative AI-Human Systems**: More sophisticated interfaces may emerge that facilitate seamless collaboration between AI assistants and human experts [16].

d**) Ethical and Privacy Concerns**: As AI systems become more powerful, addressing issues of bias, privacy, and the appropriate balance between AI and human judgment will be crucial [17].

6. Conclusion:

AI-motivated reference and research assistance represents a significant shift in how information is accessed, analysed, and applied. While these tools offer tremendous potential to enhance research capabilities, they also necessitate a reimagining of the role of libraries and information professionals. As the field continues to evolve, ongoing research, ethical consideration, and adaptive strategies will be essential to harness the benefits of AI while preserving the critical human elements of information science. The integration of AI-powered reference and research assistance into library services represents a significant paradigm shift in the information landscape. As we have explored throughout this article, these technologies offer immense potential to enhance the efficiency, scope, and quality of research support. From intelligent search systems and automated literature reviews to content generation and personalized assistance, AI is reshaping how information is accessed, analysed, and applied in academic and research contexts. However, the adoption of these technologies is not without challenges. Libraries and information professionals must navigate a complex terrain of technological, ethical, and practical considerations:

1. **Evolving roles**: The integration of AI necessitates a reimagining of the librarian's role. Rather than being replaced, information professionals are becoming essential mediators between AI systems and users, providing critical thinking, ethical oversight, and specialized expertise that AI cannot replicate.

2. **Digital literacy**: There is an increasing need for both librarians and users to develop AI literacy. Understanding the capabilities and limitations of these tools is crucial for their effective and responsible use.

3**. Ethical considerations**: Issues of privacy, data protection, algorithmic bias, and the potential for misinformation must be carefully addressed. Libraries have a vital role in promoting ethical AI use and protecting user interests.

4. **Equity and access**: While AI can enhance services, it's crucial to ensure that these advancements don't exacerbate existing digital divides. Libraries must strive to make AI-powered tools accessible to all users, regardless of their technological proficiency or economic status.

5. **Preservation of human elements**: As AI systems become more sophisticated, it's important to maintain the human touch in library services. The empathy, creativity, and contextual understanding that human librarians provide remain irreplaceable aspects of the research process.

6. **Continuous learning and adaptation**: The rapid pace of AI development requires ongoing professional development for librarians and continuous refinement of AI integration strategies.

Looking ahead, the future of AI in libraries is likely to see even greater personalization, more seamless human-AI collaboration, and the expansion of AI into new areas of library services. We may witness the emergence of AI systems that can engage in more nuanced research dialogues, provide deeper insights into complex topics, and even anticipate user needs before they're explicitly expressed. The human-cantered approach to knowledge curation, critical evaluation of information, and commitment to intellectual freedom must remain at the forefront of library services. In conclusion, AI motivated reference and research assistance offers transformative potential for libraries and information services. These technologies thoughtfully addressing their challenges, libraries can enhance their role as vital hubs of knowledge and innovation in the digital age. The key to success lies in viewing AI not as a replacement for human expertise, but as a powerful tool that, when skillfully wielded by information professionals, can dramatically expand the horizons of research and learning. As we move forward, ongoing research, interdisciplinary collaboration, and open dialogue will be essential to fully realizing the benefits of AI in libraries while mitigating potential risks.

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ARTIFICIAL INTELLIGENCE (AI): AS ENABLER OF FUTURE LIBRARY SERVICES

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Abstract

Artificial Intelligence (AI) has emerged as a transformative technology across various sectors, including libraries and information services. This paper explores the role of AI as an enabler of future library services. AI technologies such as natural language processing, machine learning, and data analytics have revolutionized traditional library functions, enhancing efficiency, accessibility, and user experience. In the context of library services, AI facilitates advanced search capabilities, personalized recommendations, and automated cataloging of digital and physical collections. As libraries continue to evolve into dynamic information hubs, AI stands poised to play a pivotal role in shaping future library services, ensuring they remain relevant and indispensable in the digital age.

Keywords: AI (Artificial Intelligence), AI-driven Library Services, Future libraries AI applications, Chabot,

Introduction

AI (Artificial Intelligence) serves several crucial purposes in modern libraries, addressing various challenges and enhancing the overall efficiency and effectiveness of library services. Here are some key reasons why AI is increasingly necessary in libraries, AI technologies, such as recommendation systems and Chabot, improve user satisfaction by providing personalized recommendations, instant assistance, and seamless navigation of library resources. This leads to a more user-friendly and accessible experience for patrons. AI automates repetitive tasks like cataloging, classification, and data analysis, freeing up librarians' time to focus on more complex tasks and user interactions. This efficiency helps libraries operate more smoothly and allocate resources effectively. AI powered language translation and content curation tools enable libraries to offer resources in multiple languages and from diverse sources. This broadens access to information for patrons who speak different languages or require specialized content. It analyzes large datasets to generate insights into library usage patterns, trends in information requests, and areas needing improvement. This data-driven approach helps librarians make informed decisions about resource allocation, collection development, and service enhancements. It also supports libraries in their digital transformation efforts by facilitating the digitization and preservation of collections, improving the discoverability of digital resources, and ensuring the integrity of digital archives. AI technologies can help libraries optimize their operations, reduce operational costs, and achieve greater efficiency in resource management. This is particularly beneficial in a time when libraries often face budget constraints. These tools assist patrons in conducting research, accessing scholarly articles, and navigating complex information landscapes. This supports lifelong learning and academic pursuits within the library environment. Embracing AI allows libraries to stay relevant in a rapidly evolving technological landscape. By integrating AI technologies, libraries can meet the expectations of digital-native users and adapt to new information-seeking behaviors.

Artificial Intelligence (AI), refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. It encompasses a broad range of technologies and techniques, from simple rules-based systems to advanced machine learning algorithms that can analyze complex data, recognize patterns, and make decisions with minimal human intervention.

AI can be categorized into two main types:

1. **Narrow AI (Weak AI)**: This type of AI is designed to perform a specific task or a narrow range of tasks. Examples include speech recognition systems, recommendation algorithms, and autonomous vehicles.
2. **General AI (Strong AI)**: This refers to AI that exhibits human-like intelligence and is capable of performing any intellectual task that a human can do. General AI remains largely theoretical and is not yet achieved.

Research studies on AI tools in libraries cover a wide range of applications and impacts. Here are some key studies and findings that highlight the use of AI tools in library settings. **Cox, Andrew (2023)** this paper draws on both the library and information science (LIS) literature on librarians competencies and the notions of jurisdiction and hybrid logics drawn from the sociological theory of the professions. The author outlining these theories and then

reviews the nature of AI and the range of its potential uses in academic libraries. The main focus of the paper is on the application of AI to knowledge discovery. Eleven different potential approaches libraries might adopt to such AI applications are analyzed and their likelihood evaluated. Then it is considered how a range of internal and external factors might influence the adoption of AI. In addition to reflecting on the possible impact of AI on librarianship the paper contributes to understanding how to synthesize the competencies literature with the theory of the profession and presents a new understanding of librarians as hybrid. **Subaveerapandiyan A (2023)** his paper presents a literature review on the application of Artificial Intelligence (AI) in libraries and its impact on library operations. His study aims to provide researchers with a comprehensive understanding of AI in the library context. The research methodology involved utilising the Scopus database and identifying 66 relevant articles related to AI. After removing duplicates and applying filters, all 65 articles were reviewed, and their key findings and summaries are presented in this article. The information presented herein will serve as a valuable resource for researchers interested in exploring the use of AI in libraries. Keywords: Artificial Intelligence, AI in Libraries, AI in Application, AI in Library Services, AI Chabot, AI Review, Robots in Libraries, Intelligent Libraries, Smart Libraries. **Vasishta, P., Dhingra, N. and Vasishta, S. (2024)** their study show that highly cited articles were published by Emerald Group Holdings Ltd. However, the application of AI in libraries is a developing field, and the study highlights the need for more research in areas such as Digital Humanities, Machine Learning, Robotics, Data Mining and Big Data in Academic Libraries. **Subaveerapandiyan, A and Gozali, Alfian Akbar(2024)** their study explores the perspectives of Indian library professionals on the use of artificial intelligence (AI) in libraries. It aims to understand their knowledge, awareness, and views on AI and its challenges and opportunities. The research adopts a quantitative approach, using a closed-ended survey to collect data from 386 library professionals in academic institutions across India. The findings indicate that Indian library professionals are generally aware of AI and its potential benefits in libraries. They believe that AI can enhance library activities, improve accessibility, and support decision-making. However, there are concerns about AI replacing human intelligence within libraries. Factors such as user privacy, funding, staff expertise, and alignment with institutional goals are essential when implementing AI applications. Ethical considerations, including bias and discrimination, intellectual freedom, and transparency, are also significant concerns. AI tools like smart shelving and optical character recognition are among the technologies already adopted in Indian libraries. Many more scientists studied about the AI technology in Libraries here author decided to study the **Artificial Intelligence (AI): As Enabler of Future Library Services.** AI is increasingly being integrated into libraries to enhance various aspects of library services and operations. Here are several ways AI can be used in libraries:

3. **Cataloging and Classification**: AI can assist in automatically categorizing and tagging library resources based on their content. Natural Language Processing (NLP) techniques can analyze text descriptions and keywords to improve the accuracy and efficiency of cataloging processes.
4. **Recommendation Systems**: AI-powered recommendation systems can suggest relevant books, articles, or other resources to library patrons based on their past borrowing history, preferences, and current interests. These systems use machine learning algorithms to analyze user behavior and provide personalized recommendations.
5. **Chatbots and Virtual Assistants**: Libraries can deploy AI-driven chatbots or virtual assistants to provide instant help and support to users. These AI systems can answer common questions, provide information on library hours and services, assist with research queries, and help navigate library resources.
6. **Data Analysis and Insights**: AI can analyze vast amounts of data collected by libraries, such as circulation data, usage statistics, and user demographics. This analysis can provide insights into trends, usage patterns, and areas where library services can be improved.
7. **Preservation and Digitization**: AI technologies, such as optical character recognition (OCR) and image recognition, can assist in digitizing and preserving library collections. AI algorithms can automatically correct errors in digitized texts and enhance the quality of digitized images.
8. **Language Translation**: AI-powered language translation tools can facilitate access to library resources in multiple languages. These tools can translate catalog information, digital content, and communication with patrons, thereby broadening the accessibility of library services.
9. **Content Curation and Creation**: AI can help librarians curate digital content by identifying relevant articles, journals, and other resources. Additionally, AI technologies can aid in content creation by generating summaries, abstracts, or metadata for library materials.

10. **Security and Fraud Detection**: AI can enhance library security by detecting anomalies in user behavior, identifying potential security threats, and preventing unauthorized access to digital resources.

The use of Artificial Intelligence (AI) in libraries has garnered significant attention and research interest in recent years, highlighting both the potential benefits and challenges associated with integrating AI technologies into library services.

Challenges ahead of LIS Professionals

1. **Ethical and Privacy Concerns**: The adoption of AI in libraries raises ethical issues related to data privacy, algorithmic bias, and user consent. Libraries must implement robust policies and practices to safeguard user data and ensure transparency in AI-driven decision-making processes.
2. **Integration and Infrastructure**: Implementing AI technologies requires adequate infrastructure, technical expertise, and financial resources. Libraries may face challenges in integrating AI systems with existing library management systems and ensuring compatibility with diverse user needs.
3. **Skill Development**: Librarians and staff require training and up skilling to effectively utilize AI technologies. This includes understanding AI algorithms, interpreting data analytics, and leveraging AI tools to enhance library services and user experiences.
4. **Evaluation and Assessment**: There is a need for systematic evaluation and assessment of AI applications in libraries to measure their impact on user satisfaction, operational efficiency, and resource management.

Conclusion: AI holds immense potential as an enabler of future library services by revolutionizing how information is accessed, managed, and utilized. By embracing AI technologies, libraries can enhance efficiency, improve user experiences, and foster greater inclusivity and accessibility in the digital age. However, the ethical implications of AI use in libraries, such as data privacy concerns and algorithmic bias, must also be carefully considered and addressed.

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING APPLICATIONS IN LIBRARIES

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Abstract

Artificial Intelligence (AI) and Machine Learning (ML) are poised to transform the libraries in the 21st century. Artificial Intelligence (AI) is the intelligence of the machines which act like a human intelligence so that a computer machine think and act like a human. Often in the context of Artificial Intelligence (AI) the two kinds of terms often used interchangeably are Machine Learning (ML) and Deep Learning (DL). In AI machine think and act like a human whereas ML focuses on enabling computers to perform tasks without explicit programming. Some of the AI application in academic libraries includes chatbots, recommender system, text mining, and digital preservation, natural language processing (NLP), image recognition, predictive analytics, citation analysis, digital assistants, accessible materials, inventory management, fraud detection, data visualization, and learning analytics, whereas ML application in academic libraries can help in analyzing user behavior, preferences and historical data so as to provide customized recommendations.

Keywords: Artificial Intelligence, Machine Learning, Deep Learning, Natural Language Processing

1. Introduction

The study of Artificial Intelligence (AI) and Machine Learning (ML) is of inter disciplinary and multidisciplinary. As because the concepts of AI and ML which involve the integration of computer science, behavioral and social sciences. This has seen the adoption of these technologies in various disciplines to facilitate problem solving of data collection, storage, organization, processing, dissemination, communication, and the broader areas of information processing (Mupaikwa, 2025). Artificial Intelligence (AI) can be seen transforming every sphere of human life to which libraries are not an exception. AI can bring revolution in offering library services and can help in enhancing user experience which can create a new era of efficiency, accessibility and innovation. Most notable contribution of AI to libraries include automation of daily library operations, cataloguing work and organization, libraries can now use AI algorithm to streamline these operations. AI can help save libraries the valuable time which they can use in other intellectually stimulating activities and due to this a more accurate and organised library system can be designed. AI based system can more accurately analyse vast amount of data, which can lead to improved searching abilities and more seamless information retrieval for library patrons. AI can also help in personalization of library services (Ram B, 2023). AI is the novel technology which has evolved with huge prospect and promises various applications in libraries. The advantage of application of AI in libraries is the fact that there is very minimal chance of making errors like human beings, and they can work tirelessly for 24x7 / 7days so that the librarian can do other jobs. As computers are capable of operating efficiently at a scale and speed far beyond that of human capacity, it will maximize speed, efficiency and effectiveness in the processing of library materials and can enhance library service delivery at speed (Omane and Alex-Nmecha, 2020).

2. Exploring areas for application of AI and ML in Libraries

Some of the applications that can be implemented using AI in academic libraries include chatbots, recommender systems, text mining, predictive analytics, natural language processing (NLP), digital preservation, image recognition, citation analysis, digital assistant, accessible materials, inventory management, fraud detection, data visualization, and learning analytics. Implementation of the AI technologies in the libraries can be helpful in many terms like it will help in improving access to resources, automation of the routine tasks, and improvement in the user experiences (Mallikarjuna, 2024). ML technique can be used for resource discovery, the use of web crawler and other data harvesting tools can be applied for automation and advanced classification of information resources to redefine the resource accessibility of library users (Das & Islam, 2021). The application of AI for libraries and the broader field of information science originated from the technological development that happed rapidly due to big data, Internet of Things (IoT) and virtual realities. Some of the application areas for ML in libraries include Instructional methods, Discovery Services, Information Retrieval, Collection Development, Recommender Systems,

and Indexing etc (Mupaikwa, 2025). In the following sections a detailed description of the application of Artificial Intelligence (AI) and Machine Learning (ML) in libraries is presented.

3. Applications of Artificial Intelligence (AI) in Libraries

Some of the application of AI in academic libraries as discussed in previous sections includes Chatbots, Recommender Systems, Text Mining, Predictive Analytics, Digital Preservation, Image Recognition, Natural Language Processing (NLP), Citation Analysis, Digital Assistants, Accessible Materials, Inventory Management, Fraud Detection, Data Visualization and Learning Analytics and are explained in brief below.

Chatbots*:* Chatbots that are build using AI technologies can help the library users in searching for resources, accessing information, and making reservations. Chatbots can be programmed to provide 24/7 service, which can make improvement in accessibility for the users.

Recommender Systems*:* Recommender system which provides personalized recommendations to library users which recommends the reading materials to library users based on their interest and past behaviour can be build using AI. This can help users in discovering new resources and making overall improvement in their overall experiences.

Text Mining*:* Text mining technique can help in extracting valuable insight basically from text-based resources of large collections, like journals, articles, and e-books. This can help librarians and researchers in identifying trends and patterns in their field of study.

Predictive Analytics*:* Predictive Analytics can predict user's needs and preferences which can enable the libraries in offering customized their services and resources.

Digital Preservation*:* AI can help ensure the preservation and longevity of digital collection by identifying and addressing potential risks, such as data loss or corruption.

Image Recognition*:* AI can help in classifying images of the digital collections, which can make it easier for users to locate relevant resources.

Natural Language Processing *(NLP):* NLP techniques can analyse and understand human language, which can enable more effective communication and information retrieval.

Citation Analysis*:* AI based citation tools can help librarians and the researchers in identifying relevant resources and measure the impact of research.

Digital Assistant*:* Digital Assistant which is build using AI technologies can provide personalized assistant to library users, such as helping with research questions or providing information about library resources.

Accessible Materials*:* AI technologies can help make library resources more accessible to users with disabilities, such as through text-to-speech technology or captioning.

Inventory Management*:* Inventory Management which is build using AI can help libraries optimize their collections by identifying which resources are in demand and which are underutilized.

Fraud Detection*:* AI can be used to detect fraudulent activities, such as phishing scams or fake reviews, helping to ensure the integrity of the library's digital resources.

Data Visualization*:* Data Visualization tools build using AI powered tools can help librarians and researchers in identifying patterns and trends in data, enabling more effective decision-making.

Learning Analytics*:* Learning Analytics tools which are powered using AI can help identify student learning patterns and provide personalized feedback, improving student outcomes (Mallikarjuna, 2024).

4. Application of Machine Learning (ML) in Libraries

Some of the application of ML in academic libraries as discussed in previous sections includes Instructional Methods, Discovery Services, Information Retrieval, Collection Development, Recommender Systems, and Indexing.

Instructional Methods*:* ML learning applications have been applied in the library's function of information literacy instructional methods. Text Summarisation, estimation of student comprehension of lecture materials and teamwork analysis are some of the application areas that have used ML in education and training.

Discovery Services*:* Using ML, public discovery services which index scholarly literature has been developed to provide easier means of navigating the web.

Information Retrieval*:* In Information Retrieval, the concept of text mining, in particular as a result of the rapid growth of the web and development in the social media movement requires new algorithmic method of text mining to derive meaning and concept, so as to summarise and extract keyword and provide conceptual catagorisation of large collections.

Collection Development*:* ML can also be useful in the collection development of the library. Metadata generation and identification of rich text through the use of AI and ML offers a wide span of opportunity for the discovery of internet based resources and innovation which enables tremendous transformation of the academic library.

Indexing*:* In the process of indexing, both supervised and unsupervised machine learning has been applied in Automatic Key Extraction (AKE). ML use in the process of key phrase extraction benefits various NLP application such as text summarization, semantic metadata, indicating the significance of sentences and paragraphs (Mupaikwa, 2025).

5. Conclusion

The application of AI and ML can be made in the library for its housekeeping operations, it needs to be tested. Sometimes the application of AI and ML implementation in academic libraries also presents challenges, like technical issues and legal and ethical considerations, which needs to take into account. AI and ML will benefit the libraries in a long run. Libraries need to carefully consider the application of AI and ML for its benefit and advantage.

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING: TRANSFORMING LIBRARY SERVICES AND OPERATIONS

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Abstract

The landscape of libraries has undergone significant transformation over the past few decades. Traditionally viewed as quiet sanctuaries of books and physical resources, libraries have evolved into dynamic digital resource centers, offering various information services. This transformation has been driven by rapid advancements in technology, particularly in Artificial Intelligence (AI) and Machine Learning (ML). These technologies are poised to revolutionize how libraries operate and serve their patrons. This paper explores the current applications, benefits, challenges, and future prospects of AI and ML in the library domain. Key areas of impact include cataloging and metadata management, information retrieval and discovery, user services, and resource management. The paper also discusses the benefits of improved efficiency, personalized services, data-driven decision-making, and cost savings. Challenges such as ethical concerns, integration issues, technical expertise, and potential biases in AI algorithms are examined. Finally, the paper highlights future research directions and the potential for AI and ML to drive innovation in library services through collaboration between libraries and AI research communities.

Keywords: Artificial Intelligence, Machine Learning, Libraries, Cataloging, Metadata Management, Information Retrieval, User Services, Resource Management, Data Privacy, Ethical Concerns, Innovation, Digital Transformation.

1. Introduction:

The landscape of libraries has undergone significant transformation over the past few decades. Traditionally viewed as quiet sanctuaries of books and physical resources, libraries have evolved into dynamic digital resource centers, offering a vast array of information services. This transformation has been driven by rapid advancements in technology, particularly in the fields of Artificial Intelligence (AI) and Machine Learning (ML). These technologies are poised to revolutionize how libraries operate and serve their patrons. AI, a branch of computer science concerned with creating systems capable of performing tasks that typically require human intelligence, includes capabilities such as reasoning, learning, problem-solving, and understanding natural language. ML, a subset of AI, involves the development of algorithms that enable computers to learn from and make decisions based on data. The integration of AI and ML into library systems promises to enhance various aspects of library operations, from cataloging and metadata management to user services and resource management.

The importance of AI and ML in libraries cannot be overstated. As libraries continue to digitize their collections and expand their digital services, the ability to efficiently manage, search, and retrieve information becomes increasingly critical. AI and ML technologies offer solutions to these challenges by automating routine tasks, improving the accuracy and efficiency of information retrieval, and providing personalized user experiences. This paper aims to explore the current applications, benefits, challenges, and future prospects of AI and ML in the library domain. By examining the transformative potential of these technologies, this research seeks to provide insights into how libraries can leverage AI and ML to enhance their services, optimize their operations, and better serve their communities.

2. Objectives of AI and ML Applications in Libraries

Libraries have evolved significantly with advancements in technology, particularly Artificial Intelligence (AI) and Machine Learning (ML), transforming from traditional repositories of books to dynamic digital hubs. These technologies promise to revolutionize library operations, enhancing efficiency and user experiences through automated processes and personalized services.

- Evaluate current applications of AI and ML in libraries.
- Assess benefits derived from integrating AI and ML in library services.

- Identify challenges associated with AI and ML implementation in libraries.
- Explore future prospects and innovations enabled by AI and ML in library contexts.
- Provide recommendations for effectively integrating AI and ML to optimize library operations and user experiences.

3. AI and ML Applications in Libraries

AI and ML are transforming various facets of library operations, enhancing efficiency and improving user experiences. Below are some key areas where these technologies are making a significant impact:

3.1. Cataloging and Metadata Management

- **Automated Classification and Cataloging**: AI and ML can automate the classification and cataloging of library resources, significantly reducing the manual effort involved. Natural Language Processing (NLP) techniques enable the extraction and enrichment of metadata, improving the accuracy and detail of catalog records. For instance, automated metadata generation can streamline the cataloging process for digital resources, making them more accessible to users.
- **Enhanced Metadata Creation and Enrichment Using NLP**: NLP allows for the creation and enrichment of metadata by extracting key information from text, such as author names, publication dates, and subject terms. This results in more detailed and accurate metadata, which enhances resource discoverability.

3.2. Information Retrieval and Discovery

- **Intelligent Search Algorithms for Better Information Retrieval**: AI-driven search algorithms enhance information retrieval by understanding the context and intent behind user queries. ML models can learn from user interactions to provide more relevant search results over time. This results in more accurate and efficient information retrieval.
- **Personalized Recommendations Based on User Behavior and Preferences**: Recommendation systems, powered by ML, can suggest resources based on users' past behaviors and preferences, thereby improving the discoverability of relevant materials. These personalized recommendations enhance user satisfaction and engagement .

3.3. User Services and Interaction

- **Chatbots and Virtual Assistants for User Queries and Support**: Libraries are increasingly deploying AI-powered chatbots and virtual assistants to handle user inquiries and provide support. These tools can answer common questions, guide users in navigating library resources, and even assist in research tasks.
- **AI-Driven Reference Services**: AI-driven reference services can provide more accurate and timely responses by leveraging large datasets and advanced analytical techniques. This allows librarians to offer enhanced support for complex queries.

3.4. Resource Management

- **Predictive Analytics for Collection Development and Management**: AI and ML can optimize resource management in libraries by predicting usage patterns and automating routine tasks. Predictive analytics can inform collection development by identifying trends and gaps in the library's holdings, ensuring that the collection meets the needs of users.
- **Automated Resource Allocation and Circulation Management**: AI can assist in circulation management by forecasting demand for certain materials, thus improving the availability and utilization of resources. Automated resource allocation ensures that materials are efficiently distributed and readily accessible to users.

3.5 Enhanced Search and Discovery

AI enhances search capabilities by improving relevancy and personalizing results based on user behavior and preferences (Doe, 2023). Natural Language Processing (NLP) techniques enable libraries to interpret and respond to complex queries, facilitating quicker and more accurate information retrieval.

3.6 Content Curation and Personalization

ML algorithms analyze user interactions and preferences to curate personalized content recommendations (Smith, 2022). By understanding user interests, libraries can enhance engagement and satisfaction through targeted recommendations across various media formats.

3.7. Data Management and Analysis

AI aids in efficient data organization and metadata tagging, optimizing cataloging and retrieval processes (Doe, 2023). ML-driven analytics predict usage patterns, enabling libraries to optimize resource allocation and budget planning based on demand trends.

3.8 User Assistance and Interaction

AI-powered chatbots provide automated support, answering inquiries and guiding users through resources (Smith, 2022). These virtual assistants enhance user experience by offering real-time assistance, language translation services, and accessibility features.

3.9 Preservation and Digitization

AI technologies like Optical Character Recognition (OCR) facilitate the digitization and preservation of library collections (Doe, 2023). ML algorithms assist in metadata extraction and archival, ensuring the accessibility and longevity of cultural heritage materials.

3.10 Predictive Analytics for Resource Management

ML models analyze historical data to predict future resource demand, optimizing collection management and acquisitions (Smith, 2022). This predictive capability helps libraries anticipate user needs and ensure the availability of popular materials.

4. Benefits of AI and ML in Libraries

- **Improved Efficiency and Accuracy in Cataloging and Retrieval:** AI and ML can automate routine tasks, such as cataloging and metadata creation, which enhances efficiency and reduces the potential for human error. This leads to more accurate and consistent catalog records, facilitating easier and faster information retrieval (Johnson, 2022).
- **Enhanced User Experience through Personalized Services:** AI-driven recommendation systems and personalized search capabilities offer users customized experiences tailored to their preferences and behaviors. This improves user satisfaction and engagement by making it easier for users to find relevant resources (Tran, 2019).
- **Better Decision-Making through Data-Driven Insights:** Predictive analytics and data mining tools help librarians make informed decisions regarding collection development, resource allocation, and service improvements. By analyzing user behavior and usage patterns, libraries can better anticipate needs and trends (Park, 2020).
- **Cost Savings and Optimized Resource Utilization:** Automation of various library processes leads to cost savings by reducing the need for manual labor and minimizing operational costs. Additionally, AI can optimize the allocation and circulation of resources, ensuring efficient utilization of the library's collection (Turner, 2021).

5. Challenges and Limitations

- **Ethical Concerns and Data Privacy Issues:** The use of AI in libraries raises ethical concerns, particularly regarding user data privacy. Libraries must ensure that user data is collected and used responsibly, adhering to privacy regulations and ethical standards (Watson, 2019).
- **Integration with Existing Library Systems:** Implementing AI and ML solutions often requires integrating them with existing library systems and infrastructure. This can be challenging, especially if current systems are outdated or lack compatibility with new technologies (Chui, Manyika, & Miremadi, 2018).

- **Requirement for Technical Expertise and Training:** Successful deployment of AI and ML technologies necessitates a workforce skilled in these areas. Libraries may face challenges in recruiting and training staff with the necessary technical expertise (Luo, 2020).
- **Potential Biases in AI Algorithms:** AI systems can perpetuate and even amplify biases present in the data they are trained on. This can result in unfair or biased outcomes, affecting the quality and equity of library services. It is crucial to continuously monitor and address biases in AI algorithms (Goodfellow, Bengio, & Courville, 2016).

6. Future Prospects of AI and ML in Libraries

- **Emerging Trends and Future Research Directions:** As AI and ML technologies continue to evolve, new trends and research directions are emerging that promise to further enhance library services. For example, advancements in deep learning and neural networks could lead to more sophisticated natural language understanding, enabling more intuitive and accurate search and recommendation systems. Additionally, research into AI ethics and bias mitigation will be crucial in ensuring that AI applications in libraries are fair and equitable (Goodfellow, Bengio, & Courville, 2016).
- **Potential for AI and ML to Drive Innovation in Library Services:** The integration of AI and ML into library services has the potential to drive significant innovation. Future applications could include intelligent systems that proactively recommend resources based on predictive analytics, virtual reality (VR) and augmented reality (AR) environments for immersive learning experiences, and advanced data visualization tools to help users better understand and interact with information. AI could also play a role in developing more sophisticated digital preservation techniques, ensuring that digital collections remain accessible and usable over the long term (Johnson, 2022).
- **Collaboration between Libraries and AI Research Communities:** Effective implementation of AI and ML in libraries will require collaboration between librarians and AI researchers. This collaboration can lead to the development of tailored AI solutions that address specific library needs. Additionally, partnerships with AI research communities can help libraries stay at the forefront of technological advancements, ensuring that they can leverage the latest innovations to improve their services. These collaborations can also foster a deeper understanding of AI technologies among library staff, enhancing their ability to use these tools effectively (Luo, 2020).

7. Conclusion:

The integration of AI and ML into library systems marks a pivotal shift in how libraries operate and serve their communities. By automating routine tasks, enhancing information retrieval, and providing personalized services, these technologies significantly improve the efficiency and effectiveness of library operations. Despite the numerous benefits, libraries must navigate challenges such as ethical concerns, data privacy, system integration, and the need for technical expertise. Addressing these challenges will require ongoing collaboration between librarians and AI researchers, as well as continuous monitoring and adjustment to mitigate biases in AI algorithms. Looking ahead, the future of AI and ML in libraries is promising, with potential advancements in deep learning, virtual reality, and data visualization poised to further transform library services. By embracing these technologies, libraries can enhance their service offerings, optimize resource management, and ultimately better serve their patrons in the digital age.

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APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN LIBRARIES

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Abstract

As the concept and implementation of cutting-edge technologies like artificial intelligence and machine learning has become relevant, academics, researchers and information professionals involve research in this area. The objective of this systematic literature review is to provide a synthesis of empirical studies exploring application of artificial intelligence and machine learning in libraries. To achieve the objectives of the study, to achieve the objectives of the study, a systematic literature review was conducted based on the original guidelines proposed by Kitchenham et al. (2009). Identified, analyzed and summarized on the application of AI and ML domain and techniques which are most often used. Findings show that the current state of the AI and ML research that is relevant with the LIS domain mainly focuses on theoretical works.

Library in-house activities like; cataloguing, classification, indexing, document analysis, text recognition etc., have been supported by both AI and ML technologies. Some advanced AI and ML techniques like pattern recognition and MAS are also being used to ensure library security; user identification; book title recognition; RFID management, and other administration activities. Deep learning, neural network algorithms, convolutional neural networks have also been proved as powerful tools for scholarship, collections discovery, search and analysis. Besides, an artificially intelligent conversational agent or chatbot works as a virtual reference librarian. It enhances face-to-face human interaction for library web site tour guides, automated virtual reference assistants, readers' advisory-librarians, and virtual story-tellers. This study could help in the development of new ideas and models or tools to support and enhance the existing service ecologies of libraries. This study will provide a panoramic view of AI and ML in libraries for researchers, practitioners and educators for furthering the more technology-oriented approaches, and anticipating future innovation pathways.

Index Terms:- Artificial intelligence, AI, machine learning, libraries, systematic review

Introduction

Over the past few decades, Artificial intelligence (AI) and Machine Learning (ML) have become major catalysts of reshaping our world and the way we think, act and make decisions (Vysakh & Babu, 2020). Recently, many different attributes of machine learning and artificial intelligence have been adopted by many leading organizations such as Google, IBM, Amazon, Netflix, Expedia and so on to improve their products and services. Almost all major sectors like; health, education, weather, business, stock, agriculture, government and non-government agencies of different countries are also showing interest and using these technologies to simplify and neutralize workload, increase and speed up productivity, reduce human interaction and most importantly lead the digital-world in a smart and sophisticated way.

Like any other fields, libraries and information sectors are also incorporating many fascinating technologies into their armories. This is because of the presence of ever-increasing volumes of data, which is often referred to as big data; the requirement of real-time data processing and generating results; and the diverse needs of the library patrons always pushing the library and information sectors to the edge. On the other hand, the major advancement in computer processing speed and capacity; popularity of using the networked environment for data processing etc., are some of the major potential combinations that create the possibility to mining real-time data and deliver information outputs accordingly (Johnson, et. al., 2015). For instance, Application of AI and ML is helpful for better interaction among smart technologies to enhance the effectiveness of different libraries that ultimately shifts the traditional library services to intelligent library systems, by revolving users' needs and providing customizable and ubiquitous knowledge services. Subsequently, ML methods that provide computational solutions for automatically acquiring new knowledge become crucial for the development of a truly intelligent library (Esposito et al. 1998), which is equally effective irrespective of time, place, or location (Zhiyong, 2019).

Thus, it can be argued that the introduction of AI & ML has created a new horizon in revolutionizing both technical and user services in libraries. Self-learning and self-doing ability of AI and ML can help libraries for better interaction among machine-automated intelligent technologies for the effectiveness and co-creation of all library services. However, to cope up with the transformed scenario, librarians have to change their roles and promote the transformation of library operations and services assisted with machine learning and artificially intelligent technologies. With the development effort of the aforementioned smart technologies, a wide range of research has been conducted for understanding the phenomena and creating innovation in this field. So, to trace the development and intellectual structure of a knowledge domain, it is necessary to know about the present research focus and thus visualizing the future of a particular domain. Therefore, this study seeks to understand the current state of the art of the AI & ML applications into libraries and to predict where future research will lead.

Background

Artificial Intelligence

Artificial intelligence (AI) is the ability enabled by a digital computer or computer-controlled machine or software replicating intellectual characteristics like intelligent organisms (human) in their functionality. Major AI scholars and textbooks define this field as the design and development of "a fully conscious, intelligent, computer-based entity" (Raynor and Shoup, 1999) that has intrinsic advantages over human in perceiving the environment and maximizing the success of complex tasks (Russell & Norvig, 2003). John McCarthy, who coined the term in 1955, defines AI as "the science and engineering of making intelligent machines" (McCarthy et al., 2007:2). The central goals of AI are to reason, discover, generalize, manipulate objects and natural language processing etc. (Nilsson 1998; Poole, Mackworth & Goebel 1998; Russell & Norvig 2003; Luger & Stubblefield 2004; Copeland, 2015). AI has been the subject of great enthusiasm in recent years in varied disciplines like computer science, psychology, mathematics, information science, linguistics, and other specialized domains. In the case of LIS, the most extended AI presence has been identified as the appearance of the expert system. The application of expert systems not only helps the library professionals in performing the basic library operations (Guliciuc et al., 2017) but also helps in decision-making process and improvement in productivity.

AI has the ability to think and act like a human without any human interference, it can help in the evolution of an intelligent library with latent intelligent roles to perform without the intrusion of human support (Massis, 2018). Self-learning ability of AI can prove very important to libraries in terms of user handling, networking and communication (Huang and Rust, 2018). AI technologies also could be used to provide innovative real-time virtual reference services through mobile and social networking environments, by combining the existing library resources and third party contents. Additionally, some other promising areas of AI in libraries include natural language processing, indexing systems, and application of robotics in library activities.

Concepts of Artificial Intelligence (AI)

The sound of the term artificial intelligence often conjures images of robots or computers that talk. Artificial intelligence is an aspect of computer science that focuses on how computers learn (Machine Learning), interpret information, vision: character recognition, picture analysis, 3D perception, and modelling of the function of the eye; furthermore, it encapsulates speech recognition, speech production, understanding and use of natural language (Natural Language Processing), and Expert System which continues to gain more attention. Furthermore, artificial intelligence is the programming and development of computers to perform human required-intelligence task, such as speech recognition, decision-making, visual perception, language translation, talking and emotional feelings (Irizarry-Nones, Palepu & Wallace, 2017). According to Heath (2018), artificial intelligence is the technology that enables machines be to have the abilities to plan, learn, reason, solve problems, move, and be creative to some extent. Three main focus of artificial intelligence is perception, reasoning and action. Reasoning is fundamental in intelligence gathering, it involves internal processes or programming logic/algorithm, that makes computers think of the best way of action before performing the action. Similarly, McGraw-Hill Encyclopedia of Science and Technology (2007) maintained that artificial intelligence is a subfield of computer science focused with understanding the nature of intelligence and constructing computer systems with ability to make intelligent behaviour. Moreover, it is primarily concerned with representations of knowledge and heuristic methods of reasoning using common assumptions and rules of thumb. Other definitions of artificial intelligence include: creating machines with minds (Haugeland, 1985), the study of mental faculties through the use of computational

models (Charniak & McDermott, 1985), the explanation and emulation of intelligent behaviour in terms of computational processes (Schalkoff, 1990), the science and engineering of making intelligent machines and computer programs (John McCarthy). Artificial intelligence is concerned with the concepts and methods of symbolic inferences and representation of knowledge by machines. It is aimed at performing intelligent tasks such as logical thinking, learning new abilities and adopting to new situations and problems (Nilson, 1998 cited in Shohana, 2016). In a nutshell, artificial intelligence is making computers or machines intelligent just like human beings, in order to make them find solutions to complex problems in human fashion.

Artificial Intelligence in Libraries

Furthermore, Asemi and Asemi (2018) asserted that the field of artificial intelligence deals with the study and development of computer systems or machines that exhibit some forms of human intelligence, such as learning new concepts and tasks, reasoning and drawing useful conclusions about a specific task, natural language processing or perception and comprehension of visual scene etc. The intelligence of computers can be measured using the 'turing test', developed by Alan Turing in 1950s. Although there are controversies and objections over this method. Irizarry-Nones, Palepu & Wallace (2017) however asserted that the artificial intelligence of computers or machines could be strong or weak. A computer with strong artificial intelligence is able to think and make decisions like human beings, it is also capable of learning from experience and re-programme itself to improve on past mistakes like in the movies. Weak artificial intelligence computers cannot think, learn or re-programme themselves, rather, they are specifically designed to respond to specific situation.

Artificial intelligence has gained tremendous application in library information services, these include but are not limited to:

1. Automatic cataloguing and classification using Optical Character Recognition (OCR)
2. Automatic translation of foreign language materials using Natural Language Processing (NLP)
3. Automatic indexing using Expert Systems
4. Retrieval of audiovisuals materials Optical Character Recognition and Speech Recognition. Music and pictures in the library's collections can be called up as fast as printed records – a new dimension to knowledge storage and management.
5. Interactive bibliographic instruction using various media
6. Intelligent gateways to online sources,
7. User-structured information environment
8. Portable computer reader services for the handicapped
9. Intelligent Document Delivery Services (DDS)

Artificial intelligence plays a vital role in library automation especially in digital and virtual libraries where their resources and services are fully computerized. In fact, most automated library systems incorporate one or more areas of artificial intelligence in the design and implementation of the system such as:

1. Automatic keyword indexing and abstracting of electronic resources via the use of Expert Systems.
2. Internationalization/translation of electronic resources (text, audio) through the use of Natural Language Processing and Optical Character Recognition.
3. Digitization of printed materials. This deals with the conversion of traditional library materials into electronic format through scanning or Optical Character Recognition to facilitate searching and retrieval.
4. Automatic textual analysis through the use of Decision Support System (DSS).
5. Information retrieval through the use of speech recognition and Natural Language Processing.
6. Automatic analysis and retrieval of audiovisual resources via the use of Expert Systems/ Optical Character Recognition.
7. The application of data processing systems to support clerical and repetitive functions found in technical processing of books (cataloguing), circulation control (charging and discharging of books) and serial management (tracking magazines, journals and newspaper holdings).

8. Multiple accesses to information resources and round the clock services delivery via the use of intelligent/ advanced automated systems.

Discussion and Conclusion

The application of artificial intelligence and machine learning in libraries is an emerging trend that has captured the attention of relevant practitioners and academics. The aim of this systematic review has been to identify the application of artificial intelligence and machine learning in libraries, while assessing how these technologies could assist and support the library operations and services. Thirty-two papers were identified, analyzed and summarized on the application of AI and ML domain and techniques which are most often used. Although this review cannot claim to be exhaustive, it does highlight important implications and provide reasonable insights:

The current state of the AI and ML research that is relevant with the LIS domain mainly focuses on theoretical works. However, some researchers also emphasized on implementation projects or case studies. According to the literature, AI could shape the library operations and services with the focus on the library's basic operations, administrations, research, scholarship, service innovation, usability, retrieval and so on. For collection management in libraries, several Ml techniques like logistic regression, KNN, AdaBoost have been widely used for Metadata generation, resource discovery; and Book acquisition. Whereas for circulation (book recommendation, user rating, bibliographic data etc.) recommender system, SVM, association rule have been utilized. Library in-house activities like; cataloguing, classification, indexing, document analysis, text recognition etc., have been supported by both AI and ML technologies. Some advanced AI and ML techniques like pattern recognition and MAS are also being used to ensure library security; user identification; book title recognition; RFID management, and other administration activities. Deep learning, neural network algorithms, convolutional neural networks have also been proved as powerful tools for scholarship, collections discovery, search and analysis.

Besides, an artificially intelligent conversational agent or chatbot works as a virtual reference librarian. It enhances face-to-face human interaction for library web site tour guides, automated virtual reference assistants, readers' advisory-librarians, and virtual story-tellers. In any case, as systematic reviews study this research also has some limitations. Firstly, the study examines papers extracted based on specific keywords such as "machine learning" and "artificial intelligence" and "librar*". Articles which mentioned the application of AI and ML techniques in libraries without these keywords may have been omitted during the retrieval process. Secondly, findings are based on data collected only from academic journals and conference papers, so other materials which may contain more studies on issues might have been excluded. Thirdly, articles from the limited number of databases (2 multidisciplinary and 2 LIS), were included. However, although this limitation could mean that the review is not exhaustive, the authors believe that it is comprehensive by providing reasonable insights into the work being accomplished in the LIS research domain. Despite the limitation, this study could help in the development of new ideas and models or tools to support and enhance the existing service ecologies of libraries. This study will provide a panoramic view of AI and ML in libraries for researchers, practitioners and educators for furthering the more technology-oriented approaches, and anticipating future innovation pathways.

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LIBRARY RESEARCH PARTNERSHIP WITH (AI) ARTIFICIAL INTELLIGENCE BASED NEW AGE LIBRARY

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Abstracts

Recent research in AI applied to library sciences focuses on enhancing information retrieval, management, and user experience. AI techniques such as natural language processing (NLP) are employed to automate cataloguing, classify content accurately, and recommend personalized reading lists based on user preferences and behaviour analysis. Machine learning algorithms facilitate predictive analytics for demand forecasting, optimizing resource allocation, and improving collection development strategies. Additionally, AI-driven chatbots and virtual assistants are deployed to provide real-time assistance, answer queries, and guide users through library resources efficiently. These advancements underscore AI's transformative potential in modernizing library services, fostering greater accessibility, and enriching scholarly pursuits through innovative technology integration.

Key-word: AI, Library Research, Library and New Technology

Introduction:

Artificial Intelligence (AI) and library research have forged a transformative partnership, reshaping how information is accessed, analysed, and utilized in academic and professional contexts. The synergy between AI technologies and traditional library resources offers unprecedented opportunities for researchers to delve deeper into vast repositories of knowledge, uncovering insights that were once buried in the sheer volume of data. This partnership not only accelerates the process of information retrieval but also empowers researchers with tools for advanced data analysis, automation of routine tasks, and personalized recommendations tailored to individual research needs. However, as AI continues to evolve, ethical considerations regarding fairness, transparency, and privacy emerge as crucial discussions in the intersection of AI and library research. This essay explores the multifaceted relationship between AI and library research, examining its current capabilities, ethical implications, and future directions in shaping the landscape of scholarly inquiry and information management.

1. Information Retrieval: AI techniques, such as natural language processing (NLP) and machine learning, enhance the process of searching and retrieving information from vast amounts of data stored in libraries and digital archives. AI algorithms can sift through texts, categorize information, and present relevant documents efficiently.

2. Data Analysis: AI can analyze large datasets to identify patterns, trends, and correlations that may not be immediately apparent through traditional methods. This capability is particularly useful in fields like social sciences, where researchers can use AI to analyze survey data or textual data from interviews and documents.

3. Automation: AI can automate repetitive tasks involved in library research, such as indexing documents, categorizing materials based on content, or even summarizing lengthy texts. This automation frees up researchers' time to focus on higher-level analysis and interpretation.

4. Personalization: AI can personalize recommendations for researchers based on their interests and past interactions with library resources. By analyzing user behavior and preferences, AI systems can suggest relevant papers, books, or databases that researchers may not have discovered otherwise.

5. Ethical Considerations: AI also raises ethical considerations in library research, such as ensuring fairness and transparency in algorithmic decision-making, protecting user privacy, and addressing biases that may exist in training datasets used by AI systems.

6. Future Directions: The integration of AI with library research is likely to grow, with advancements in AI technologies such as deep learning and reinforcement learning potentially revolutionizing how researchers access and utilize information.

AI offers numerous benefits for library research, making it a valuable tool in modern scholarly inquiry:

1. Enhanced Information Retrieval: AI algorithms can efficiently sift through vast amounts of data to retrieve relevant information quickly. This capability is particularly useful in libraries with extensive digital collections where traditional search methods may be less effective.

2. Advanced Data Analysis: AI techniques, such as machine learning and natural language processing, enable sophisticated analysis of textual data. Researchers can uncover patterns, trends, and relationships within datasets that may not be apparent through manual methods alone.

3. Automation of Routine Tasks: AI can automate tedious tasks like cataloging, indexing, and summarizing documents. This automation frees up researchers' time, allowing them to focus on higher-level tasks such as analysis and interpretation.

4. Personalized Recommendations: AI systems can personalize recommendations based on users' preferences and past interactions with library resources. This enhances the user experience by suggesting relevant papers, books, or databases that align with researchers' interests.

5. Access to Diverse Sources: AI-powered systems can facilitate access to diverse sources of information, including non-traditional or niche publications that may be overlooked in conventional library searches.

6. Efficiency and Cost-Effectiveness: By streamlining workflows and improving the efficiency of information retrieval and analysis, AI ultimately contributes to cost savings and resource optimization within library settings.

AI as a Boon:

1. Advancements in Technology: AI has driven significant technological advancements across various fields, including healthcare, transportation, finance, and education. It has the potential to solve complex problems and improve efficiency in tasks that were previously time-consuming or impossible.

2. Automation and Efficiency: AI enables automation of routine tasks, freeing up human resources for more creative and strategic endeavours. This can lead to increased productivity and economic growth.

3. Enhanced Decision-Making: AI systems can analyze vast amounts of data quickly and accurately, helping businesses and governments make more informed decisions. This capability is crucial for industries such as finance, where predictive analytics can mitigate risks and enhance profitability.

4. Improving Quality of Life: In sectors like healthcare, AI is transforming diagnosis, treatment planning, and drug discovery. It has the potential to improve patient outcomes, personalize medicine, and extend life expectancy.

5. Innovation and Research: AI fosters innovation by enabling researchers to explore new frontiers in science and technology. It accelerates the pace of discovery and facilitates interdisciplinary collaboration.

AI as a Curse:

1. Job Displacement: The automation enabled by AI threatens to eliminate jobs, particularly those involving routine and repetitive tasks. This could exacerbate income inequality and lead to socioeconomic disruptions if adequate measures are not taken to retrain and reskill the workforce.

2. Ethical Concerns: AI raises ethical issues related to privacy, bias in algorithms, and the potential misuse of autonomous systems. Concerns about data privacy and security are heightened as AI systems collect and analyze vast amounts of personal information.

3. Human Dependence on Technology: Over-reliance on AI could diminish human skills and critical thinking abilities. There is a risk of losing control over technology if AI systems operate autonomously without human oversight.

4. Security Risks: AI-powered cyberattacks pose a significant threat to organizations and individuals. Malicious actors can exploit vulnerabilities in AI systems to manipulate data, spread misinformation, or disrupt critical infrastructure.

5. Unequal Access: The benefits of AI may not be evenly distributed across society, leading to a digital divide between those who have access to AI technologies and those who do not. This could widen existing disparities in education, healthcare, and economic opportunities.

Conclusion:

Whether AI is a boon or a curse ultimately depends on how society harnesses its potential while addressing its challenges. Responsible development and deployment of AI, coupled with robust regulations and ethical guidelines, can maximize its benefits while mitigating its risks. Balancing technological innovation with considerations for social impact and ethical implications is essential in shaping a future where AI serves humanity's best interests.

the debate surrounding whether Artificial Intelligence (AI) is a boon or a curse reflects its dual nature: offering immense potential for positive transformation alongside significant challenges and risks. AI's ability to drive technological advancements, automate tasks, enhance decision-making, and innovate across industries underscores its potential as a boon to society. However, concerns about job displacement, ethical implications, human dependence on technology, security risks, and unequal access highlight the potential downsides and complexities associated with AI.

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CHALLENGES AND OPPORTUNITIES: IMPLEMENTING ARTIFICIAL INTELLIGENCE IN LIBRARY SERVICES

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Abstract

The implementation of artificial intelligence (AI) in libraries offers significant opportunities to enhance efficiency, improve user services, and streamline resource management. However, this transition is accompanied by several challenges. This paper aims to provide a comprehensive overview of these challenges, offering insights into potential solutions for successful AI integration in library settings. Addressing these challenges requires a multifaceted approach, incorporating collaboration among librarians, technologists, policymakers, and users to balance innovation with ethical considerations and financial realities.

Key Words: Artificial Intelligence, Library, Information, Reference, Analytics

1. Introduction:

The implementation of artificial intelligence (AI) in libraries holds great potential to revolutionize the way libraries operate and offer services to their patrons. AI can enhance various aspects of library services, including cataloging, information retrieval, user interaction, and resource management, making libraries more efficient and user-friendly. However, the effective integration of AI into library systems is fraught with numerous challenges.

These challenges span across technical, ethical, financial, and organizational domains, each presenting unique obstacles that libraries must navigate to harness the full potential of AI. Technical challenges involve issues related to data quality, infrastructure, and interoperability, while ethical and legal challenges focus on privacy, bias, and intellectual property rights. Financial challenges encompass both the initial investment and ongoing costs associated with AI implementation. Organizational challenges include the need for staff training, change management, and user acceptance.

2. Review of Literature:

The literature on the implementation of artificial intelligence (AI) in libraries is vast and varied, encompassing numerous studies, reviews, and case analyses. This review synthesizes key findings from the literature, highlighting the potential applications, benefits, challenges, and ethical considerations associated with AI in library services.

Applications of AI in Libraries

Cox et al. (2019) found that automated metadata generation systems can process large volumes of new acquisitions, providing accurate and consistent catalog entries. Yang and Koo (2020) demonstrated how natural language processing (NLP) techniques can enhance search capabilities, enabling more intuitive and effective user queries. Virtual reference assistants using AI can offer continuous support to library users. According to Shachaf and Horowitz (2019), chatbots can handle a substantial portion of user inquiries, freeing up librarians for more complex tasks. AI techniques, including image recognition and automated restoration, are critical for digital preservation efforts. Conway and Lee (2021) highlighted how AI tools can identify and repair digital artifacts, ensuring long-term accessibility.

Benefits of AI in Libraries

Hu et al. (2020) found that AI-driven cataloging systems reduced manual entry time by over 50%. Personalized services, such as recommendation systems, greatly improve user engagement. Smith and Smith (2021) reported that libraries using AI-powered recommendations saw a 30% increase in user satisfaction. AI enhances accessibility for diverse user groups, including those with disabilities. Fernandez et al. (2020) discussed how AI-driven text-to-

speech and translation services made library resources more accessible to visually impaired and non-English-speaking users.

Challenges and Ethical Considerations

Kim and Park (2019) emphasized the technical difficulties in ensuring data consistency and compatibility across platforms. Handling user data raises privacy concerns. Martin et al. (2020) argued that robust data protection measures are essential to maintain user trust. Noble (2018) discussed how biased algorithms could lead to discriminatory practices, necessitating careful design and oversight of AI systems. McGowan and Robinson (2019) noted that smaller libraries often struggle with the financial burden of adopting AI solutions. Effective use of AI requires significant training and a shift in organizational culture. According to Jones and Collins (2020), ongoing staff development and support are crucial for successful AI integration.

3. Applications of AI in library services

The application of artificial intelligence (AI) in library services has the potential to transform how libraries operate and interact with their patrons. AI can be utilized in various areas, each aimed at enhancing efficiency, user experience, and the overall functionality of library services. Here are some key applications of AI in library services:

3.1. Cataloging and Metadata Generation

AI can automate the process of cataloging and generating metadata for library materials. Machine learning algorithms can analyze and classify new acquisitions, assign subject headings, and generate descriptive metadata, significantly reducing the time and effort required for manual cataloging.

3.2. Information Retrieval

AI-powered search engines and discovery systems can enhance information retrieval by providing more accurate and relevant search results. Natural language processing (NLP) enables users to search using conversational language, improving accessibility and ease of use.

3.3. Reference Services

AI-driven virtual assistants and chatbots can assist patrons with reference queries, providing instant responses to frequently asked questions, guiding users to relevant resources, and even conducting preliminary research. These systems can operate 24/7, offering continuous support.

3.4. Recommendation Systems

AI can analyze user behavior and preferences to provide personalized recommendations for books, articles, and other resources. Recommendation systems can enhance user engagement by suggesting materials that align with individual interests and reading histories.

3.5. Digital Preservation

AI can aid in the digital preservation of library collections by automating processes such as digitization, data extraction, and content analysis. Machine learning algorithms can identify and repair damaged digital files, ensuring long-term access to digital assets.

3.6. Collection Development

AI can assist in collection development by analyzing trends in user preferences, circulation data, and external factors. This analysis helps librarians make informed decisions about acquiring new materials and weeding out less relevant items.

3.7. User Behavior Analysis

AI can track and analyze user behavior within the library, providing insights into how patrons interact with library resources and services. This data can inform improvements in library layout, resource allocation, and service offerings.

3.8. Knowledge Organization

AI can improve the organization of knowledge within the library by automating the creation of taxonomies, ontologies, and thesauri. These tools enhance the discoverability of resources and support more efficient information retrieval.

3.9. Sentiment Analysis

AI can perform sentiment analysis on user feedback and reviews, helping libraries understand user satisfaction and areas needing improvement. This analysis can guide service enhancements and user engagement strategies.

3.10. Predictive Analytics

AI can use predictive analytics to forecast trends in library usage, such as peak visitation times, popular subjects, and emerging research areas. This information aids in resource planning and staffing decisions.

3.11. Accessibility Services

AI can enhance accessibility services for patrons with disabilities. For example, AI-powered text-to-speech and speech-to-text technologies can assist visually impaired users, while NLP can help those with language barriers.

3.12. Automated Transcription and Translation

AI can automate the transcription of audio and video content, making these materials more accessible and searchable. Additionally, AI-driven translation services can break down language barriers, allowing patrons to access resources in multiple languages.

4. Advantages of AI applications in libraries

The application of artificial intelligence (AI) in libraries brings many advantages that enhance the efficiency, accessibility, and overall quality of library services. Here are some of the key advantages:

4.1. Improved Efficiency and Productivity

- **Automated Cataloging and Metadata Generation**: AI can automate the cataloging process, reducing the time and effort required for manual data entry and classification. This allows librarians to focus on more complex tasks.
- **Streamlined Information Retrieval**: AI-powered search engines provide faster and more accurate search results, making it easier for users to find the information they need quickly.

4.2. Enhanced User Experience

- **Personalized Recommendations**: AI can analyze user preferences and behavior to provide personalized recommendations for books, articles, and other resources, increasing user engagement and satisfaction.
- **24/7 Support with Virtual Assistants**: AI-driven chatbots and virtual assistants offer round-the-clock support, helping users with queries, resource navigation, and basic research needs.

4.3. Better Resource Management

- **Data-Driven Collection Development**: AI can analyze usage patterns and trends, helping libraries make informed decisions about acquiring new materials and optimizing existing collections.
- **Predictive Analytics**: AI can forecast library usage trends, enabling better resource allocation, staffing, and event planning.

4.4. Increased Accessibility

- **Assistive Technologies**: AI can enhance accessibility for users with disabilities, such as through text-to-speech, speech-to-text, and language translation services.
- **Automated Transcription and Translation**: AI can transcribe and translate audio and video content, making it more accessible to a wider audience.

4.5. Enhanced Digital Preservation

- **Automated Digitization and Restoration**: AI can assist in digitizing and restoring old and fragile materials, ensuring their preservation and making them accessible to future generations.

4.6. Improved Decision Making

- **User Behavior Analysis**: AI can provide insights into how patrons interact with library resources and services, helping librarians make data-driven decisions to improve service delivery.
- **Sentiment Analysis**: AI can analyze user feedback and sentiment, offering valuable insights into user satisfaction and areas for improvement.

4.7. Cost Savings

- **Reduced Labor Costs**: Automation of routine tasks such as cataloging, metadata generation, and basic reference services can reduce labor costs and free up staff time for more value-added activities.
- **Efficient Resource Utilization**: AI can help libraries optimize resource usage, reducing waste and ensuring that resources are directed where they are most needed.

4.8. Support for Research and Learning

- **Enhanced Research Tools**: AI can assist researchers by providing advanced tools for data analysis, literature reviews, and information synthesis.
- **Knowledge Discovery**: AI can uncover hidden patterns and connections within large datasets, aiding in the discovery of new knowledge and insights.

4.9. Better Community Engagement

- **Targeted Outreach and Marketing**: AI can help libraries identify user segments and tailor outreach and marketing efforts to engage specific groups within the community more effectively.
- **Interactive Programs and Services**: AI can enable the creation of interactive and engaging programs, such as virtual tours, online workshops, and interactive exhibits.

4.10. Improved Knowledge Organization

- **Enhanced Taxonomies and Ontologies**: AI can help create and maintain detailed taxonomies and ontologies, improving the organization and discoverability of knowledge within the library.

Conclusion:

The integration of artificial intelligence (AI) in libraries promises to revolutionize library services, offering significant enhancements in efficiency, user experience, and resource management. AI applications such as automated cataloging, advanced information retrieval, personalized recommendations, and digital preservation are reshaping the way of library operations and interactions with their patrons. These technologies enable libraries to provide more accurate, timely, and personalized services, thus better meeting the diverse needs of their communities.

However, the implementation of AI in libraries is not without its challenges. Technical obstacles such as data quality, system interoperability, and the need for robust IT infrastructure must be addressed to ensure successful

integration. Ethical and legal considerations, including privacy, bias, and intellectual property rights, are critical to maintaining user trust and ensuring fair and transparent AI applications. Financial constraints, encompassing both initial investments and ongoing maintenance costs, pose significant hurdles, particularly for smaller libraries. Additionally, organizational challenges, such as staff training, change management, and user acceptance, are crucial for the seamless adoption of AI technologies.

Ultimately, the successful implementation of AI in libraries will depend on continuous research, thoughtful planning, and a commitment to ethical principles. As libraries evolve with AI, they will not only improve their operational efficiency but also enrich the user experience, making knowledge and information more accessible and engaging for all.

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ARTIFICIAL INTELLIGENCE FOR LIBRARIES

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Abstract

Computers and machines can simulate human intelligence and problem-solving tasks through the use of artificial intelligence (AI) technology. The capabilities of the human mind can be matched or improved upon by machines through artificial intelligence. Ai is becoming more integrated into daily life, from self-driving cars to the rise in generative AI tools. AI learns by analyzing large amounts of data and identifying patterns to incorporate into their decision-making processes. Many AI systems will be supervised by humans, reinforcing good decisions and dissuading wrong ones, but some are designed to teach themselves on their own. In order to improve the accessibility and inclusion of library services, artificial intelligence is helping libraries. The article defines artificial intelligence as the various ways that AI can benefit libraries and the tools that can be used to support them, the benefits and constraints of artificial intelligence.

Keywords

Artificial Intelligence, Libraries, Implement, Machine Learning, AI Tools, Digital Libraries, Chatbot.

Introduction

Libraries play an important role in today's information age. Librarians are repositories of knowledge because they keep a book and other sources of information available to them. One of most powerful technologies that libraries can use to achieve their objectives is artificial intelligence. Libraries can use artificial intelligence to streamline process, provide personalized services and improve the user experience. AI is capable of transforming traditional libraries into digital ones. Internet connectivity libraries have evolved from an original mode and are moving towards the digital library, as a result of technological process. Digital libraries have preserved the data available in physical form.

Definitions of Artificial Intelligence

Technologies with the ability to perform tasks that would otherwise require human intelligence, such as visual perception, speech recognition, and language translation' (quoted by House of Lords Select Committee on Artificial Intelligence, 2018: 14)

"AI is the ability of a computer system to solve problems and perform tasks that would otherwise require human intelligence". (US National Security Commission on AI, 2021) Artificial intelligence (AI) is 'a machine-based system that can, for a given set of human defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy'. (OECD, 2020).

"Simply put, AI is a collection of technologies that combine data, algorithms and computing power". (European Commission, 2020: 2)

"A suite of technologies and tools that aim to reproduce or surpass abilities in computational systems that would require "intelligence" if humans were to perform them. This could include the ability to learn and adapt; to sense, understand and interact; to reason and plan; to act autonomously; or even create. It enables us to use and make sense of data". (UKRI, 2021: 4) "Theories and techniques developed to allow computer systems to perform tasks normally requiring human or biological intelligence" (JISC, 2022: 3)

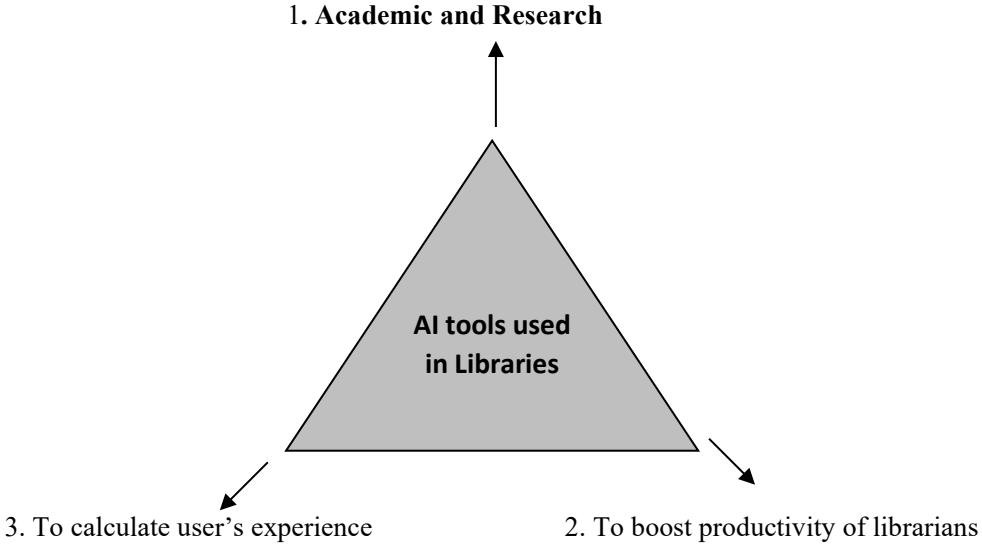
"Machines that imitate some features of human intelligence, such as perception, learning, reasoning, problem-solving, language interaction and creative work" (UNESCO, 2022: 9)

How AI Implement in Library:

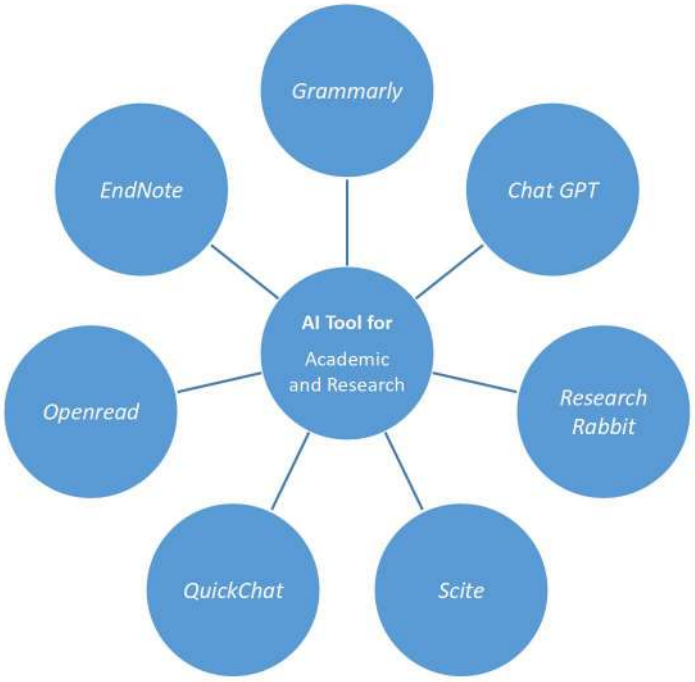
Libraries can use AI to prophesy not only future needs but also recommended personal suggestions for reading materials to individual users based on their preferences. Librarians are already incorporating AI into various services such as technical support and reference services thereby improving user access to information.

Artificial Tools for Libraries

AI tools are used in libraries for various types of application, including academic and research purpose, to enhance the productivity of librarians and to evaluate.



AI Tool for Academic and Research



Chat GPT: is an advanced language model, excelling in natural language understanding and generation for diverse tasks and conservations.

Research Rabbit: Librarians can use Research Rabbit to uncover the latest and greatest ideas that will truly transform our libraries. Research Rabbit is a citation-based mapping tool that focuses on the relationships between research works. It is available online.

Scite: is an award-winning platform for discovering and evaluating scientific articles via smart citations. Scite is academic search engine that relies on abstracts and citations statements to complete and give context to literature review

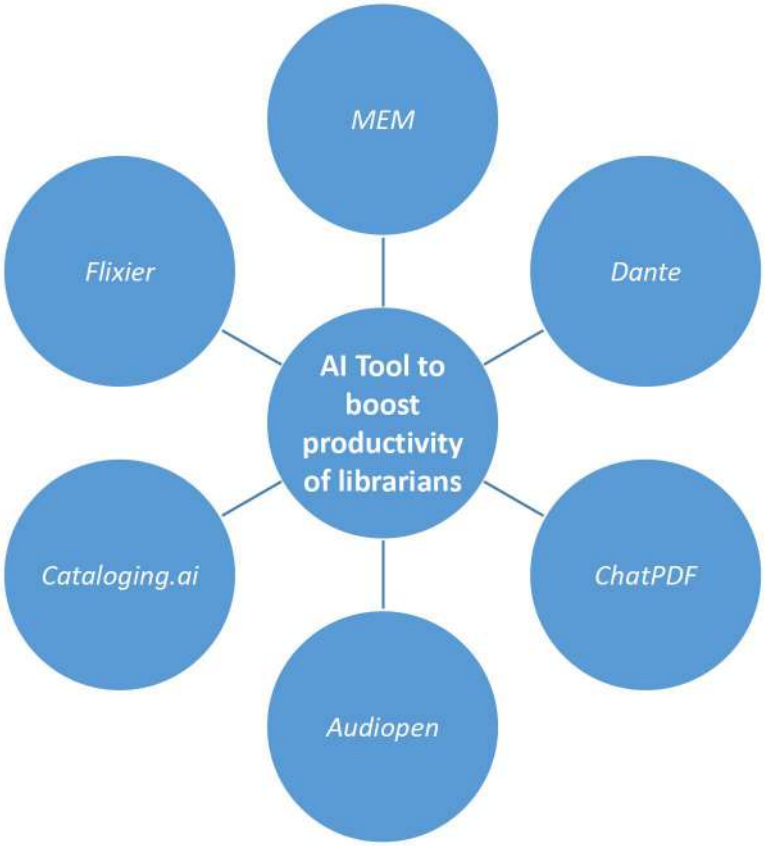
Quick Chat: A library chatbot can handle basic inquiries, freeing up librarians to focus on in-depth research and personalized assistance. Quick Chat is an intelligent chat assistant that you can integrate into your website. Using these kinds of tools in conjunction with human services can help libraries streamline otherwise redundant tasks. As more businesses and public institutions implement AI, libraries will have to do the same to keep up with visitors' expectations.

Open Read: Open Read is an AI-powered interactive platform that provides users with an intuitive and comprehensive way of organizing, interacting with, and analyzing various literature formats such as papers, journals, and research documents.

End Note: is an AI and text mining for searching and screening the literature. EndNote works with Microsoft Word and Open Office Writer to insert citations into documents. EndNote will format citations and bibliographies into a nominated style. Style can include footnotes and numbering. Endnote is distracting to the reader and allows the narrative to flow better.

Grammarly: Grammarly is the AI writing partner that helps writer at every stage of the writing process, from blank page to final draft. Grammarly can help to catch spelling and grammar errors, improve sentence structure, suggest better word choices and provide writing style suggestion.

AI Tool to Boost Productivity of Librarians



MEM: MEM (Microsoft Endpoint Manager is an AI tool designed to assist individuals in managing and maximing their potential. With features like smart search, note taking, smart write and edit, saving links and importing knowledge from various sources. Users can easily retrieve information, generate content and access their stored knowledge. MEMS context aware AAI understands and organize user input, assisting with tasks ranging from creative projects to personal reminder.

Dante: Dante (Digital Audio Network through) Before anything is printed, librarians can work with an AI editor to remove consistency issue and other mistake. We may present a positive picture of our institutions by producing polished, error-free and professional library communication with Dante's assistance.

Chat PDF: is an AI tool that combines advances natural language processing and machine learning to help users understand PDF documents better. By uploading your PDF to the platform, you can ask question about the content and Chat PDF will provide you with answers drawn directly from the text.is an open-source project and there is a free plan limit of three PDF uploads per day. This tool saves time of user and supports their work.

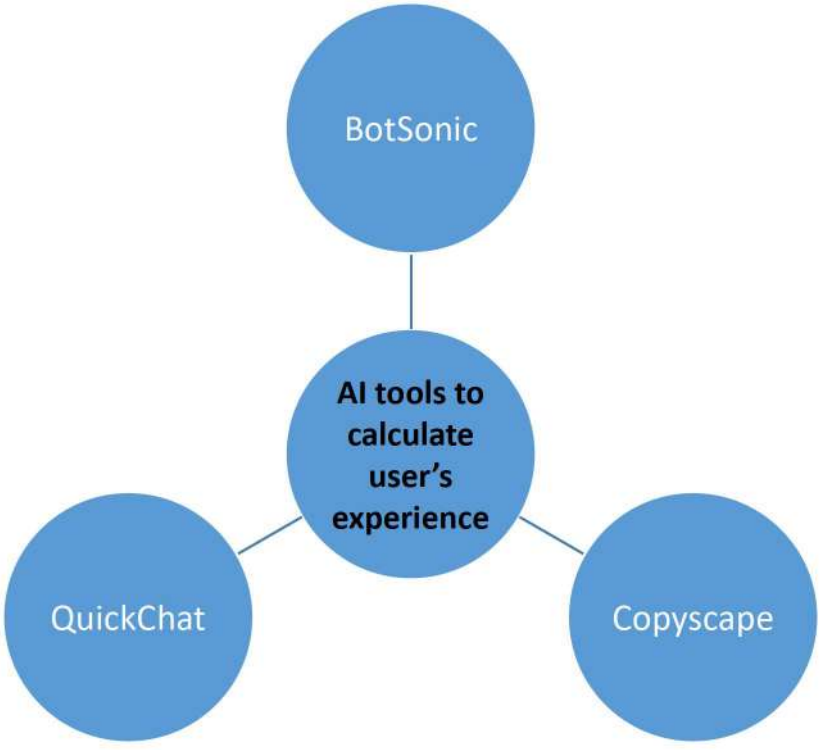
AudioPen: is a web-based tool that utilizes AI for speech to text conversion, making it easy for users to transform their spoken ideas into clear and formatted text. Users can use it to capture lecture notes, drafts essays. Users can record their ideas anytime and keep track of their ideas in a text format. Users can also access their transcription for further reference and the generated summary can be converted into an image.

Audio Pen a free plan that allows users to save up to 10 notes.

Cataloging.ai: Cataloging.ai can generate metadata for library items, saving librarians from the tedious tasks of manual data entry. This fee up time for more valuable tasks that directly serve users. Create, arrange and update product catalogs in e-commerce with the use of catalog artificial intelligence.

Flixier: Flaxier can transcribe audio/ video materials for librarians, making the content searchable, shareable and accessible. This allows spoken content to reach and benefit a wider audience.

AI tools to calculate user's experience



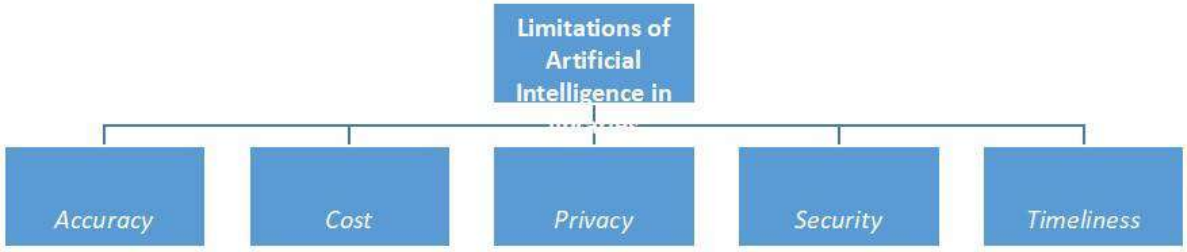
BotSonic: Batsonic is a powerful AI tool that can transform your users support, revolutionize your ecommerce experience and supercharge your lead generation. With its ability to provide instant, precise responses, embody your brand voice. Maintain a focus on security and relevance. By training a botsonic tool with our library's knowledge, we extend our personal assistance beyond the front desk. Users can get quick answers around the clock to basic questions, freeing up librarians tackle more complex research needs.

Copyscape: is an online plagiarism detection tool that flags up content used illegally. Plagiarism is when someone takes your work and passes it off as their own. Copyscape searches Google and Bling to check if another website or person is illegally using your content without consent. You can then contact the website owner and ask them to take it down.

Quick Chat: QuickChat is a consersational AI chatbot that allows users to use technology to build AI assistants that talk like humans. This tool enables users to use virtual multilingual assistants that can talk just like people and are built to your needs and requirements. A library Chatbots handle basic inquiries, freeing up libraries to focus on in-depth research and personalized assistance.

Importance of Artificial Intelligence in libraries: Artificial Intelligence enables machines to take lessons from experience, adapt to new inputs and perform tasks that are similar to those of humans. The efficiency and accuracy of library data will be improved with use of artificial intelligence in libraries. In addition, it raises the importance and diversity of sources and services as well increasing access to information and supporting innovation and learning.

Limitations of Artificial Intelligence in libraries:



1. **Accuracy** - A typical AI model is not judge whether the information it provides is accurate. When it is given a prompt, its goal is to generate what it thinks is the most likely sequence of words to answer that prompt. Sometimes this leads to a correct answer, but sometimes it doesn't - and the AI cannot interpret or differentiate between the two.

2 **Cost**: Currently, many generative AI tools are free to use, which is one of the reasons for their popularity. However, on one seems to know how long the free use will last. Among generative AI tools that are not free to use, there are at least two pricing models: a subscription-based model, which can be monthly, semi-annual or annual; and pay as you wish.

3**. Privacy**: the privacy policies of tools might enable the developers to market and make money off of the sale of your personal data.

4. **Security:** You can use indirect prompt injections, such as hidden instructions on a web page, to trick an AI system into stealing data, manipulating a resume, or remotely executing code on a machine.

5**. Timeliness:** Many popular generative AI tools are not connected to the internet and cannot update or verify the content they generate. Additionally, many tools (including ChatGPT) are trained on data with cut-off dates, which results in the information becoming outdated or unable to provide answers to current information and events.

Conclusion:

In the digital era, AI plays a very important role for libraries. Librarianships future is being shaped by the collaborative relationship between human competency and AI capabilities. There are many areas where libraries can benefit from AI. Librarians can benefit from AI tools, but if they are not used ethically, they could lead to

problems. We must support AI tools that ensure that all users use them and no one remains behind to reap the benefit.

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USE OF ARTIFICIAL INTELLIGENCE IN LIBRARIES

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Abstract

Artificial Intelligence (AI) has brought new opportunities to expand research in all fields. The presence of artificial intelligence technology in all fields of work has made the future promising. The application of (AI) has greatly contributed to the provision and utilization of library information resources. It has helped in achieving the objectives of the library. Librarians must be innovative in this. They are looking to stay relevant in their jobs as AI has found numerous applications in libraries. Libraries such as connecting physical library information resources and electronic resources and also videos related to physical information materials and objects are becoming readily available.

Keywords: Library and Artificial Intelligence, Challenges, Benefits, Cost-effective and bright future.

Introduction

Artificial intelligence (AI) is an aspect of computer science that deals with making machines answer complex and difficult problems like humans. Human cognitive behave- touristic are mapped, modelled, and integrated into algorithms in a way that computers can understand. and may process to produce an output or result. In its logical approach, artificial intelligence is a neural network. The current age is one of giant information. Because such demand will be in the future. For example, reading a description of a hike requires actually feeling it. The technology that creates such virtual reality (virtual) is advancing due to artificial intelligence. Libraries are using it creatively to maintain their importance. As the ability to interpret human language in context is given to devices or systems with artificial intelligence

They may handle internal technical tasks in the library such as cataloguing, indexing and subject analysis. Therefore, it is possible to provide such a system with the service of suggesting and summarizing references to the reader according to his needs. Such systems that recommend exactly the materials available in the library and information sector are becoming popular among readers. Because they can find at least basic information on the particular topic they want, they save time and effort to search the library's giant database. Besides, keeping track of how many readers have used each book before helps in evaluating the literature. It also provides guidance to librarians on what type of library should be included in the future. It also increases the likelihood that most of the library materials will be used.

Overall, with the help of artificial intelligence, libraries, especially large libraries, can achieve things such as smoothing out the challenging tasks of book and information edition, providing new services to readers and encouraging them to use the library regularly by providing them with a library information experience. But at the same time, it is necessary to see that the personal information of the readers will remain confidential and used responsibly.

Components of Artificial Intelligence

Machine Learning (ML)

It is an artificial intelligence (AI) technology that enables developed systems to train themselves and acquire new knowledge without special training. Data is fed into a machine learning system that uses it, which controls how the system outputs or reacts. Programming can also be unique in that a machine learning system can be trained to identify specific patterns in a case study by exposure to large data collections of case studies. A system can also be built iteratively when its own output is used as an input or data source, it can be tested and programmed on a continuous basis. ML systems can also be constructed assets or groups. Where there is a pair, each collaborator or competitor, is focused on developing computer algorithms for machine learning systems that access and use data to train themselves. Machine learning systems can play a key role in the provision of library information resources

and services. Examples of machine learning tools in Al include Big Data, Text Data Mining (TDM), Robotics, Pattern Recognition.

Deep Learning (DL)

This is a machine learning subset. The human brain inspires algorithms and artificial neural networks that then learn from massive amounts of data. Even with unstructured, highly diverse and interconnected data sets, machines solve complex problems through deep learning. Natural language processing (NLP), image processing (IM), and neural networking are examples of al tools used in the context of deep learning.

Natural Language Processing (NLP)

Allows computers to understand the primary language impression in a question or solution. Design of subject indexes, development of information retrieval systems and bibliometric How NLP can be used as an important factor in establishing a digital library. These are all examples. The researchers noted that the use of text mining techniques on a large-scale Language data (i.e., converting to structured data) and expressed in textual formTo define concepts (e.g. sentiment and sentiment analysis in speeches and comments) In efforts to organize.

Pattern Recognition (PR)

Pattern recognition automatically identifies patterns and consistencies in data sets. Pattern recognition machine Learning is an example, as well as other al technologies such as data mining and knowledge in databases Search, based on a priori knowledge or statistical information gathered from pattern recognition structures is focused. Classified samples are groups of repeated observations or measurements that are appropriate Defines points in multi- dimensional space. The user is a robot or a human on the front- end interface A fully automated public touring test (captcha) is used to check that.

Advantages of Artificial Intelligence in Libraries

Without any doubt, the use of Al will benefit the library service provider, user and studentsThere are certainly various advantages. Some of them are listed below, Capable of handling difficult and complex tasks (workload) which would be difficult or impossible for humans at a particular time. , Finding undiscovered things easily. E.g., space , is done faster and faster than human employees, Fewer mistakes and errors, Efficiency and Improves effectiveness, Improves accuracy in transactions , No theft and losdirection.8) Favourable work environment, Conducive environment for students to learn, To develop the habit of peer learning among students.

Challenges of Artificial Intelligence

Generally, in the initial stage many challenges are faced with many problems. Similarly, it also has further challenges, Capable of taking over human jobs, can sense malfunctions and act contrary to their programming, can be used to cause mass destruction, Damage to next generation, Health hazard due to use of screens and electronic gadgets, the initial investment is high, which some organizations cannot afford, On-compliant usage is definitely a costly affair.

Conclusion

Recently, libraries have the potential to transform into centres of knowledge and learning for all. In the field of librarianship, artificial intelligence applications technology is developing rapidly. Artificial intelligence holds great promise for better and easier access, manipulation and use of library resources, as well as security of library information materials. To address teaching and research issues related to the use of Al in libraries, LIS researchers need to work with Al experts.

Recommendations

While there are many challenges faced by librarians in adopting AI and ML, due to the low adoption of these technologies, the study makes the following recommendations., Pre- service and in- service training for librarians on AI and ML applications in libraries to improve their attitudes and perceptions towards these technologies in libraries, especially academic libraries and public libraries should invest in AI technology to support library

functions. This is because libraries are faced with an increasing number of users, large collections with complex datasets, and diverse information sources such as the Web and the Internet,

Library schools and training institutes must include AI and ML in their curriculum. It will improve librarians' skills in digital technologies and also has the potential to improve their attitudes towards AI and ML. Knowledge of AI and ML will enable library professionals to recommend better innovations for libraries and develop these innovations in- house,

Future research directions

The study recommends further studies on the use of ML algorithms in libraries. This is because with modern and user-friendly programming languages like Python, innovations based on ML can be easily developed to support library functions. This is particularly relevant in the fields of web mining and web intelligence as libraries rely on wave and internet information. Few researchers have investigated the ethical dimensions of the use of AI in academic libraries. Therefore, future research is recommended.

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IMPACT OF DIGITAL TECHNOLOGIES ON LIBRARIES AND INFORMATION SERVICES

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Abstract

This paper examines the transformative impact of Artificial Intelligence (AI) and Machine Learning (ML) on libraries, focusing on key applications that enhance operational efficiency, user engagement, and information accessibility. AI and ML technologies revolutionize cataloging and metadata management by automating classification and improving data accuracy. Recommendation systems powered by AI analyze user behavior to offer personalized resource suggestions, enriching user experiences and promoting exploration of library collections. Moreover, AI facilitates advanced data analysis, enabling libraries to derive insights into usage patterns for informed decision-making in collection development and resource allocation. Digital preservation efforts benefit from AI's capabilities in ensuring long-term accessibility and integrity of digital collections. By embracing AI and ML, libraries can optimize services, innovate user interactions, and adapt to the evolving digital landscape, ultimately enriching their role as vital hubs of knowledge dissemination and community engagement in the digital age.

Keywords: Artificial Intelligence (AI), Machine Learning (ML), Libraries, Digital Transformation, Recommendation Systems, Digital Preservation

Introduction

In today's digital era, libraries are leveraging Artificial Intelligence (AI) and Machine Learning (ML) to redefine their roles and services. AI enhances operational efficiency by automating tasks like cataloging and resource management, while ML facilitates personalized user experiences through recommendation systems. These technologies

also empower libraries with advanced data analytics capabilities to optimize collection development and decision-making processes. Furthermore, AI supports digital preservation efforts, ensuring the accessibility and integrity of digital collections. This introduction explores the transformative impact of AI and ML on libraries, highlighting their potential to enhance information access, user engagement, and service delivery in an increasingly interconnected and data-driven environment.

Need of AI and ML in Libraries

AI and ML are indispensable in libraries for optimizing operational efficiency, enhancing user services, and managing vast amounts of digital information. These technologies automate routine tasks like cataloging and metadata management, improving accuracy and reducing workload. AI-driven recommendation systems personalize user experiences, guiding patrons to relevant resources based on preferences and behavior. Machine learning algorithms analyze data to derive insights into library usage patterns, aiding in collection development and resource allocation decisions.

Benefits to Libraries and ML Applications

AI and ML offer several benefits to libraries, including enhanced operational efficiency through automation of tasks like cataloging and resource management. These technologies improve user services by providing personalized recommendations, facilitating easier access to information, and supporting virtual assistance. ML applications in libraries include recommendation systems for personalized suggestions, text classification for efficient cataloging, predictive analytics for usage trend forecasting, NLP for interactive chatbots, and digital preservation automation. These technologies enhance operational efficiency and user engagement, transforming library services in the digital age.

Cataloging and Metadata Management:

AI and ML revolutionize cataloging and metadata management in libraries by automating classification, enhancing accuracy, and improving efficiency. Machine learning algorithms analyze large volumes of data to categorize and tag library materials, ensuring consistent and high-quality metadata. Natural language processing (NLP) techniques further refine metadata by extracting and analyzing textual

information, enhancing search ability and discoverability of library resources. These advancements streamline cataloging processes, reduce manual effort, and optimize resource allocation, allowing librarians to focus on higher-value tasks such as user engagement and collection development.

Recomendation systems:

AI-powered recommendation systems in libraries analyze user behavior and preferences to suggest relevant resources, enhancing personalized user experiences. Machine learning algorithms process historical usage data, user profiles, and content attributes to generate accurate recommendations. These systems employ collaborative filtering, content-based filtering, or hybrid approaches to deliver tailored suggestions, promoting exploration of diverse library collections.

Data Analysis and Decision Support:

AI and ML empower libraries with robust data analysis capabilities to derive insights from vast amounts of information. Machine learning algorithms process data to uncover usage patterns, trends, and user preferences, aiding in informed decision-making for collection development, resource allocation, and service optimization. AI-driven predictive analytics forecast future demands and user behavior, enhancing proactive planning and responsiveness. These technologies also facilitate evidence-based strategies for improving operational efficiency and user satisfaction. By leveraging data analysis and AI-driven decision support systems, libraries can adapt quickly to evolving needs, optimize resource management, and provide tailored services that meet user expectations effectively.

Digital preservation:

Digital preservation ensures the long-term accessibility and usability of digital content by employing strategies such as migration to current formats, emulation of original software environments, and storage in secure digital repositories. These practices safeguard digital materials from obsolescence, degradation, and loss, preserving them for future generations.

Security and Fraud Detection:

AI enhances security in libraries by detecting anomalies in user behavior, preventing unauthorized access, and safeguarding sensitive information. Machine learning algorithms analyze patterns in usage data to identify potential threats or suspicious activities. AI-powered systems can also automate fraud detection processes, ensuring the integrity of library transactions and protecting patron privacy. By leveraging AI for security measures, libraries can mitigate risks, maintain trust with users, and uphold confidentiality standards. These advancements strengthen overall security posture, enabling libraries to confidently manage digital resources and provide secure access to valuable information.

Conclusion:

In conclusion, the integration of Artificial Intelligence and Machine Learning has revolutionized libraries, enhancing operational efficiency, user engagement, and information accessibility. These technologies automate tasks, personalize user experiences through recommendation systems, and optimize decision-making through data analysis. AI-driven advancements in digital preservation ensure the longevity and accessibility of digital collections. Despite these benefits, challenges such as data privacy, digital equity, and adapting to rapid technological advancements persist. Moving forward, libraries must continue to innovate responsibly, balancing technological adoption with user-centric values to meet evolving needs effectively. By embracing AI and ML strategically, libraries can sustain their essential role as dynamic hubs of knowledge and community interaction in the digital era.

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APPLICATION OF ARTIFICIAL INTELLIGENCE IN LIBRARIES: AN OVERVIEW

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Abstract

The rapid advancements in Artificial Intelligence (AI) have revolutionised various sectors and libraries are no exception. This article aims to provide a comprehensive review of the AI application in libraries and its impacts on library operations. This article discusses the concept of artificial intelligence, its application in libraries, artificial intelligence and virtual libraries, as well as the advantages and disadvantages of artificial intelligence. The application of AI in libraries will crucially change future libraries' processes and activities. AI has revolutionized library operations across all activities.

Keywords*:* Artificial Intelligence, Future Library, Virtual Libraries, Digital Preservation, Automated Content Management.

Introduction

Artificial Intelligence (AI) in library administrations have become increasingly popular, possibly changing the area by fundamentally improving routine library activities and administrations. The library functions entail recurrent tasks performed by library professionals ranging from user services to technical undertakings like development and management. Such tasks, although necessary, often prove time-consuming, detracting from professional growth and library enhancement opportunities. Many libraries have embraced automation through a computer and IT, but these systems require considerable human interaction and involvement. For instance, in organising library information – such as classification and cataloguing – library professionals must manually ascertain a collection's metadata before system entry. This process demands significant time expenditure (Subaveerapandiyan, and Gozali, 2024).

Artificial Intelligence (AI) is the re-enactment of human knowledge in machines that are customized to think and learn like people. These machines can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation. AI can be categorized into two main types: narrow AI and general AI. A Narrow AI: also known as weak AI, it is designed to perform a narrow task (e.g., facial recognition or internet searches). Most of the AI applications we encounter today fall under this category. General AI: it is also known as strong AI or artificial general intelligence (AGI); it refers to machines that possess the ability to perform any intellectual task that a human being can do. General AI remains largely theoretical and is a major area of current research.

Concepts of Artificial Intelligence (AI)

Artificial intelligence (AI) is the ability enabled by a digital computer or computer-controlled machine or software to replicate intellectual characteristics like intelligent organisms (human) in their functionality. The central goals of AI are to reason, discover, generalize, manipulate objects and natural language processing etc. AI has been the subject of great enthusiasm in recent years in varied disciplines like computer science, psychology, mathematics, information science, linguistics, and other specialized domains. In the case of LIS, the most extended AI presence has been identified as the appearance of the expert system. The application of expert systems not only helps the library professionals in performing the basic library operations but also helps in the decision-making process and improvement in productivity. AI can think and act like a human without any human interference, it can help in the evolution of an intelligent library with latent intelligent roles to perform without the intrusion of human support. The self-learning ability of AI can prove very important to libraries in terms of user handling, networking and communication. AI technologies also could be used to provide innovative real-time virtual reference services through mobile and social networking environments, by combining the existing library resources and third-party contents. Additionally, some other promising areas of AI in libraries include natural language processing, indexing systems, and the application of robotics in library activities. These algorithms can be described simply as; step-by-step instructions that allow a computer to solve a particular type of learning problem. Machine learning has now

been considered a game-changer through reaching solutions to complicated real-world problems in a scalable way useful with a wide range of computing tasks (Das, and Islam, n.d.).

Artificial Intelligence (AI) encompasses a broad range of concepts and methodologies aimed at creating machines capable of performing tasks that typically require human intelligence. Here some key concepts of AI are; machine learning (ML), deep learning, natural language processing (NLP), computer vision, robotics, expert systems, fuzzy logic, genetic algorithms, swarm intelligence and cognitive computing.

Application of Artificial Intelligence in Libraries

Artificial intelligence (AI) is transforming various industries, including libraries. The integration of AI in libraries offers numerous benefits, improving the efficiency and effectiveness of library services. Here are some key applications:

- Cataloguing and Classification:
- Automated Metadata Generation: AI can assist in generating metadata for new acquisitions, reducing the manual effort required for cataloguing. Subject Classification: AI algorithms can classify books and materials into relevant subjects more accurately and quickly.
- Search and Discovery:
- Enhanced Search Engines: AI-powered search engines can understand natural language queries, making it easier for users to find the information they need. Recommendation Systems: Similar to those used by e-commerce platforms, AI can recommend books and other resources to users based on their past behaviour and preferences.
- Digital Libraries:
- Digitization and Optical Character Recognition (OCR): AI can improve the quality and accuracy of digitizing printed materials, making them more accessible in digital libraries. *Content Analysis:* AI can analyse the content of digitized materials to extract key information, summarize documents, and even translate texts.
- User Services:
- Chatbots and Virtual Assistants: AI chatbots can handle common user queries, provide information about library services, and assist with research inquiries. *Personalized Learning:* AI can help create personalized learning paths for users, suggesting resources and activities based on their learning progress and goals.
- Resource Management:
- Predictive Analytics: AI can predict usage patterns and help in the efficient allocation of resources, such as deciding which books to purchase or how to manage physical space. *Inventory Management:* AI can optimize the management of library inventories, including book check-ins and check-outs, reducing the time staff spend on these tasks.
- Preservation and Conservation:
- Condition Monitoring: AI can monitor the condition of physical materials and predict when they might need conservation efforts, helping to preserve valuable collections.
- Research Support:
- Data Mining: AI can help researchers by mining large datasets for relevant information, identifying patterns, and suggesting new research directions. *Academic Writing Assistance:* AI tools can assist in writing and formatting academic papers, providing suggestions for improvement, and checking for plagiarism.
- Community Engagement:
- Social Media Analysis: AI can analyse social media trends to understand the interests of the community and tailor library programs and services accordingly. *Event Planning:* AI can help in planning and promoting library events by analysing attendance data and user feedback.

Chiancone discussed the revolution of AI in public libraries. It is a fascinating journey that is reshaping the way libraries operate and serve their patrons. Here's an in-depth look at the various applications of AI in libraries: AI for

cataloguing and classification, AI for user services, AI for predictive analysis, the potential benefits of AI in libraries, enhanced user experience, improved efficiency, data-driven decision-making and privacy and ethical concerns. However, as libraries continue to integrate AI into their operations, it's crucial to address the challenges and ethical considerations that come with this technology. Issues such as data privacy, algorithmic bias, and the digital divide must be carefully considered to ensure that the use of AI in libraries is fair, ethical, and inclusive (Chiancone, 2023).

Artificial Intelligence and Virtual Libraries:

Artificial Intelligence (AI) and virtual libraries together have the potential to revolutionize how libraries operate and how users access and interact with information. Here are some key aspects of how AI can enhance virtual libraries;

1. Enhanced Information Retrieval: AI-powered search engines can understand natural language queries, recognize synonyms, and provide more accurate and relevant search results. AI can improve search by understanding the context and intent behind user queries, offering results that are more aligned with what the user is looking for.

2. Personalized User Experience: AI algorithms can analyse user behaviour and preferences to suggest books, articles, and other resources tailored to individual interests. Virtual libraries can offer personalized learning paths and resources based on the user's progress, interests, and learning style.

3. Automated Content Management: AI can automatically generate and update metadata for digital content, ensuring that materials are well-organized and easily searchable. AI can classify and tag content into appropriate categories, making it easier for users to find related materials.

4. Virtual Assistance and Chatbots: AI-driven chatbots can provide round-the-clock assistance (24/7 support), answering user queries, guiding them through the library's resources, and helping with research. Virtual assistants can help users navigate the virtual library, locate specific resources, and provide recommendations based on user queries.

5. Enhanced Accessibility: AI technologies can convert text to speech and vice versa, making library resources accessible to users with visual or hearing impairments. AI can translate content into different languages, broadening access to non-native speakers and making diverse resources available to a wider audience.

6. Data Analytics and Insights: AI can analyse user interactions with the virtual library to gain insights into usage patterns, preferences, and needs, helping to improve services and resources. AI can predict trends and user needs, helping libraries anticipate demand for certain resources and adjust their collections accordingly.

7. Digital Preservation: AI can assist in the digitization of physical materials, ensuring they are preserved and accessible in digital formats. AI can help manage digital archives, ensuring that digital content is preserved, indexed, and accessible over the long term.

8. Interactive and Immersive Experiences: AI can enhance VR and AR experiences in virtual libraries, providing interactive and immersive ways to explore resources and learn. AI can introduce gamified elements to virtual libraries, making learning and information retrieval more engaging and enjoyable.

Advantages of Artificial Intelligence in Libraries:

Implementing Artificial Intelligence (AI) in libraries offers numerous benefits, transforming traditional library operations and enhancing services provided to patrons. Here are some key benefits;

1. Enhanced User Experience: AI can analyse user behaviour and preferences to provide personalized book and resource recommendations, similar to how e-commerce platforms like Amazon recommend products. AI-powered search engines can understand and process natural language queries, making it easier for users to find the information they need without using specific keywords or phrases. AI-driven chatbots can assist users 24/7, answering queries, helping with research, and providing information about library services.

2. Improved Cataloguing and Classification: AI can automatically generate metadata for new acquisitions, ensuring consistent and accurate cataloguing with less manual effort. AI algorithms can classify books and materials into appropriate categories and subjects more accurately and quickly than traditional methods.

3. Efficient Resource Management: AI can analyse usage patterns and predict future trends, helping libraries manage their collections more effectively, such as determining which books to purchase or deaccession. AI can streamline inventory management by automating tasks like book check-ins and check-outs, reshelving, and stocktaking.

4. Enhanced Research Capabilities: AI can analyse large datasets to uncover trends, patterns, and insights that can aid researchers in their work. AI tools can assist in writing and formatting academic papers, providing suggestions for improvement, checking for plagiarism, and even generating citations.

5. Accessibility and Inclusion: AI technologies can convert text to speech and vice versa, aiding users with visual or hearing impairments. AI-powered translation tools can help non-native speakers access library materials by translating text and documents into different languages.

6. Operational Efficiency: AI can automate repetitive and time-consuming tasks, such as answering common queries, processing new acquisitions, and managing interlibrary loans. AI can optimize the management of energy resources within the library, reducing costs and improving sustainability.

7. Enhanced Collection Development: AI can analyse user feedback and usage data to inform collection development decisions, ensuring that the library's collection remains relevant and up-to-date. AI can identify emerging trends and popular topics, guiding librarians in acquiring materials that meet current and future demands.

8. Preservation and Conservation: AI can assist in digitizing and preserving historical and rare documents, ensuring long-term access and reducing physical wear and tear. AI can monitor the physical condition of materials and predict when conservation efforts might be needed.

9. Enhanced Security: AI can enhance security by monitoring access points, identifying unauthorized access, and managing user authentication. AI-powered systems can help prevent theft and unauthorized removal of library materials.

10. Community Engagement: AI can analyse attendance data and user feedback to help plan and promote library programs and events tailored to community interests. AI can analyse social media trends and interactions to engage with the community and promote library services effectively.

Disadvantages of Artificial Intelligence in Libraries:

While the implementation of Artificial Intelligence (AI) in libraries offers numerous benefits, it also comes with several potential drawbacks and challenges. Here are some key demerits:

1. High Implementation Costs: Deploying AI technologies can be expensive, requiring significant upfront costs for hardware, software, and infrastructure upgrades. Continuous maintenance, updates, and potential repairs add to the overall cost. Budget constraints may limit the extent to which AI can be integrated.

2. Data Privacy and Security Concerns: AI systems often require access to personal data to function effectively, raising concerns about the privacy and security of user information. Libraries must implement robust security measures to protect sensitive data from breaches, which can be costly and damaging to user trust.

3. Technical Challenges: Integrating AI systems with existing library management systems can be complex and may require significant technical expertise. AI systems are not infallible and can malfunction or produce errors, leading to potential disruptions in library services.

4. Bias and Fairness: AI systems can inherit biases present in their training data, leading to unfair or discriminatory outcomes. Ensuring fairness and transparency in AI algorithms is challenging. If AI systems are not trained on diverse datasets, they may not serve all user groups effectively, leading to unequal access to information.

5. Job Displacement and Staff Concerns: The automation of tasks traditionally performed by library staff could lead to job losses or reduced hours, causing concern among employees. Staff may need new skills to manage and maintain AI systems, requiring ongoing training and professional development.

6. User Acceptance and Experience: Both staff and users may be resistant to adopting AI-driven processes and technologies, particularly if they are perceived as impersonal or intrusive. If AI systems are not designed with user-friendly interfaces, they may hinder rather than help users, leading to frustration and decreased satisfaction.

7. Ethical Considerations: The use of AI for monitoring user behaviour can raise ethical concerns about surveillance and the potential misuse of data. Determining accountability for decisions made by AI systems can be complex, particularly in cases where AI recommendations affect users.

8. Dependence on Technology: Excessive reliance on AI systems can lead to a decrease in critical thinking and decision-making skills among library staff. Dependence on AI makes libraries vulnerable to technology failures, which can disrupt services and negatively impact user experiences.

9. Standardization and Interoperability: The absence of standard protocols for AI implementation in libraries can lead to compatibility issues and hinder the seamless integration of different systems. Ensuring that AI systems can work harmoniously with existing library technologies and across various platforms can be challenging.

10. Cultural and Social Impact: The introduction of AI may alter the traditional culture of libraries, which is often centred on human interaction and personalized service. AI systems may inadvertently exacerbate social inequities if not designed and implemented with inclusivity in mind.

Conclusion:

Artificial intelligence is a rapidly advancing field with the potential to revolutionize many aspects of life and industry. As AI technology continues to evolve, it is crucial to address ethical considerations and ensure that its development and deployment are aligned with societal values and goals. The integration of AI in libraries offers significant benefits, enhancing user experiences, improving operational efficiency, and enabling more effective resource management. By leveraging AI technologies, libraries can better serve their communities, remain relevant in the digital age, and continue to be vital centres of learning and information.

While AI has the potential to significantly enhance library services, it is essential to carefully consider and address its potential drawbacks. Libraries must balance the benefits of AI with the ethical, social, and technical challenges it presents, ensuring that the integration of AI technologies aligns with their mission to serve and support their communities effectively. Libraries can harness the power of AI while mitigating its risks and maintaining their role as inclusive, trusted institutions. AI has the potential to greatly enhance virtual libraries, offering personalized, efficient, and accessible services that meet the evolving needs of users. By addressing the associated challenges and leveraging AI's capabilities, virtual libraries can become more dynamic and user-centred, ultimately transforming how information is accessed and utilized in the digital age.

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JOURNAL OF APPLIED ECOLOGY A BIBLIOMETRIC STUDY

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Abstract

This paper presents a Bibliometric analysis of 3562 articles published in volume 47-56 issue 6 The present study has been done by using Bibliometric method. the journal titled "Journal of applied ecology "British ecological society during the periods of 2010-2019.The paper has analyzed various factors USA (23.78%) were as the minimum contributions were contributed by other countries i.e. (0.05%)). that university wise contribution was maximum (1426) the authorship pattern it was seen that 827 articles (23.21%) out of 3562 articles have been contributed by single author3562 contributions majority (13.53%) research article of the citations is the article and minimum (1.34%) are review citations The maximum pages werecovered in the 1989(55.84%) & minimum pages were covered in the year of 136 (3.82%).

Keywords: Bibliometrics, journal of applied ecology

1.0. Introduction

Bibliometrics is an important area of research in the library and information science. The word "Bibliometrics" has been derived from two Greek words "Biblio" means books and "metric" means measure which refers to the application of mathematics to the study of bibliography. Pritchard (1962),The subject of Bibliometrics was first defined by Pritchard (1996) as "the application of mathematical and statistical methods to books and other media". Journal of Applied Ecology Publishers novel, broad –reaching and high impact papers on the interface between ecological science and the management of biological recourses the journal includes all major themes in applied ecology such as conservation biology, global change, environmental pollution, wildlife and habitat management, land use and management, aquatic, recourses, restoration ecology and the management of pests, weeds and disease

Journal of Applied Ecology publishes novel, broad-reaching papers on the interface between ecological science and the management of the natural environment. We cover all ecological realms and themes in applied ecology, with a focus on addressing the acute global challenges of mitigating and adapting to climate change, conserving biodiversity, and promoting nature's multifaceted contributions to people. *Journal of Applied Ecology* is part of the prestigious British Ecological Society portfolio.

1.1. About the Journal

Journal of Applied Ecology

Journal of Applied Ecology publishes novel, broad-reaching papers on the interface between ecological science and the management of the natural environment Journal of Applied Ecology is a monthly peer-reviewed scientific journal publishing research in all areas of environmental management. It was established in 1964 and is published by Wiley on behalf of the British Ecological Society. The Senior Editors are Jos Barlow (Executive Editor), Nathalie Pettorelli, Philip Stephens, Martin Nuñez and Romina Rader.

1.2. Bibliometric Analysis

Bibliometrics is the application of statistical and mathematical methods to books and Other communication (Pritchard, 1969). Bibliometrics is type of research method used in Library and Information sciences. It is an emerging area of research in the LIS field. The quantitative analysis and statistics to describe patterns of publication with within a given field of body of literature are utilized. (George, 2012) Bibliometric term introduced by Alan Pritchard in 1969 (Jena, 2006) Bibliometrics is the application of statistical and mathematical methods to books and other communication (Pritchard, 1969). Bibliometrics is type of research method used in Library and Information sciences. It is an emerging area of research in the LIS field. The quantitative analysis and statistics to describe patterns of publication with within a given field of body of literature are utilized. (George, 2012) Bibliometric term introduced by Alan Pritchard in 1969 (Jena, 2006) Bibliometrics is the application of statistical and mathematical methods to books and other communication (Pritchard, 1969). Bibliometrics is type of research

method used in Library and Information sciences. It is an emerging area of research in the LIS field. The quantitative analysis and statistics to describe patterns of publication with within a given field of body of literature are utilized. (George, 2012) Bibliometric term introduced by Alan Pritchard in 1969 (Jena, 2006)

1.2.3 British Ecological Society

The British Ecological Society is a learned society in the field of ecology that was founded in 1913. It is the oldest ecological society in the world The Society's original objective was "to promote and foster the study of Ecology in its widest sense" and this remains the central theme guiding its activities today. The Society had, circa 2013 around 4,000 members [of which 14% are students. It has always had an international membership and currently [42% are outside the United Kingdom, in a total of 92 countries. The head office is located in London.

2. Review of Literature

(Alhamdi, Khaparde & Kanekar, 2014) They attempted on a Bibliometric analysis of ten volumes (57-66) in the field of journal of Documentation. It is based on the references appended to International Journal of "Journal of Documentation" during 2001-2010. The present study is based on 15150 references appended to 364 articles contributed by the authors in Journal of Documentation. It was found that Journals Citations are more in number than other citations. Also it was found that Solo Researchers are Predominant than Collaborative Researchers. The extent of collaboration was not much popular among the Journal of Documentation. The mean relative growth for articles and citation in the first five years 2001 to 2005 is reduced according to the last five years 2006 to 2010.The value of group co-efficient (gp) was only 0.46. It was seen that researchers cited latest documents. Out of 364 articles there are 175 articles have pages length from 11 to 20.

(Alhamdi, Khaparde & Shesharao, 2014) They conducted a Scientometric analysis of 56 papers published in the Library and Information science & Technical Abstract (LISTA) on internet use in the subject of library &Information science during the period 2004 - 2013. The study focused on various aspects: such as document types, growth Rate (GR) and doubling time (DT) of publications and citations, year-wise, authorship pattern, institutions involved, most prolific authors of the journal. The study revealed that most of the papers (71.4%) of papers were contributed by multiple authors. USA is the top producing country with 8 (14.3%) publications of the total output. All the articles were published in English language. The mean doubling time for the first five years (i.e. 2004 to 2008) is only (1.05) which is increased to (6.07) during the last five years (2009 to 2013). Maximum 35 (62.5%) out of 56 of the authors are not mentioned their email address in the paper (Alhamdi, Khaparde & Kanekar, 2014) The present study deals a Scientometric analysis of 56 papers published in the Library and Information science & Technical Abstract (LISTA) on internet use in the subject of library &Information science during the period 2004 - 2013. The study focused on various aspects: such as document types, growth Rate (GR) and doubling time (DT) of publications and citations, year-wise, authorship pattern, institutions involved, most prolific authors of the journal. The study revealed that most of the papers (71.4%) of papers were contributed by multiple authors. USA is the top producing country with 8 (14.3%) publications of the total output. All the articles were published in English language. The mean doubling time for the first five years (i.e. 2004 to 2008) is only (1.05) which is increased to (6.07) during the last five years (2009 to 2013). Maximum 35 (62.5%) out of 56 of the authors are not mentioned their email address in the paper.

2.0 Objective of the study

- Author ship pattern of distribution of contribution
- Degree of Authors Collaboration
- Institute wise Distribution of contribution Article
- Relative Growth Rate [R(P)] and Doubling Time[Dt(p)] for Articles
- Volume Issue wise distribution of contribution of article
- Country wise Distribution of contribution Article
- Type of Document type distribution of article
- Length of Pages wise distribution of article

2.2. Scope & Limitation of the study

The present study is based on the A Bibliometric study Journal of Applied ecology The present study is based on over all 3562 articles during 2010-2019.

2.3 Data collection

Data collected from the Journal of Applied ecology Reports the period of 2010-2019 i.e. 10 years. A total number of 3562 publications were received. The data was download and analyzed by using the Excel sheet..

2.4. Data Analysis and Interpretation:

Table 6.1 indicates that the details about the authorship pattern it was seen that 827 articles (23.21%) out of 3562

Table No 1

Author ship pattern of distribution of contribution

Year	Single	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten	More thanten	Total
2010	79	49	46	29	36	22	19	20	20	19	39	378
2011	86	42	32	40	20	24	17	17	22	20	44	364
2012	73	35	40	28	30	32	23	17	19	17	40	354
2013	76	39	41	29	25	20	14	22	18	18	37	339
2014	79	42	33	32	30	33	21	14	18	16	32	350
2015	89	46	32	31	24	21	20	18	19	17	32	349
2016	99	36	33	26	33	20	20	18	20	15	41	361
2017	67	48	40	31	31	21	18	21	17	16	36	346
2018	91	40	31	32	22	29	17	18	18	14	37	349
2019	88	48	32	29	28	28	19	18	16	21	45	372
	827	425	360	307	279	250	188	183	187	175	383	3562

articles have been contributed by single author 425 articles (11.93%) by two authors and three authors articles 307 (8.61 %) articles by more than ten authors. "**Majority of the contributions are contributed by single authors. Hypotheses No 1 Valid)**

Table No 03

Degree of Author's collaboration:

Year	Single(Ns)	%	Multiple (Nm)	%	Nm+Ns	DC
2010	79	9.55	299	10.93	378	0.20
2011	86	10.39	278	10.16	364	0.23
2012	73	8.82	281	10.27	354	0.20
2012	73	8.82	281	10.27	354	0.20
2013	76	9.18	263	9.61	339	0.22

2014	79	9.55	271	9.90	350	0.22
2015	89	10.76	260	9.50	349	0.25
2016	99	11.97	262	9.57	361	0.27
2017	67	8.10	279	10.20	346	0.19
2018	91	11.0	258	9.43	349	0.26
2019	88	10.64	284	10.38	372	0.23
	827	100	2735	100	3562	0.23

Degree of Author's collaboration:

Various methods have been proposed to calculate the degree of research collaboration. Here, in this study the formula proposed by Subramanian (1983) has been used.

The Degree of Collaboration

$$C = \frac{NM}{Nm+Ns}$$

Where, C=Degree of Collaboration on a discipline

Nm=Number of multi authored paper in the discipline

Ns= Number of single authored paper in the discipline

Here, Nm=2735

Ns=827

$$C = \frac{2735}{827+2735} = 0.76$$

Degree of Collaboration is C = 0.76

So, in the study of collaboration during the overall 10 years (2010 – 2019) is 0.76

Table No 03

Institute wise Distribution of contribution Article

Year	University	Institute	Department	School	College	Research	Total	Percentage
2010	123	65	52	49	32	33	354	9.94
2011	140	55	49	49	44	52	389	10.93
2012	144	44	53	40	22	22	325	9.12
2013	158	62	39	46	44	43	392	11
2014	136	53	35	46	33	33	336	9.43
2015	146	52	37	26	49	29	339	9.52
2016	136	56	44	32	49	48	365	10.25

2017	151	48	52	36	32	23	342	9.6
2018	117	52	44	51	46	33	343	9.63
2019	146	53	45	52	40	41	377	10.58
Total	1426	540	450	427	391	357	3562	100

Table No 03 shows the distribution of institutions wise contribution year wise. It was seen that university wise contribution was maximum (1426) than institution wise (540) Department (450) school (427) college (391) and research (357) contributions were contributed by the colleges. Table No 6.4 shows that the highest number of contributions is of university level. **"Majority of the affiliated Institution are from University (Hypotheses No 3) Valid"**

Table No 04

Relative Growth Rate & Doubling Timing of Articles

Year	No. of Article	Cumulative no. of Article	W1	W2	RGR	Mean[R(P)]	[Dt(P)]	Mean[(Dt (P)}
2010	362	362	5.89	5.89	0		0	
2011	368	730	5.90	6.59	0.69		1.00	
2012	323	1053	5.77	6.95	1.18		0.58	
2013	356	1409	5.87	7.25	1.38	0.96	0.50	
2014	359	1768	5.88	7.47	1.59		0.43	0.50
2015	353	2121	5.56	7.65	2.09	2.12	0.33	
2016	402	2523	5.99	7.83	1.84		0.37	
2017	364	2887	5.89	7.96	2.07		0.33	
2018	327	3214	5.78	8.07	2.29		0.30	
2019	348	3562	5.85	8.17	2.32		0.29	0.32

The Relative growth [R(c)] and doubling time [Dt(c)] of citations were determined and provided in the table 6.5 in case of citations it was observed that the relative growth rate of citations was gradually decreased from 0.96 in 2014 to 2019 2.12 in 2019. The mean relative growth [R(c)] of citations during first five years (i.e. 2010 to 2014) was higher (0.96) than the last five years i.e. during 2010 to 2019 (2.12)

Table No 05

Volume Issue wise distribution of contribution of article

Year	Volume	Issue						Totalarticle	Percentage
		1	2	3	4	5	6		
2010	47	70	59	59	56	56	62	362	10.16
2011	48	74	56	59	59	58	62	368	10.33
2012	49	61	55	54	46	58	49	323	9.07
2013	50	65	55	59	58	50	69	356	9.99
2014	51	62	63	54	62	57	61	359	10.08
2015	52	63	52	60	55	62	61	353	9.91
2016	53	71	74	66	63	62	66	402	11.29
2017	54	59	63	55	61	57	69	364	10.22
2018	55	51	56	51	53	54	62	327	9.18
2019	56	69	75	66	34	55	49	348	9.77

From the Table No 05 it is clear that the number of articles in each issue varies from the maximum Number 402(11.29%)is in the issue no 53 of 2016 & the lowest numbe368(10.33%)is in issue no 48 2nd issue of 2010-2019 there is gradual increase in the number of articles from year 2010 to 2019 the last number of articles was published in 2010 (362 articles) and the highest number of articles was published in 2012(247) it is shown in Gives us the cumulative distributionof articles in 2010 to 2019 and its percentage

Table No 06

Country wise Distribution of contribution Article

SrNo	Country	Frequency	percentage	CumulativeNumber	cumulative percentage
1	USA	847	23.78	847	23.78
2	India	432	18.08	1491	41.86
3	Italy	325	12.13	1923	53.99
4	Japan	325	9.12	2248	63.11
5	New York	222	6.23	2470	69.34
6	Argentina	154	4.32	2624	73.65
7	Canada	143	4.02	2767	77.68
8	France	122	3.43	2889	81.1

9	Germany	111	3.12	3000	84.22
10	The Netherlands	96	2.75	3096	86.92
11	Denmark	82	2.30	3178	89.21
12	Brazil	77	2.16	3255	91.38
13	Denmark	26	0.7	3281	92.11
14	South Africa	22	0.61	3303	92.73
15	Poland	14	0.39	3317	93.12
16	Switzerland	14	0.39	3331	93.51
17	Spain	10	0.28	3341	93.80
18	Boston	10	0.28	3351	94.07
19	Australia	10	0.28	3361	94.36
20	United Kingdom	9	0.25	3370	94.61
21	México	9	0.25	3379	94.86
22	Portugal	9	0.25	3388	95.11
23	Finland	8	0.22	3396	95.34
24	Ireland	8	0.22	3404	95.56
25	Israel	6	0.17	3140	88.15
26	Romania	6	0.17	3416	95.90
27	New Zealand	5	0.14	3421	69.04
28	Morocco	2	0.05	3423	96.09
29	south Korea	2	0.05	3425	96.15
30	Single time country (1*126)	126	3.54	3551	99.69
31	Not Mentioned	11	0.31	3562	100

Table No.6 shows the country wise distribution of contribution which indicates that the majority of the contributions were contributed by USA (23.78%) were as the minimum contributions were contributed by other countries i.e. (0.05%) respectively **"USA is the highest productive country (Hypothesis No. 2) is valid"**

Table No 07

Type of Document type distribution of article

Sr No	Document	Frequency	Percentage
1	Research Article	482	13.53
2	Review	379	10.64

3	Original Article	374	10.49
4	Review Article	245	6.87
5	original Review	241	6.76
6	Research	239	6.70
7	original Paper	212	5.95
8	Mini-Review	212	5.95
9	Letter to Editor	180	5.05
10	Clinical Review	170	4.77
11	Short Communication	143	4.01
12	original Research	132	3.70
13	Article	126	3.45
14	Original Research Article	111	3.11
15	Perspectives	78	2.18
16	Letters	60	1.68
17	Editorials	52	1.45
18	Papers	49	1.37
19	Research Report	48	1.34
20	Not Mentioned	29	0.81
	Total	3562	100

Table No. 07 shows the types of publication year wise. in Total 3562 contributions majority (13.53%) research article of the citations is the article and minimum (1.34%) are review citations

Table No 08

Length of Pages wise distribution of article

Sr No	length ofpages	Frequency	Percentage
1	1 to 10	1989	55.84
2	11 to 20	874	24.54
3	21 to 30	563	15.81
4	31 to 40	136	3.82
Total		3562	100

Table No.08 shows the average pages (per contributions). The maximum pages werecovered in the 1989(55.84%) & minimum pages were covered in the year of 136 (3.82%).

Conclusion

- The Present study confirmed to the publication of 3562 research articles printed in 12 volumes of appeared within the journal of applied ecology from 2010-2019
- The mean relative growth for articles in the first five years 2010 to 2019 is (0.96), reduced to (2.12) in the last five years 2010 to 2019.
- It was seen that university wise contribution was maximum (1426) than institution wise (540) Department (450) school (427) college (391) and research (357) contributions were contributed by the colleges
- The USA is ranked first with 847(23.78%) publication
- Types of publication year wise. in Total 3562 contributions majority (13.53%) research article of the citations is the article and minimum (1.34%) are review citations
- The average pages (per contributions). The maximum pages were covered in the 1989(55.84%) & minimum pages were covered in the year of 136 (3.82%).

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PUBMED: AN IMPORTANT RESOURCE FOR BIOMEDICAL RESEARCH.

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Abstract

PubMed is a best online resource that has established helpful to scientific researchers. PubMed, operated by the National Center for Biotechnology Information (NCBI) at the National Institutes of Health (NIH), provides free access to MEDLINE, a database containing millions of references and abstracts from life science and biomedical magazines. (NCBI, n.d.) This article looks at PubMed's history, key operations, and advanced features, highlighting its significance in the scientific community.

Keywords: PubMEd, Medical Subject Headings (MeSH), MEDLINE, National Center for Biotechnology Information (NCBI).

Historical Background and Development

PubMed was established in the early 1990s as part of a larger initiative to digitize and organize medical literature. The goal was to provide a comprehensive and publicly available biomedical research library for academics, physicians, and the general public. PubMed has evolved greatly over time, with better search capabilities, user-friendly interfaces, and connectivity with other NCBI databases. (Lu., 2011) . One of PubMed's most notable accomplishments was the invention of the Medical Subject Headings (MeSH) system, which provides a standardized vocabulary for indexing publications.
This strategy allows users to select significant material even when multiple phrases describe the same subject. (Canese & Weis, 2013)

Here are 5 one-line objectives for the paper title "PubMed: An Important Resource for Biomedical Research":

Objectives:

1. Introduce the core features and functionalities of PubMed as a comprehensive biomedical literature database
2. Examine PubMed's search algorithms and indexing system for efficient information retrieval.
3. Assess the impact of PubMed on facilitating evidence-based medicine and clinical decision-making.
4. Explore PubMed's role in promoting open access to scientific literature and fostering global research collaboration.
5. Evaluate PubMed's integration with other NCBI resources to enhance biomedical research capabilities.

Core Features and Functionalities

PubMed's essential features are meant to serve a wide range of users, from beginner researchers to expert scientists. The site offers a number of search options, including simple keyword searches, MeSH term searches, and advanced search filters. These capabilities allow users to personalize their searches to their individual requirements, ensuring that they locate the most relevant articles quickly and effectively. (Misra & Ravindran, 2022)

Keyword Searches

The easiest approach of searching PubMed is through keyword searches. Users can type one or more phrases into the search field, and PubMed will provide a list of papers with those terms in the title, abstract, or keywords. This strategy is appropriate for wide searches or when users are confused about what terminology to use.

MeSH Term Searches

MeSH words allow for more specific searches in PubMed. Each article in the database is indexed using one or more MeSH keywords that characterize the article's major subjects. By employing MeSH keywords to search for papers, users may guarantee that their searches focus on the most relevant material. This strategy is very beneficial for doing systematic reviews and other forms of extensive literature searches. (Yang & Lee, 2018)

Advanced Search Filters

PubMed also provides a variety of sophisticated search filters, allowing users to focus their searches based on specified criteria. These filters include publication date, article kind, language, and others. Users may use these criteria to rapidly limit their searches and locate articles that match their specific needs. (Misra & Ravindran, 2022)

Visualization of Research Trends

One of PubMed's distinguishing characteristics is its ability to visually represent research trends using MeSH keywords. This feature enables academics to find emerging areas of interest and follow the evolution of certain subjects over time. For example, by studying the frequency of specific MeSH words in PubMed's database, researchers can spot patterns in the literature and get insight into future research directions. (Yang & Lee, 2018)
These visualizations might be very beneficial for scholars who want to test new research lines or assess the relevance of their present work. Understanding the trends in their field allows researchers to ensure that their work is up to date and addresses the most urgent concerns.

Access and Integration with Other Tools

PubMed's connection with other NCBI databases and technologies makes it more useful for researchers. For example, researchers may easily access full-text publications, gene sequences, and other associated resources, allowing for a more complete examination of biological material. (Canese & Weis, 2013) This connection enables users to take a more holistic approach to research by providing easy access to all essential material from a single platform.

Link out and Full-Text Access

One of PubMed's important features is the Link out service, which gives direct access to full-text articles on publisher websites. This service allows users to access the full text of articles straight from PubMed, making it easy to gather all of the material required for their study. Many publishers offer free access to articles, particularly those that are publicly funded, further enhancing the accessibility of biomedical literature. (Lu., 2011)

Integration with Other NCBI Tools

PubMed also works with other NCBI programs, including GenBank, PubChem, and the NCBI Gene database. This integration enables researchers to quickly access related information from different databases, resulting in a more complete picture of the biomedical research environment. Users can, for example, link from a PubMed article to associated GenBank genetic sequences or PubChem chemical information, allowing for a more comprehensive approach to study. (Canese & Weis, 2013)

Enhancing Search Efficiency

To use PubMed effectively, you must first get familiar with its search features. Several studies have identified ways for increasing search efficiency, such as employing relevant MeSH keywords and Boolean operators. (Fatehi, Geay, & Wootton, 2013) Researchers who learn these strategies will be able to access relevant literature more quickly and with higher quality.

Boolean Operators

Boolean operators (AND, OR, NOT) can be used to combine search words in PubMed, resulting in more accurate outcomes. For example, using "AND" between two phrases will return articles containing both terms, whereas "OR" will return articles including any term. "NOT" can be used to exclude articles that utilize a specified phrase. Using these operators, researchers may develop complicated search techniques that better represent their information requirements. (Fatehi, Geay, & Wootton, 2013)

Search History and Alerts:

PubMed's search history tool allows users to record and evaluate prior queries, making it easy to refine and repeat them as required. Users can also set up search alerts to receive notifications when new articles matching their search parameters are added to PubMed. These characteristics assist researchers in staying current with changes in their field and ensuring that essential new articles are not missed. (Lu., 2011)

Tutorials and User Support:

PubMed provides a variety of tutorials and user guides to help researchers improve their search strategies. These resources contain step-by-step instructions, video tutorials, and frequently asked questions (FAQs), giving full support to users of all skill levels. Using these resources, researchers can learn how to use PubMed more effectively and optimize its benefits. (Ebbert, Dupras, & Erwin, 2003)

Table. 1. Selective Deposit Collection Open Access articles in PubMed Central

Sr No.	Selective Deposit Collection	Publisher	Articles
1	Springer	Springer	131816
2	Wiley Open Access Collection	Wiley-Blackwell	72437
3	ACS AuthorChoice	American Chemical Society	34317
4	JAMA Network	American Medical Association	22138
5	Elsevier Sponsored Documents	Elsevier	21868
6	Lippincott Open Access	Wolters Kluwer Health	19230
7	Nature Portfolio	Nature Publishing Group	17729
8	Sage Choice	Sage Publications	16033
9	Portland Press Open Access	Portland Press Ltd	5850
10	IOS Press Open Library	IOS Press	3973
11	Royal Society of Chemistry	Royal Society of Chemistry	3456
12	Taylor & Francis Open Select	Taylor & Francis	3152
13	Karger Author's Choice	Karger Publishers	2542
14	Thieme Open Access	Thieme Medical Publishers	2292
15	Oxford University Press	Oxford University Press	1848
16	AACR Open Access	American Association for Cancer Research	1679
17	RSNA Journals	Radiological Society of North America	1101
18	ERJ Open	European Respiratory Society	963
19	International Journal of Exercise Science	Western Kentucky University	870
20	The Journal of Immunology Author Choice	The American Association of Immunologists, Inc.	643
21	Society for Endocrinology Open Access	Bioscientifica Ltd.	547
22	The International Journal of Tuberculosis and Lung Disease	The International Union Against	508

		Tuberculosis and Lung Disease	
23	FSG Selective Deposit	Future Science Group	461
24	NEJM Group COVID-19 Collection	Massachusetts Medical Society	457
25	IOP Publishing	IOP Publishing	380
26	De Gruyter Funded Articles	De Gruyter	307
27	AIP Publishing Selective Deposit	American Institute of Physics	295
28	Liebert Funded Articles	Mary Ann Liebert, Inc.	273
29	MIT Press Open Journals	MIT Press	205
30	Emerald Publishing Open Access	Emerald Group Publishing Ltd.	178
31	Royal College of Psychiatrists Open Access	Royal College of Psychiatrists	123
32	Hogrefe OpenMind	Hogrefe Publishing	117
33	European Society of Endocrinology Open Access	Bioscientifica Ltd.	81
34	JNSPG Special Collection	American Association of Neurological Surgeons	72
35	IEEE Sponsored Documents	Institute of Electrical and Electronics Engineers	61
36	Optica Publishing Group - Funded Articles	Optica Publishing Group	34
37	Informa Healthcare Open Access	Informa Healthcare	32
38	The Johns Hopkins University Press Selective Deposit	The Johns Hopkins University Press	24
39	MDPI - Funded Articles	Multidisciplinary Digital Publishing Institute (MDPI)	22
40	Maney MORE Open Choice	Maney Publishing	17
41	Edinburgh Open	Edinburgh University Press	3
42	Society for Reproduction and Fertility Open Access	Bioscientifica Ltd.	2
		Total	**368136**

Contributions to open access articles in PubMed Central.

1. Total Articles: The table shows a total of 368,136 open access articles across all listed publishers.

2. Top Contributors: Springer is the largest contributor with 131,816 articles, representing about 35.8% of the total. Wiley-Blackwell is second with 72,437 articles (19.7% of the total). American Chemical Society is third with 34,317 articles (9.3% of the total).

3. Distribution: The top 5 publishers contribute 282,576 articles, which is about 76.8% of the total. The top 10 publishers account for 325,391 articles, or 88.4% of the total.

4. Publisher Types: The list includes a mix of commercial publishers (e.g., Springer, Elsevier), society publishers (e.g., American Chemical Society, American Medical Association), and university presses (e.g., Oxford University Press, MIT Press).

5. Specialized Collections: Some entries represent specific open access initiatives or collections within larger publishers, such as "ACS Author Choice" or "Elsevier Sponsored Documents."

6. Disciplinary Focus:

While many publishers cover a broad range of subjects, some are focused on specific fields (e.g., American Association for Cancer Research, European Respiratory Society).

This data provides insights into the landscape of open access publishing in biomedical and life sciences, showing the dominance of a few large publishers and the long tail of smaller contributors. It also reflects the diverse range of publishers participating in open access initiatives, from large commercial entities to specialized societies and university presses.

Conclusion: Offering a wide range of features to facilitate trend analysis and literature searches, PubMed is a particularly powerful online resource for biomedical scientists. It is highly valued in the scientific community because to its ongoing development and incorporation with other biological resources. The ever-expanding corpus of scientific information will require the use of technologies such as PubMed in order to be accessed and managed as biomedical research does. A few large publishers dominate, contributing over 75% of open access articles. Diverse Participation: Wide range of contributors, including commercial, academic, and society publishers. Cross-Disciplinary Adoption: Open access spans various scientific fields. In summary, while the field is concentrated among top publishers, there's broad participation across the industry. This snapshot reveals a significant move towards open access in scientific publishing, albeit at varying paces among different organizations.

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EVALUATING THE IMPACT OF LIBRARY AND INFORMATION SCIENCE JOURNALS: A BIBLIOMETRIC STUDY

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Abstract:

This study focuses on evaluating the impact and relevance of Library and Information Science (LIS) journals by analyzing those with substantial LIS content. Excluding interdisciplinary and related journals, the analysis targets solely dedicated LIS journals using data from the Scopus Preview Portal and the SCImago Portal. The research employs quantitative Bibliometric techniques to assess journal metrics, considering potential limitations such as the exclusion of lesser-known journals and the reliance on data from specific periods, which might not reflect recent field developments. Data for the study were collected from SCImago Journal & Country Rank (SJR) and Journal Metrics Scopus – CiteScore databases on July 1, 2024. The researchers identified 100 relevant LIS journals, ranking them based on the cite score, SJR indicator.

Keywords: SCImago Journal and Country Rank (SJR); Source Normalized Impact per Paper (SNIP) , Journal Ranking; Library and Information Science (LIS)

1.0 Introduction: Journals in the field of Library and Information Science (LIS) are extremely valuable to researchers, librarians, and information professionals. They help share new research findings and show what is currently happening in the field. Research published in these journals ensures that important discoveries and ideas are accessible to everyone who needs them. In addition, these journals help measure the impact of research. This information is useful for understanding which studies have contributed the most to the field and for helping guide future research efforts by tracking how often articles are cited. In addition to offering information on trends, best practices, and new developments in organizing and managing information, librarian journals are great resources for students and professionals. In a constantly changing field, this keeps everyone informed about the latest advances. Additionally, citation analysis helps determine which research is most influential by looking at how often articles, authors, and institutions are cited in these journals. It also helps evaluate the contribution different studies have made to the field through thematic reviews published in these journals. This type of journal highlights new trends, emerging topics of interest, and new ideas and methods by reviewing previous publications. Experts in the field are able to share knowledge and communicate more effectively. There are a number of reasons why LIS journals are essential for promoting excellent research, sharing knowledge, and supporting professional growth. A key role played by LIS journals in advancing library and information science is ensuring that high-quality research is accessible, evaluated, and used to inform future research. By participating in these activities, LIS journals are significantly contributing to the progress of library and information science over the years (Mane, S. (2022) and Edewor, N. (2013)).

1.1 **Significance of the study:** The library and information science journals play an important role in the research and academic community because they provide a platform where researchers can publish their work and make contributions to the field. In addition, these journals help spread new knowledge, research findings, and innovative ideas within the library and information sciences field. Also, these journals can be used to track researchers' productivity and publication trends as well, as well as the number of publications published by different countries and regions and the time it takes for them to be published. Further, these journals increase the visibility of regional research through the use of open access platforms, which facilitates the sharing of scientific work and encourages scholarly communication in the region. In general, library and information science journals promote academic discussion, share knowledge, and advance research(Sinha, P. (2022); Kim, E. (2023) and Faber Frandsen, T., & Nicolaisen, J. (2024)).

1.3 Objectives:

1. To Evaluate and Rank Journals Based on CiteScore:
2. To study the Rank Journals Using the Source Normalized Impact per Paper (SNIP) Metric:

3. To find the Rank Journals Using the SCImago Journal Rank (SJR) Metric:
4. To Identify Leading Publishers in the Field of Library and Information Science:
5. To Understand the Global Distribution of Publishing Activity and Identify Leading Countries in the Field:

1.4 Scope and Limitations: This research paper focuses on analyzing and evaluating publications within the field of Library and Information Sciences. The journals selected for this study were identified and categorized based on their inclusion in the SCImago Journal & Country Rank (SJR) and Journal Metrics Scopus – CiteScore databases. The scope is limited to journals that are specifically classified under the subject area of Library and Information Sciences and the relevant subject categories within this field. The data for this analysis is based on metrics available as of March 2024.

1.5 Research Methodology: The research methodology for this study involved quantitative analysis using Bibliometric techniques. Data was collected from the SCImago Journal & Country Rank (https://www.scimagojr.com) and Journal Metrics Scopus – CiteScore (https://www.scopus.com/sources) databases, which provide various metrics for journals. On July 1, 2024, data specific to Library and Information Sciences research journals were identified and downloaded from both websites. The SCImago database listed 271 journals, while the Scopus database listed 336 journals. The researchers then selected 100 journals from these lists based on their relevance and coverage within the field. The collected data was cleaned, organized, and analyzed to derive insights.

2.0 Review of Liteature: Liao and Chen (2018) conducted a study investigating the impact of Library and Information Science (LIS) journals through citation analysis. Their research ranked journals based on their contribution to knowledge within the field, identified key subfields, and suggested potential research avenues for scholars and editors. Building on this, Ahmad et al. (2019) assessed the quality of LIS journals using various indicators, including the Journal Impact Factor and the Eigenfactor Score. Their paper offered insights into the ranking methodologies employed in the LIS field. In a related study, Ahmad, Sheikh, and Rafi (2020) analyzed the ISI Web of Science database and found that the Journal of Medical Library Association was recognized as the most highly cited journal in Library and Information Science. Further expanding on the identification of influential journals, Sun and Yuan (2020) identified the top five core journals in LIS based on impact factor. These journals included MIS Quarterly, Journal of the American Medical Informatics Association, International Journal of Information Management, Journal of the Association for Information Science and Technology, and Information Management. Further, Vijayan and VR (2021) compared citation data for publications such as DESIDOC Journal of Library & Information Technology and Annals of Library and Information Studies, focusing on scientometric indicators. Their research revealed significant differences in the SCImago Journal Rank (SJR) among these journals and observed variations in the level of international collaboration among authors contributing to these publications. Moreover, Qutab et al. (2022) investigated the distinctions in subject matter between top-ranked (Q1) and lower-ranked (Q4) journals in LIS. Their findings indicated that Q1 journals tend to publish more cutting-edge research on contemporary topics such as social media and machine learning, whereas Q4 journals focused more on established areas within the field, including academic libraries and information-seeking behavior. This study highlights the diversity of research topics across journal rankings and suggests potential trends in the field's development.In another dimension of LIS research, Ashiq et al. (2023) performed a bibliometric analysis of research on library leadership, revealing that the United States leads in this area of research. They identified the Journal of Library Administration as a particularly popular outlet for studies on library leadership, providing insights into the geographical distribution of scholarship in this specific subfield of LIS. Finally, Kim (2023) examined publication trends in LIS journals, highlighting major publishers in the field, including Taylor & Francis, Emerald, and Springer Nature. Kim's research identified the United States, United Kingdom, and Netherlands as leading countries in terms of publishing activity in LIS, offering a broad perspective on the current landscape of academic publishing in the field. Research on Library and Information Science (LIS) journals presents diverse analyses of journal impact, quality metrics, citation behaviors, and publication trends, collectively offering a detailed understanding of the academic landscape in this field.

3.0 Analysis and Results: This paper provides a analysis of data gathered from various sources within library and information science , aiming to deliver analysis and interpretation of the findings .

3.1 Ranking of Library and Information Science Journal by CiteScore: The table:1 focuses on journals in the field of library and information science. **CiteScore:** This is a metric used to evaluate the citation impact of a

journal. It considers the number of citations received by articles published in the journal over a specific period, usually four years. **% Cited:** This likely refers to the percentage of articles published in the journal that have been cited by other scholarly works.

Table:1 –Ranking of Library and Information Science Journal by CiteScore

S.N.	Title	CiteScore	% Cited
1	European Journal of Information Systems	23.1	94
2	International Journal of Information Management Data Insights	19.2	93
3	Information Systems Management	14.6	89
4	Journal of Cheminformatics	14.1	81
5	Information and Organization	11.2	80
6	Journal of Information Technology	10	76
7	Bottom Line	9.9	98
8	Journal of Chemical Information and Modeling	9.8	80
9	Journal of the Association for Information Science and Technology	8.3	84
10	Library Hi Tech	8.3	99

Table 1 shows ranks the top ten Library and Information Science journals based on their CiteScore and the percentage of cited articles. Journals with higher CiteScores, such as the *European Journal of Information Systems* with a CiteScore of 23.1 and 94% of its articles cited, are generally seen as more influential in the field.

3.2 Ranking of Library and Information Science Journal by SNIP : Table 2 likely focuses on ranking Library and Information Science journals. This table presents journals in a ranked order, likely based on their SNIP (Source Normalized Impact per Paper) score. **SNIP (Source Normalized Impact per Paper):** This is a citation-based metric used to evaluate the influence of a journal relative to the field it covers. It considers the number of citations received by articles in the journal, along with the average number of citations for articles in the same field.

Table: 2- Ranking of Library and Information Science Journal by SNIP

S.N.	Title	SNIP
1	European Journal of Information Systems	3.766
2	International Journal of Information Management Data Insights	3.295
3	Cataloging and Classification Quarterly	3
4	Information Systems Management	2.311
5	Journal of Cheminformatics	2.078
6	Journal of Information Technology	2.047
7	Archives and Manuscripts	2.037
8	International Journal of Multimedia Information Retrieval	1.969
9	Information and Organization	1.939
10	Journal of the Association for Information Science and Technology	1.915

Table 2 presents ranks Library and Information Science journals based on their SNIP scores. The *European Journal of Information Systems,* with a SNIP score of 3.766, is considered to have a greater relative impact within the field. This journal publishes articles that are cited more frequently compared to the average citation rate for similar journals.

3.3 Ranking of Library and Information Science Journal by SJR :- This table presents Library and Information Science Journals in a ranked order, most likely based on their SJR score. SJR (SCImago Journal Rank)**:** This metric considers both the number of citations received by a journal's articles and the prestige of the journals citing those articles. It takes into account a weighted citation network, where citations from high-impact journals contribute more to the SJR score.

Table-3: Ranking of Library and Information Science Journal by SJR

S.N.	Source title	SJR
1	European Journal of Information Systems	3.824
2	International Journal of Information Management Data Insights	2.137
3	Information and Organization	2.01
4	Journal of Cheminformatics	1.745
5	IEEE Transactions on Information Theory	1.607
6	Information Systems Management	1.598
7	Journal of Information Technology	1.443
8	Journal of Chemical Information and Modeling	1.396
9	Ethics and Information Technology	1.359
10	Journal of Informetrics	1.355

Table 3 shows ranks Library and Information Science journals based on their SJR scores. The *European Journal of Information Systems,* with an SJR score of 3.824, is considered to have a greater overall impact in the field. This journal not only publishes frequently cited articles but is also cited by other influential journals, demonstrating its broad influence.

3.4 Publishers in Library and Information Science: Table 4 focuses on identifying the leading publishers in the field of Library and Information Science, rather than ranking individual journals. This indicates the table showcases the major publishing houses for Library and Information Science materials.

Table : 4-Top Publishers in Library and Information Science

S.N.	Publisher	Frequency	% Frequency
1	Taylor & Francis	24	24%
2	Emerald Publishing	17	17%
3	Springer Nature	8	8%
4	Elsevier	6	6%
5	SAGE	5	5%
	Total	**100**	**100%**

Table 4 shows the top publishers in Library and Information Science. These publishers are known for producing a variety of materials, such as scholarly journals, in this field. Taylor & Francis is at the top publisher of the list with a frequency of 24%. Other major publishers include Emerald Publishing, Springer Nature, Elsevier, and Sage.

3.5 Top geographical distribution of publishers: Table 5 deals with the geographical distribution of publishers in the field of Library and Information Science, rather than individual journals themselves. This indicates the table ranks countries based on the number of publishers or the prominence of publishers within Library and Information Science

Table : 5- Top geographical distribution of publishers in Library and Information Science Journals

S.N.	Country	Frequency	%
1	United Kingdom	47	47%
2	United States	29	29%
3	Netherland	5	5%
4	Canada	3	3%
5	China, Germany, India	2	2%
	Total	**100**	**100%**

Table 5 represents ranks countries based on their contributions to Library and Information Science publishing. The United Kingdom, with a 47% share, ranks highest, indicating it has a significant number of prominent publishers in this field.

4.0 Discussion and Conclusion: A study was carried out to examine the impact and relevance of 100 LIS journals using CiteScore, SNIP metrics obtained from Scimago Journal & Country Rank and Journal Metrics Scopus - CiteScore database web portal to measure the impact and relevance. Using quantitative Bibliometric techniques, we used the CiteScore , the Journal Ranking tool , and the SJR to determine how these journals rank based on their citation metrics. While citation metrics are valuable, they cannot capture the full qualitative power of journals.

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TRANSFORMATIVE IMPACT OF DIGITAL TECHNOLOGIES ON LIBRARIES: REVOLUTIONIZING ACCESS, PRESERVATION AND SCHOLARLY ENGAGEMENT

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Abstract

Libraries, once bastions of printed knowledge, have evolved into dynamic centers embracing digital technologies. This paper explores how digitization, advanced information retrieval systems, digital archives, and AI-driven tools have reshaped library services. It examines their impact on access, user experience, community engagement, and scholarly communication. Challenges such as the digital divide and ethical considerations in data stewardship are addressed, alongside future directions in digital scholarship and sustainable practices. The study underscores libraries' pivotal role in advancing knowledge dissemination and supporting lifelong learning in the digital era.

Keywords: Digital libraries; Digitization; Information retrieval systems; Digital archives; Artificial Intelligence; User experience; Community engagement; Digital divide; Data stewardship; Sustainable practices

1. Introduction

Libraries have historically served as repositories of knowledge, providing access to information through physical collections. In an era characterized by rapid technological advancement, libraries have emerged as dynamic hubs of knowledge, adapting profoundly to the digital age. Traditionally bastions of printed books and repositories of physical archives, libraries today are embracing digital technologies to revolutionize how information is accessed, stored, and utilized. This transformation is not merely about digitizing collections but entails a fundamental shift in the role and function of libraries within the global information landscape. The integration of digital technologies has enabled libraries to transcend physical boundaries, offering unprecedented access to diverse collections and resources from anywhere in the world. From digitizing rare manuscripts to harnessing artificial intelligence for data analysis, libraries are leveraging technology to enhance user experiences, foster scholarly collaboration, and promote lifelong learning.

This overview explores the multifaceted impact of digital technologies on libraries and information services. It delves into key developments such as the digitization of collections, implementation of advanced information retrieval systems, creation of digital archives, and adoption of AI-driven tools. Furthermore, it examines the evolving role of libraries in promoting digital literacy, addressing challenges such as the digital divide, and navigating ethical considerations in digital stewardship. As libraries continue to evolve as vital centers of knowledge in the digital era, understanding their adaptation to digital technologies provides insights into their transformative journey and their enduring commitment to serving diverse communities and advancing scholarly inquiry.

Objectives

1. To explore the transformative impact of digital technologies on library services.
2. To examine the integration of digitization, information retrieval systems, digital archives, and AI in enhancing library functions.
3. To analyze challenges such as the digital divide and ethical considerations in digital stewardship faced by libraries.
4. To discuss future directions in digital scholarship and sustainable practices within libraries.

2. Digital Technologies Transforming Libraries

2.1. Digitization of Collections

Libraries have undertaken extensive digitization efforts to convert their physical collections—comprising books, manuscripts, journals, and archival materials—into digital formats. This process involves meticulous scanning, Optical Character Recognition (OCR), and metadata tagging to ensure that digital objects are preserved, searchable, and accessible online (Lynch, 2003). Digitization enhances preservation by reducing physical handling of fragile materials, thereby extending their longevity. Digital collections enable remote access, transcending geographical boundaries and time constraints, and provide inclusive features like text-to-speech and adjustable font sizes to cater to diverse user needs (Deegan & Tanner, 2002).

2.2. Information Retrieval Systems

Libraries employ sophisticated digital cataloging systems and online databases to manage and organize their collections efficiently (Borgman, 2000). These systems facilitate seamless searching and retrieval across diverse formats, including books, articles, multimedia, and institutional repositories. Advanced search functionalities empower users with complex queries, filtering options, and hierarchical subject classifications (Buckland, 1997). Standardized metadata schemas like MARC and Dublin Core enhance interoperability and cross-referencing of resources. Metadata enrichment through controlled vocabularies and abstracts improves resource discoverability, enhancing user satisfaction and research outcomes (Hider, 2018).

2.3. Digital Archives and Repositories

Digital archives and repositories serve as secure storage for born-digital materials and digitized content. They implement robust backup protocols, data integrity checks, and migration strategies to ensure long-term access and sustainability (Waters & Garrett, 1996). Libraries collaborate with content creators to preserve scholarly outputs, contributing to the digital scholarly record. These repositories facilitate open access to research, adhering to licensing agreements such as Creative Commons, while ensuring compliance with embargo periods (Lavoie & Dempsey, 2004). Interoperability with external repositories enhances discoverability and citation impact, amplifying scholarly influence (Smith, 2015).

2.4. Data Analytics and Artificial Intelligence (AI)

Libraries leverage data analytics and AI to enhance services and operations significantly (Bishop, 2018). AI-powered tools perform text mining, NLP tasks, and citation analysis to extract insights from textual data and assess research impact (Bollen et al., 2011). Sentiment analysis and topic modeling identify emerging research areas, informing collection development (Hirsh, 2012). Recommendation systems personalize user experiences by suggesting relevant resources based on preferences and browsing history (Koren et al., 2009). Predictive analytics optimize operations by forecasting resource demand and guiding collection development decisions (Haddow, 2014). Machine learning automates metadata management, ensuring data accuracy and accessibility (Hawkins et al., 2017).

3. Impact on Library Services

3.1. Access and Accessibility

Remote Access: Digital technologies have transformed access to library resources by enabling remote access. Users can now access a wide range of digital collections, including books, journals, and multimedia, from anywhere with internet connectivity. This capability transcends physical boundaries, allowing libraries to serve patrons globally and ensuring access to resources regardless of geographical location or time zone differences (Van Orsdel & Born, 2019).

24/7 Availability: Libraries provide round-the-clock access to their digital collections, catering to diverse user needs and preferences. This accessibility enhances convenience for users with varying schedules or those requiring immediate access to information outside traditional library hours. Users can browse, borrow, and interact with library resources at their convenience, fostering continuous learning and research activities (Chowdhury & Chowdhury, 2020).

3.2. User Experience

Personalization and Interactive Interfaces: Digital technologies facilitate personalized user experiences through interactive interfaces and customization features. Libraries can tailor services to individual preferences by recommending relevant resources based on browsing history or user interests. Interactive interfaces enhance engagement with intuitive navigation, multimedia content, and interactive learning tools that accommodate diverse learning styles and preferences (Jeng, 2018).

Virtual Reference Services and Online Tutorials: Libraries offer virtual reference services and online tutorials that enhance information literacy and support lifelong learning. Virtual reference services enable remote access to expert assistance via chat, email, or video conferencing, assisting users with research queries and navigating digital resources effectively. Online tutorials provide self-paced learning opportunities on topics from database searching techniques to digital literacy skills, empowering users to develop essential research and information retrieval skills independently (Li, 2021).

3.3. Collaborative Spaces and Community Engagement

Virtual Collaborative Spaces: Libraries create virtual collaborative spaces that facilitate teamwork, knowledge sharing, and interdisciplinary collaboration. These spaces allow users to collaborate on projects, share resources, and engage in virtual meetings or discussions regardless of physical location. Collaborative document editing platforms and video conferencing tools enhance productivity and foster innovation among researchers, educators, and community members (Harrison & Reisdorf, 2022).

Community Engagement and Outreach: Digital technologies enhance libraries' community engagement efforts through social media platforms, digital storytelling initiatives, and online events. Libraries use social media to connect with diverse audiences, promote services and events, and engage in conversations with patrons. Digital storytelling initiatives, such as virtual exhibits or digital archives, showcase cultural heritage and local history, fostering community pride and cultural exchange. Online events like webinars, author talks, and book clubs attract virtual participation, expanding outreach beyond physical library premises and cultivating a vibrant community of lifelong learners and information seekers (Yang & Ouyang, 2020).

4.Challenges and Considerations

4.1. Digital Divide

Disparities in Digital Access and Literacy: One of the primary challenges for libraries is addressing disparities in digital access and literacy among diverse communities. While digital technologies have expanded access to information, not all individuals or communities have equal access to technology or the necessary digital literacy skills to effectively navigate digital resources. This disparity can exacerbate existing socio-economic inequalities, limiting access to educational opportunities and essential information resources (Warschauer, 2003).

Efforts to Bridge the Digital Divide: Libraries are actively engaged in bridging the digital divide through various outreach programs and equitable access initiatives. These efforts include providing public access computers, Wi-Fi hotspots, and digital literacy training programs in underserved communities. Collaborations with community organizations, schools, and government agencies help extend the reach of these initiatives and ensure that all individuals have the opportunity to benefit from digital resources and services offered by libraries (Horrigan, 2009).

4.2. Privacy and Ethical Concerns

Privacy Concerns Related to User Data: Libraries must navigate privacy concerns related to the collection, storage, and use of user data in digital environments. Protecting patron confidentiality and ensuring secure access to personal information are paramount considerations. Libraries adhere to established privacy policies and data protection regulations to safeguard user privacy rights while providing access to digital resources and services (American Library Association, 2021).

Ethical Considerations in Data Stewardship: Ethical considerations arise in data stewardship practices within libraries, particularly concerning data management, copyright compliance, and open access initiatives.

Libraries must uphold ethical standards in the acquisition, use, and dissemination of digital content, respecting intellectual property rights and licensing agreements. They play a crucial role in promoting responsible data practices, transparency in information sharing, and equitable access to knowledge resources while balancing the principles of open access and intellectual freedom (International Federation of Library Associations and Institutions, 2018).

The challenges and considerations underscore the complex landscape that libraries navigate in the digital age. By addressing disparities in digital access, promoting digital literacy, and adhering to ethical standards in data stewardship, libraries can enhance their role as inclusive and trusted information hubs within their communities.

5. Future Directions

5.1. Innovation in Digital Scholarship

Support for Interdisciplinary Research: Libraries are increasingly recognized as essential partners in digital scholarship, facilitating interdisciplinary research and open science initiatives (Van Dijk, 2020). They curate and provide access to diverse digital collections, datasets, and scholarly publications, enabling collaboration across academic disciplines and promoting knowledge integration (Johnson, 2019).

Emerging Technologies in Scholarly Communication: Emerging technologies like blockchain and virtual reality (VR) hold transformative potential in scholarly communication. Blockchain technology offers secure and transparent methods for managing scholarly peer review, intellectual property rights, and digital rights management (Nakamoto, 2008). Virtual reality enhances immersive learning experiences and virtual research environments, facilitating collaborative research and data visualization (Smith et al., 2022).

5.2. Sustainable Practices

Digital Preservation and Energy-Efficient Infrastructure: Libraries prioritize sustainable practices in digital preservation and energy-efficient infrastructure management. Robust digital preservation strategies, including standardized file formats and migration protocols, ensure the long-term integrity and accessibility of digital collections (Digital Preservation Coalition, 2021). Energy-efficient infrastructure initiatives optimize data storage, server management, and computing technologies to reduce environmental impact (Environmental Protection Agency, 2020).

Collaborative Digital Stewardship: Collaborative efforts in digital stewardship involve partnerships among libraries, archives, academic institutions, and cultural heritage organizations. These collaborations enhance collective capacity in preserving and providing access to digital collections (Research Libraries UK, 2023). Shared resources, expertise, and best practices in digital preservation promote sustainable stewardship of cultural and scholarly heritage for future generations (International Federation of Library Associations and Institutions, 2019).

This overview encapsulates the transformative impact of digital technologies on libraries and highlights their ongoing adaptation to meet the challenges and opportunities of the digital age.

6. Conclusion

The adoption of digital technologies has revolutionized libraries, expanding access to knowledge beyond physical boundaries while enhancing preservation and scholarly engagement. Despite challenges such as the digital divide and privacy concerns, libraries continue to evolve as vital hubs of information, promoting digital literacy and equitable access. Future directions in digital scholarship, including interdisciplinary research support and sustainable stewardship, underscore libraries' enduring commitment to serving diverse communities and advancing scholarly inquiry in the digital age.

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A BIBLIOMETRIC STUDY ON DATA REPOSITORIES AND DATA SHARING PLATFORMS

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Abstract

The present study is based on the Bibliometric analysis of 361 research article published in Web of Science on Dublin Core during the period of 2019-2023. This Study will review on Annual Growth Rate (AGR) wise distribution, year-wise distribution, Authorship pattern of contributions, Author wise distribution, country-wise distribution, Document Types of the article, Languages of Article wise distribution. The findings must reveal various aspects of the characteristics and patterns of contributions of the study.

Keywords: Bibliometric, Data Repositories, Data Sharing Platforms, Authorship pattern.

Introduction

Pritchard (1968) "Application of mathematical methods to books and other media of communication." Bibliometrics is a fast-developing area in information science, which is defined as a discipline that investigates the properties and behaviour of information. Bibliometrics Constitutes one of the major thrusts of research in the field of library and information science. It utilizes quantitative analysis and statistics to describe patterns of publications within a given field or body of literature. Knowledge is dynamic and multidimensional in nature. The new researches and the thirst for knowledge has led to the generation of new work.

Bibliometrics Constitutes one of the major thrusts of research in the field of library and information science. It utilizes quantitative analysis and statistics to describe patterns of publications within a given field or body of literature. A technique has emerged to identify the patterns of publications, authorship, citations used for a subject, etc. which is known as Bibliometrics. Bibliometric studies in recent years have attained significance because of its practical application in the evaluation of library operation and services, as a statistical and mathematical technique. It has extensive application in library and information field in identifying the research trends in particular subject, trends in authorship and collaboration research core journals, author's productivity, obsolescence and scattering of literature. It has extensive application in library and information field in identifying the research trends in particular subject, trends in authorship and collaboration research core journals, author's productivity, obsolescence and scattering of literature.

Definitional Analysis

Bibliometric

I.N. Sengupta (1985) "Organization, Classification and Quantitative evaluation of publication patterns of all macro communication along with their authorship by mathematical and statistical calculus." 'Alan Pritchard' in 1969 has coined the term bibliometrics. In general, Bibliometrics is that branch of science, which studies the behaviour of information. Bibliometric studies in recent years have attained significance because of its practical application in the evaluation of library operation and services, as a statistical and mathematical technique. This study is helpful in management of scientific literature measuring the utility of periodicals and relationship between journals and subject area and also in knowing the most productive contribution in a given field.

Data repositories and Data Sharing Platforms

A data repository is also known as a data library or data archive. This is a general term to refer to a data set isolated to be mined for data reporting and analysis. The data repository is a large database infrastructure several databases that collect, manage, and store data sets for data analysis, sharing and reporting.

Data sharing is the ability to make the same data available to one or many consumers. The ever-growing amount of data has become a strategic asset for any company. Sharing data within business units as well as consuming data from external sources is an enabling technology for new business opportunities.

Web of Science

Web of Science (WoS) is the world's oldest, most widely used and authoritative database of research publications and citations. Web of Science, previously known as Web of Knowledge, is a database of bibliographic citations of multidisciplinary areas that covers the various journals of medical, scientific, and social sciences including humanities. Based on the Science Citation Index, founded by Eugene Garfield in 1964, it has expanded its selective, balanced, and complete coverage of the world's leading research to cover around 34,000 journals today. A wide range of use cases are supported by WoS from daily search and discovery by researchers worldwide through to the supply of analytical datasets and the provision of specialized access to raw data for bibliometric partners. A long- and well-established network of such partners enables the Institute for Scientific Information (ISI) to continue to work closely with bibliometric groups around the world to the benefit of both the community and the services that the company provides to researchers and analysts

Methodology

Methodology means study of method or a system of methods and rule applicant to research or work. It is connected basically with what principles and technique to be follow for collecting data information and material for a given research project. (Kothari, 1990). For the present study quantitative research method is used. It is also used as a way to research in different aspects of education.

Literature Review

Tupe S. K & Khaparde V. S, 2016 analysed 217 articles with 4813 references in Information Technology and Libraries on DOAJ from 2005 to 2014 (10 volumes & 40 issues). Most articles (57.14%) had single authors. The USA had the highest output with 178 publications (82.03%). The mean relative growth rate for 2010-2014 was 0.13, indicating a reduction. Doubling time (Dt (p)) increased from 1.00 in 2006 to 7.70 in 2014. The mean doubling time for 2005-2009 was 1.69, increasing to 5.69 for 2010-2014. The majority of references (3154) were print, while 1659 were web references. **Gaikwad Deepa N. and Khaparde Vaishali .S. (2019)** were studied in scientometric analysis on mapping of plagiarism research output in India. The Study analysed the plagiarism research performance of India in national as well as global Context, Focused on geographical distribution that the most of the publication are from USA with 19.32% the study explained that the solo Research is predominant than the collaborative research and the degree of collaboration is 0.87 also shows that the Relative growth rate [R (A) is (0.346) while the Doubling time DT (A) gradually increased from (1.548) that shows rate of publication was decreased, the Doubling time was increased. **Yadav, Sunil Kumar et. al. (2019),** Observed the collaboration research of 578 articles during the study period (2008-2017) of the SRELS Journal of Information Managements. The majority of articles involved collaboration, with a maximum of 292 (50.52%) being two-author collaborations. Out of the total articles, 382 (66.09%) were contributed by two or more authors. Metrics such as collaboration index, degree of collaboration, collaboration coefficient, modified collaboration coefficient, activity index, relative growth rate, and doubling time were calculated. The study revealed an average collaboration index of 1.86, average degree of collaboration of 0.66, average collaboration coefficient of 0.36, average relative growth rate of 0.32, and average doubling time of 3.40. The findings suggest a prevalence of joint authorship and a high collaboration coefficient, indicating the predominance of team research in the journal. **Singh,(2007)**Bibliometrics involves the quantitative analysis of the literature of a subject domain, as represented by bibliographic entries such as keywords, classification codes, authors and citations, purposes of the bibliometrics study is to find out the growth and characteristics of digital library literature. The major objectives of the bibliometrics study is to find out authorship pattern, author productivity, prolific authors, core journals in subject area, indexing terms frequency, Bradford distribution of articles, year-wise distribution of articles, language-wise distribution of articles and country-wise distribution of journals.

Objectives of the Study: - According to the specific field Like Year, Most Productive Author, country-wise distribution etc. objectives of the study categorized are as follows-

- To estimate the Annual Growth rate (AGR) of publication
- To distributing Authorship Productivity
- To find out the authorship and degree of collaboration pattern in the publication
- To find out country-wise distribution of publication
- To estimate Document form of Distribution of publication

- To study the growth Rate (GR) and doubling time (DT) of publications
- Language wise distribution

Hypothesis of the Study: The following hypotheses are formulated for the present study:

1) USA is the high productive country.
2) Research Articles are major source of data.

Scope and Limitation of the Study: The present study is based on Bibliometric study. The scope of the present study is limited to the 361 articles covered on 'Data repositories and Data Sharing Platforms' on Web of Science Database during the total Five years i.e. (2019-2023)

Data Collection: The list of Articles on Data repositories and Data Sharing Platforms were collected from the web of science Database the latest Five Years from 2019-2023 with adequate details such as applied Annual Growth rate (AGR), Degree of Collaboration and also Estimate Relative Growth rate, Doubling Time (RGR & DT) various other analysis done on basis upon data collected. These have been classified grouped and analysed to find the various dimensions of the study.

Data Analysis: The analysis will be done as per the parameters laid down in the objectives of the study. The data collection & analysis is done for Data repositories and Data Sharing Platforms a Bibliometric study of total 361 articles was collected & was analysed as per the objective laid down as well as by using various statistical tools.

Annual Growth Rate (AGR) wise distribution

The growth rate is a measurement which is essential in any field. In meaning the growth of the number of publications in a particular discipline. This is often a measure of the annual increase or decrease. Here, the AGR has been determined as per the formula given below:-

AGR= (End value – First value) / (First Value) X 100

Table-1.Annual Growth Rate Wise Distribution

Year	Frequency	Annual Growth Rate %
2019	65	
2020	59	-9.23
2021	79	33.89
2022	87	10.12
2023	71	-18.39

In this Table 1. Describe the Annual growth rate of each year according to published paper during particular year. These tables revels that the AGR of 2020 is -9.23 followed by 2021 are 33.89, followed by 2022 are 10.12 & in the year 2023 with -18.39 are indicated.

Authorship Productivity

Table -2 Most Productive Author

Authors	Total	Percentage
Evans AC	4	0.13
Zhang Y	4	0.13
Ames DP	3	0.09
Das S	3	0.09
Davidson SC	3	0.09
Duncan D	3	0.09

Hermjakob H	3	0.09
Memar S	3	0.09
Toga AW	3	0.09
Wang L	3	0.09
Zhang GQ	3	0.09
Zhang Z	3	0.09
Author Publishing Two (2x108)	216	6.82
Author Publishing Single (1x2914)	2914	91.98
Total	**3168**	**100**

Table no. 2 shows that, the Author names, the total 3168 authors has published the papers in the Web of Science databases on information resources during 2019-2023, the most productive authors are three they, Evans AC & Zhang Y who has the highest number 4(0.13%) publication with single times author publication 2914 (91.98%) publication

Year- Wise Degree of Collaboration of Articles

Different methods have been used in research studies to determine the degree of research collaboration. The formula suggested by Subramanyam (1983) has been used in this research.

The formula is where

The degree of collaboration C =Nm/ (Nm+Ns)

C = Degree of collaboration

Nm = Number of multiple authors

Ns= Number of single authors

Here, Nm = 345

Ns = 16

C=345/ (345+16) = 0.95

Thus, result show the average degree of author collaboration of Thus, result show the average degree of author collaboration of Congenital Rubella Syndrome is 0.95 which is clearly indicates its dominance upon multi - authored articles.

Table -3 Year- Wise Degree of Collaboration of Articles

Year	No. of Articles	Total No. of Authors	No. of Single Author Article	Percentage of Articles	No. of Multi Authored Articles	Percentage of Article	Degree of Collaboration
2019	65	526	3	0.83	62	17.17	0.95
2020	59	426	4	1.11	55	15.24	0.93
2021	79	819	4	1.11	75	20.78	0.95
2022	87	710	3	0.83	84	23.27	0.97
2023	71	649	2	0.55	69	19.11	0.97
	361	**3130**	**16**	**4.43**	**345**	**95.57**	**0.95(Mean)**

The Table No.3 represents the year wise number of multi-authored articles and their degree of collaboration. In the study, the degree of collaboration of all years is almost same of the mean value as 0.95. Table shows that in the 5 years of period the multi authored articles 84 (23.27%) are highest in the year 2022.

Country-wise Distribution of Publication

Table -4 Country-wise distribution of publication

Sr. No	Country	Frequency	Percentage
1	Abu Dhabi	1	0.28
2	West Asia	1	0.28
3	Egypt	1	0.28
4	Israel	1	0.28
5	Jordan	1	0.28
6	Kenya	1	0.28
7	Mexico	1	0.28
8	Nigeria	1	0.28
9	Pakistan	1	0.28
10	Russia	1	0.28
11	Singapore	1	0.28
12	Tanzania	1	0.28
13	Balkans	2	0.55
14	Greece	2	0.55
15	Taiwan	2	0.55
16	Turkey	2	0.55
17	Japan	4	1.11
18	Portugal	6	1.66
19	South Korea	7	1.94
20	South America	8	2.22
21	France	8	2.22
22	South Africa	8	2.22
23	Spain	8	2.22
24	Asia	9	2.49
25	India	11	3.05
26	Oceania	16	4.43
27	Germany	20	5.54
28	Italy	20	5.54
29	United Kingdom	24	6.65
30	China	25	6.93
31	North America	27	7.48
32	Europe	42	11.63
33	USA	98	27.15
Total		**361**	**100**

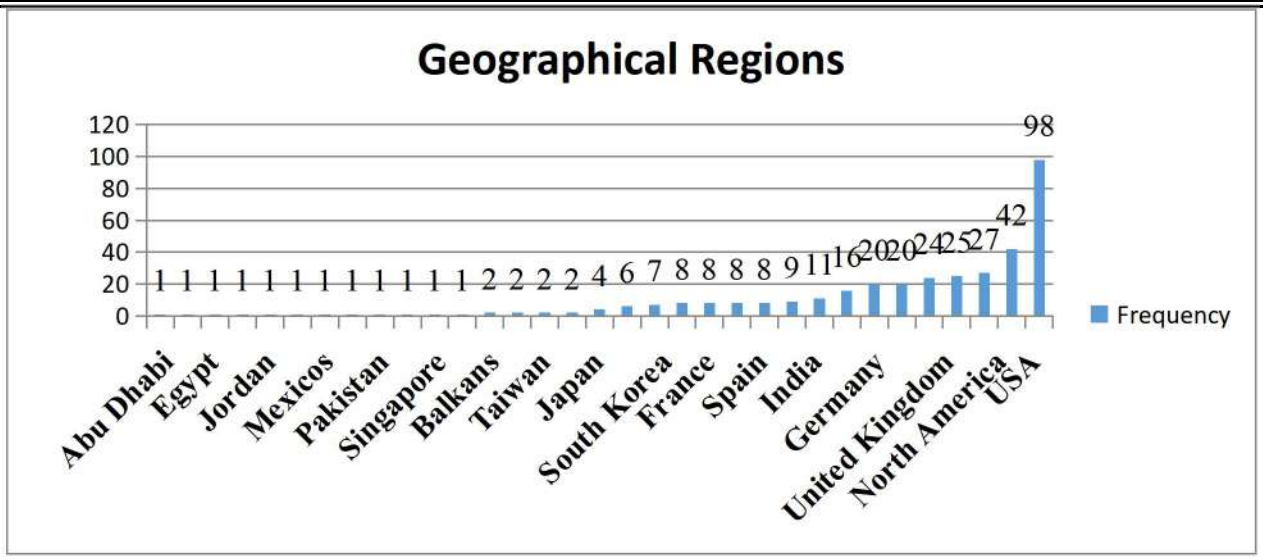

Figure No. 1 Country-wise distribution of publication

Certain Countries give more research output in a particular subject than others. This is very much useful not only for the information manager in finalizing the subscription list of periodicals but also for the research scholars as they tend to know the countries that are leaders in their respective field of research. The study regarding the country wise distributions has been done in order to know the most dominant countries in which the information is available.

Table No.4 reveals that USA with 98(27.15), Europe 42(11.63), North America 27(7.48) than China 25(6.93) as per as follows in table & Geographical Maps. Where in which Hypothesis No.1 is valid, "Majority of the contributions are contributed by USA" in Table no.4 and Figure no.1

Estimate Document form of Distribution of publication

Table No.5 Form wise distribution of Article

Document Types	Record Count	Percentage
Article	250	69.25
Proceeding Paper	62	17.17
Review Article	34	9.42
Early Access	6	1.66
Data Paper	5	1.39
Editorial Material	2	0.55
Book Chapters	1	0.28
Retracted Publication	1	0.28
Total	**361**	**100**

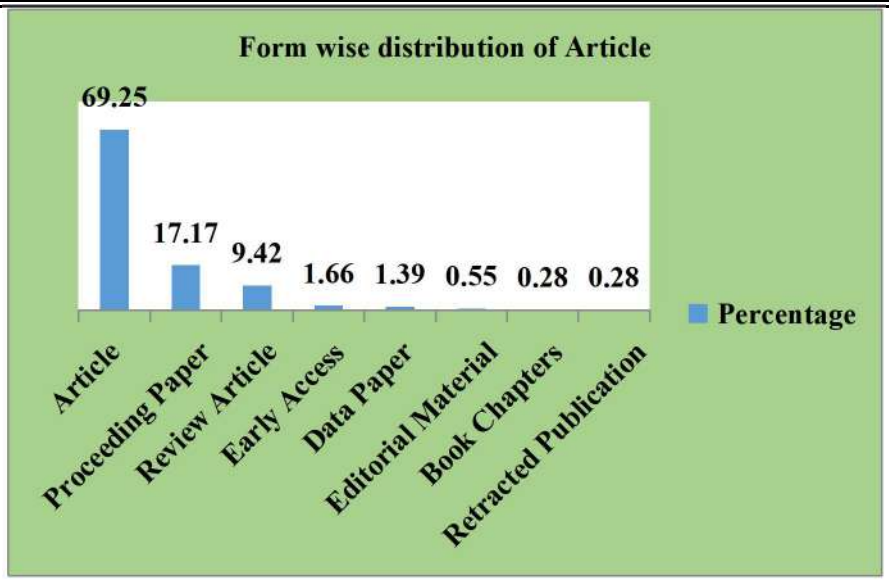

Figure No.02 Form wise distribution of Article

Table No. 5 & Figure No.02 The main objective of this analysis is to know the forms in which the literature on this particular subject is being published. This study helps the information scientists/librarians in knowing the most productive form of literature on the subject. The distribution of all publications among different forms are presented in table no. 5 the highest 250 (69.25%) number of publication has been published in research article followed by Proceeding Paper with 62 (17.17%) publications, Review Article with 34(9.42%), and so on presented in this Table. **Hence the Hypothesis, "Research articles are the major source used in maximum" (Hypothesis No. 2) is Valid.**

Relative Growth Rate (Rgr):

The Relative Growth Rate (RGR) is the increase in number of articles/ pages per unit of time. This definition is derived from the definition of relative growth rates in the study of growth analysis of individual plants and effectively applied in the field of Botany Hunt (1919), Blackman (1919) defined, which in turn had its origin from the study of the rate of interest in the financial investment. The mean Relative Growth rate (R) over the specific period of interval can be calculated from the following equation.

R

1-2 = Loge 2 W - loge IW

Whereas,

1-2 R = mean relative growth rate over the specific period of interval.

Loge IW = log of initial number of Articles.

Loge 2 W = log of final number of articles after a specific period of interval.

2 T - 1 T = the unit difference between the initial time and final time.

The year can be taken here as the unit of time. The RGR for articles is hereby circulated.

Therefore,

1-2 (aa-1 year-1) can represent the mean relative growth rate per unit of year over a specific period of interval.

Doubling Time (Dt)

There exists a direct equivalence between the relative growth rate and the doubling time. If the numbers of articles/pages of subject double during a given period then the difference the logarithms of numbers at the beginning and end of this period must be logarithms of number 2. If natural logarithm is used this difference has a value of 0.693. Thus the corresponding doubling time for each specific period of interval and for both articles and pages can be calculated by the formula,

Doubling time (Dt) = 0.693/ R (A)

Therefore,

Doubling time for articles D (t) = 0.693/1-2 R (aa-1 year-1)

Table No. 6: Relative Growth Rate and Doubling Time of Publication

Year	No. of Articles	Cumulative No. of Articles	Loge 1	Loge2	[R)(P)	Mean [R(P)]	[Dt(P)]	Mean [Dt(P)]
2019	65	65		4.17				
2020	59	124	4.17	4.82	0.65		1.07	
2021	79	203	4.82	5.31	0.49	0.34	1.41	1.53
2022	87	290	5.31	5.66	0.35		2.00	
2023	71	361	5.66	5.88	0.22		3.15	

From the table no.6 no, it noticed that the mean relative growth for the first five years 2019 to 2023 is (0.34). While the Doubling time for different years [DT (A)] gradually increased from (1.53).Thus as the rate of growth of publication was decreased, the corresponding Doubling Time was increased

Table No 7 Language wise distribution

Languages	Record Count	Percentage
English	360	99.72
Croatian	1	0.28

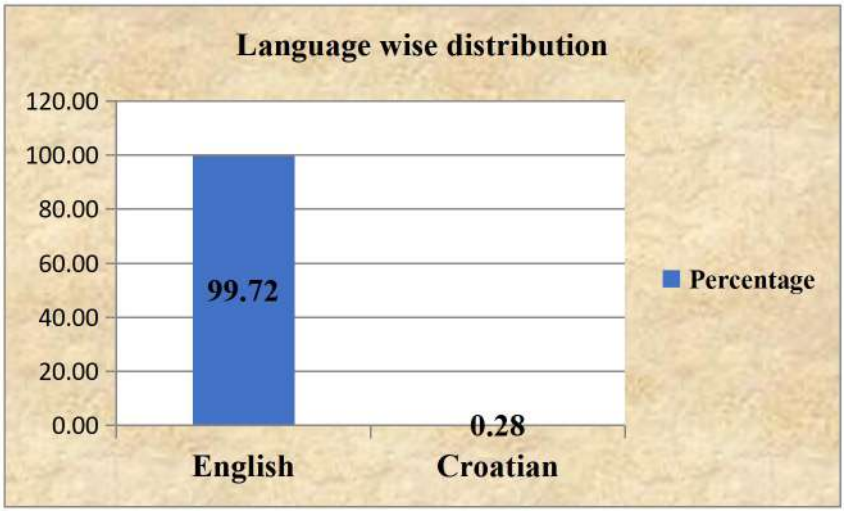

Figure No.02 Language wise distribution

From table 7 & Figure No 2 show that, the language wise distribution of Article on Web of Science. Total 361 Article were published in "Data repositories and Data Sharing Platforms" from 2019 to 2023. The 360(99.72%) the articles were published in English language.

Conclusion:

Bibliometrics relatively new subject of information. It helps to evaluate information & to handle the information in libraries and information centers by the quantitative analyzed information. It deals with the mathematical and statistical analysis. This is an umbrella term used for many studies where quantitative method or techniques are used to investigate various aspect of written document. We concluded that the present study is based on Data repositories and Data Sharing Platforms. During the period of five years in the Web of Science. This study is completed with the help of Excel. this study is helpful for researches as well as information scientists. it is good and informative for the researcher.

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LIBRARIES IN DIGITAL ERA: SCIENTOMETRICS OUTPUTS

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Abstract

The development of information in the digital era forces librarians to change their roles to become information professionals who have modern skills to face challenges in the digital environment. This study aimed to determine the extent of the studies conducted on libraries in digital era and to find out the trend of topics each year, and the social networks of the authors. The method used was Scientometric analysis using a single search in the web of science database. Articles were searched using the terms “libraries in digital era” in the title. The data obtained were 630 publications from 1993 to 2024. The results of this study showed that in 1993 and 2024 the largest number of publications were 76 with new york country ,630country contributed in paper. In addition, the total no of articles is counted 630 and document wise articles, review, proceeding papers languages are counted according to data published. Journals are counted in this paper top rank journal COMM COM INF SC with 22 frequencies.

I-Introduction

The scientometric research productivity and scholarly communication on library and information science papers indexed in the Web of Science and Scopus database from 1993 to 2024 are explored in this article. The main focus of scientometric research in the field of library science was on the range of research production over time. This paper presents a scientometric analysis to know Libraries in digital era the growth of publications, most prominent authors, most preferred journals, country and Institute collaboration etc.

Key Words- Scientometrics, Library in digital Era.

II. Review of Literature

Kasyapa (1998) reported that chilli + garlic solution and NSKE spray were the common practices used by local farmers for pest management. Among different botanicals tested by Sridevi (1998), NSKE (5%) proved to be effective in reducing sucking pests’ population in sunflower and all botanicals were found to be safer to natural enemies and pollinator Mallikarjun Rao et al. (1998) reported the effectiveness of garlic extract in combination with other extracts like neem, chilli, ginger, tobacco and cow urine against H. armigera and S. litura upto 13 day of spray

Sudhakar et al. (1998) observed the effect of fertilizer and insecticides on brinjal shoot and fruit borer Leucinodes orbonalis Guane. Among the different treatments shoot infestation and per cent fruit damage was least in soil application of neem cake (2 t/ha) and this was on par with vermicompost @ 6.6 t/ha.

Narayanasamy (1999) studied the insecticidal activity of 23 selected traditional pest control practices (plant extracts) against pests of rice viz., brown plant hopper and leafhopper under laboratory condition. The most effective practices against brown plant hopper was spraying the extract of garlic + kerosene (39.29% mortality) followed by neem oil and rice bran + kerosene Natarajan et al. (2000) studied the efficacy of some botanicals like NSKE, garlic kerosene extract and Vitex extract against the leafhopper, A. biguttula biguttula on okra and found that garlic kerosene extract recorded the lowest number of leafhoppers.

Patel et al. (2003a) studied that cow urine has some insecticidal properties but it needed enrichment to enhance this effect therefore cow urine alone and with some plant extract and some botanical preparation were tested against Lipaphis and the results proved to be significantly superior over control in reducing the Lipaphis populations.

Patel et al. (2003b) tested the efficacy of cow urine alone and in combinations with some plant extracts against sucking pests of cotton.The results revealed that all the treatments proved significantly superior to control to reduce the sucking pests population.It was also found that although,applications of cow urine 20 per cent alone was found to be effective to reduce the aphid population,its insecticidal effect could be further enhanced by enriching it with

other botanical products.Further it was concluded that enrichment of cow urine with various botanicals enhanced the insecticidals property.

Purwar and Yadav (2003) determined the efficacy of pesticides from different origin against tobacco caterpillar Spodoptera litura on soybean.Conventional synthetic insecticides i.e.Dimlin (Diflubenzuron).Entomo-pathogenic fungi Beaveria bassiana showed more effectiveness than botanical i.e neem seed kernel extract and animal origin pesticides i.e. cow urine and cow dung ash for suppressing the population of tobacco population.

Shukla et al., (2003) tested the efficacy of different botanicals formulations in combination with cow urine against sucking pests and capsule borer. Results revealed that the sucking pest population was significantly low in 10 and 20 per cent cow urine treatments however efficacy of cow urine was higher when it was fortified with various plant products

Mandal and Mandal (2010) reported the efficacy of insecticides against mustard aphid, Lipaphis erysimi Kalt.Difenthiuron 50 WP@50g a.i/ha proved most effective in managing the aphids incidence and realizing higher yield of mustard(10.70q/ha)followed by thiamethoxam 25 WG@25g a.i/ha(10.53 q /ha) and acetamiprid 25 SP@40 g a.i /ha (10.12 q/ha)Treatments viz.imidacloprid 200 SL@50g a.i/ha and betacyfluthrin 25 SC@25 g a.i /ha were comparatively less effective in reducing the pest population and they were statistically equaly in realizing the yield of mustard but superior to achook 0.15 EC@800g a.i/ha(8.68)q /ha and dimethoate 30 EC@400g a.i /ha(8.85 q /ha) Satyanaryana et al. (2010) studied the incidence of Spodoptera litura in terms of larval population which showed non-significant relationship with maximum temperature, relative humidity wind speed spiders and coccinellid predatory beetles, but significant relationship with minimum temperature.The result of chemical control trials indicated that emamectin benzoate 0.00725% was the most effective treatment followed by indoxacarb 0.0145% and indoxacarb 0.00725%, novaluron 0.005% in reducing the larval population of S. litura.

Table no 1 Publications wise Contribution

Sr.no	Publisher Country	Frequency	%
1	NEW YORK	76	12.06
2	BINGLEY	57	9.05
3	CHAM	34	5.40
4	LONDON	32	5.08
5	ABINGDON	28	4.44
6	PARIS	23	3.65
7	BERLIN 30	23	3.65
8	AMSTERDAM	21	3.33
9	CHICAGO	15	2.38
10	MOSCOW	14	2.22
11	HERSEY	14	2.22
12	CEDEX A	14	2.22
13	BASEL	14	2.22
14	OXFORD	13	2.06
15	HOBOKEN	11	1.75
16	BALTIMORE	11	1.75
17	SAWSTON	9	1.43
18	DELHI	9	1.43
19	ATHINA	9	1.43
20	PISCATAWAY	7	1.11

21	LOS ALAMITOS	6	0.95
22	GOTTINGEN	6	0.95
23	DORDRECHT	6	0.95
24	BRISTOL	6	0.95
25	Five time city 7*5	35	5.56
26	Three time city 7*3	21	3.33
27	Two time city 2* 25	50	7.94
28	one time city 1* 66	66	10.48
Total		630	100.00

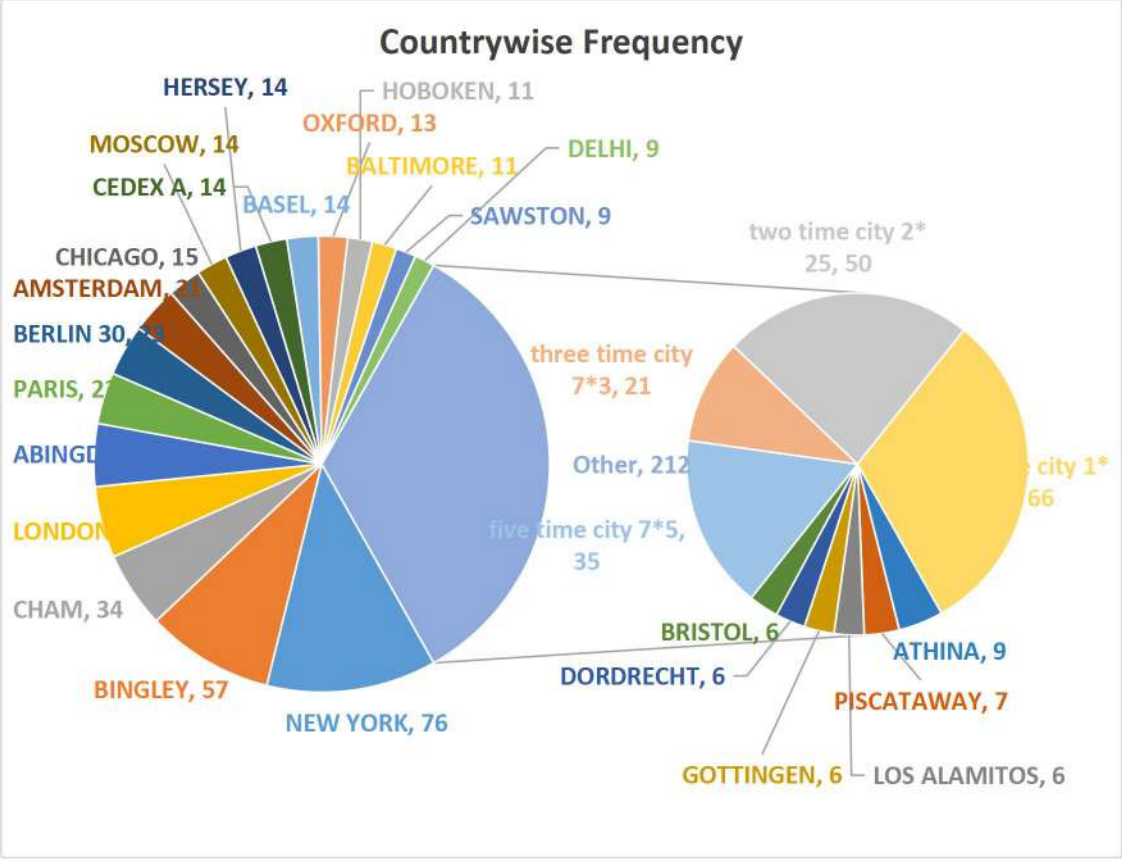

Fig no. 1 1

Distribution the data covers 630 total entries. there are 28 distinct locations from the worlds. Top Publishers, New York is the leading publisher location with 76 entries (12.06% of the total). Bingley follows with 57 entries (9.05%). Cham, London, and Abingdon round out the top 5 with 34 (5.40%), 32 (5.08%), and 28 (4.44%) entries respectively. Geographical Spread: The list includes cities from various countries, indicating a global distribution of publishers. There's a strong presence of English-speaking countries (USA, UK) and European cities. Frequency Groups, the table includes grouped data for cities appearing multiple times, 66 cities appear only once (10.48% of total), 25 cities appear twice (7.94% of total), 7 cities appear three times (3.33% of total), 7 cities appear five times (5.56% of total). Concentration the top 10 locations account for about 51% of all entries, suggesting a moderate concentration in major publishing centers. Notable Points Some major publishing cities like London (5.08%) and Oxford (2.06%) have lower percentages than might be expected. There's a significant presence of smaller or less traditional publishing locations (e.g., Cham, Bingley). Geographical Diversity: While Western countries dominate,

there's representation from other regions (e.g., Moscow, Delhi). Data Representation: The use of grouped data for less frequent cities helps to summarize the long tail of the distribution efficiently.

This data suggests a publishing landscape that is globally distributed but with significant concentrations in certain key locations, particularly in the United States and Europe. The presence of both major cities and smaller locations indicates a diverse publishing ecosystem.

Table No. 2-Formwise Distribution

sr.no	Document Type	No of documents	total
1	Article	266	42.22
2	Proceedings Paper	204	32.38
3	Article; Early Access	57	9.05
4	Article; Book Chapter	44	6.98
5	Review	26	4.13
6	Review; Early Access	12	1.90
7	Book Review	6	0.95
8	Article; Proceedings Paper	5	0.79
9	Editorial Material	3	0.48
10	Article; Retracted Publication	2	0.32
11	Review; Book Chapter	1	0.16
12	Meeting Abstract	1	0.16
13	Editorial Material; Early Access	1	0.16
14	Editorial Material; Book Chapter	1	0.16
15	Article; Data Paper	1	0.16
total		630	100.00

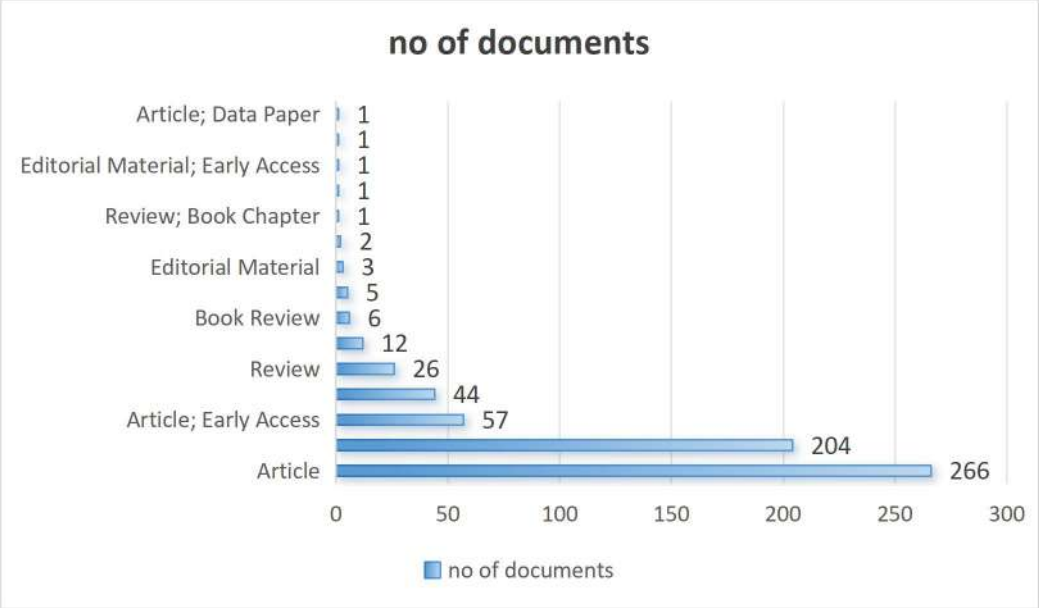

Fig No 2. 1

From table no 2 and figure no 2.2 shows the distribution of different document types:

Total Documents: The table represents a total of 630 documents. Document Type Distribution Articles are the most common document type, accounting for 266 documents (42.22% of the total). Proceedings Papers are the second most frequent, with 204 documents (32.38%). These two categories combined represent nearly 75% of all documents. Early Access, there's a significant number of Early Access, documents 57 Articles (9.05%), 12 Reviews (1.90%) 1 Editorial Material (0.16%) In total, Early Access documents account for 11.11% of all documents, indicating a notable portion of new or upcoming publications. Book Chapters: There are 44 Article; Book Chapters (6.98%)1 Review; Book Chapter (0.16%) 1 Editorial Material; Book Chapter (0.16%) Book Chapters in various forms constitute 7.30% of the total. Reviews: Standard Reviews account for 26 documents (4.13%) When combined with Review; Early Access and Review; Book Chapter, reviews make up 6.19% of the total. Less Common Types: Book Reviews: 6 documents (0.95%) Article; Proceedings Paper: 5 documents (0.79%) Editorial Material: 3 documents (0.48%) Several document types appear only once, each representing 0.16% of the total. Unique Categories: There are some interesting unique categories like: Article; Retracted Publication (2 documents, 0.32%) Meeting Abstract (1 document, 0.16%)

Article; Data Paper (1 document, 0.16%). Hybrid Categories: Several entries are hybrid categories (e.g., Article; Book Chapter, Article; Proceedings Paper), suggesting some documents span multiple classification types. Research Output: The high number of articles and proceedings papers (74.6% combined) indicates a strong focus on original research output. Publication Lifecycle: The presence of Early Access documents across different types suggests an emphasis on rapid dissemination of new research.

This data provides insight into the types of academic or scientific documents in this collection. It shows a clear preference for traditional research outputs (articles and proceedings papers), but also indicates a diverse range of document types, including newer formats like data papers and early access publications. The distribution suggests a comprehensive collection covering various aspects of academic publishing.

Table No. 3 Language wise Distribution

Sr. No	Language	Total	Percentage
1	English	581	92.22
2	Russian	18	2.86
3	Spanish	7	1.11
4	French	5	0.79
5	Chinese	5	0.79
6	Italian	3	0.48
7	German	2	0.32
8	Croatian	2	0.32
9	Unspecified	1	0.16
10	Ukrainian	1	0.16
11	Swedish	1	0.16
12	Portuguese	1	0.16
13	Japanese	1	0.16
14	Bulgarian	1	0.16
15	Afrikaans	1	0.16
		630	100

From above table 3 we can conclude that given data or literature published. The distribution of languages for a set of 630 documents or publications. Total Documents 630 documents are analyzed with this article. English is

overwhelmingly the most common language, with 581 documents (92.22% of the total). This suggests that English is the primary language of communication in this field or publication set. Language Diversity: Despite English dominance, the table shows 14 other languages represented. This indicates some level of linguistic diversity, albeit limited. Second Most Common Language: Russian is the second most frequent language, with 18 documents (2.86%). This is significantly less than English but notably more than other non-English languages. Other Major Languages: Spanish: 7 documents (1.11%) French and Chinese: 5 documents each (0.79% each)- These represent the next tier of language frequency after English and Russian.

European Languages: Several European languages are represented, including Italian, German, Croatian, Swedish, and Portuguese. This suggests a European influence or focus in the publication set. Asian Languages: Chinese and Japanese are present, indicating some representation of Asian languages. Rare Occurrences: 7 languages (Ukrainian, Swedish, Portuguese, Japanese, Bulgarian, Afrikaans, and an unspecified language) appear only once each. These single occurrences (each 0.16%) highlight the presence of less common languages in the dataset. Language Distribution: After English (92.22%), the remaining 7.78% is distributed among 14 other languages. This shows a long tail distribution with many languages having very small representation. Implications: The strong dominance of English suggests this might be an international or English-centric publication set. The presence of multiple languages, even in small numbers, indicates some level of global reach or contribution. This data suggests a publication landscape that is heavily English-centric but with a small yet diverse representation of other languages. It may reflect the global nature of the field, with English serving as the primary language of communication, but also showing contributions from various linguistic communities.

Table No. 4 Journal Wise Contribution

SR.NO	JOURNAL NAME	FREQUENCY	%
1	Comm Com. Inf Sc.	22	4.06
2	Nauchnye Tek Bibl	14	2.58
3	Epj Web Conf	14	2.58
4	Adv Soc Sci Educ Hum	13	2.40
5	Lect Notes Comput Sc	10	1.85
6	Qual Quant Methods L	9	1.66
7	Libr Manage	9	1.66
8	Libr Hi Tech	9	1.66
9	Ifla Publ	9	1.66
10	Desidoc J Lib Inf Te	9	1.66
11	J Acad Libr	8	1.48
12	Glob Knowl Mem Commu	8	1.48
13	Adv Libr Inf Sci	8	1.48
14	Chand Publ Soc Media	7	1.29
15	Portal-Libr Acad	6	1.11
16	Libr Trends	6	1.11
17	Interlend Doc Supply	5	0.92
18	Ifla J-Int Fed Libr	5	0.92
19	Electron Libr	5	0.92
20	Coll Res Libr	5	0.92
21	Acm-Ieee J Conf Dig	5	0.92
22	four times journals 4*7	28	5.17

23	three times journals 11*3	33	6.09
24	two times journals 40*2	80	14.76
25	one time journal	215	39.67
Total		542	100.00

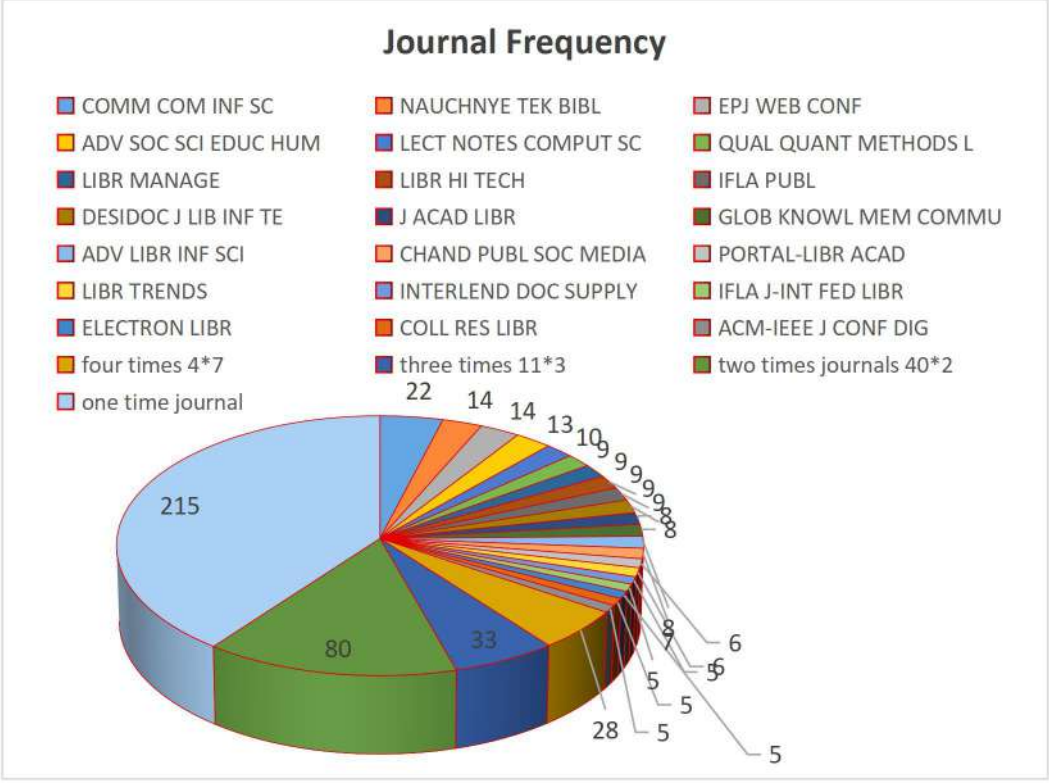

Fig No.4 1 Journal wise Distribution

Distribution of publications across various journals. total Publications: The dataset includes 542 publications in total. Journal Distribution: there are at least 83 unique journals represented (21 listed individually, plus grouped entries for journals appearing 1-4 times). top Journals: "Comm Com. Inf Sc." is the most frequent journal with 22 publications (4.06% of total) "Nauchnye Tek Bibl" and "Epj Web Conf" tie for second place with 14 publications each (2.58%). "Adv Soc Sci Educ Hum" follows with 13 publications (2.40%). Concentration: The top 5 journals account for 13.47% of all publications. The top 21 individually listed journals represent 32.31% of the total. Long tail Distribution: There's a significant "long tail" in the distribution: 215 publications (39.67%) are in journals that appear only once. 80 publications (14.76%) are in journals that appear twice. 33 publications (6.09%) are in journals that appear three times. 28 publications (5.17%) are in journals that appear four times. Diversity of Publications: The long tail suggests a wide variety of journals being used for publication, indicating a diverse field or research area. Subject Areas: Based on journal names, there seems to be a focus on library and information science, computer science, and social sciences. Some journals suggest a technical or digital focus (e.g., "Libary Hi Tech", "Electron Libr"). Conference Proceedings: Some entries like "Epj Web Conf" and "Lect Notes Computer Science" suggest the inclusion of conference proceedings, not just traditional journals. International Scope: The presence of "Ifla" (International Federation of Library Associations) journals suggests an international scope. "Nauchnye Tek Bibl" appears to be a non-English title, indicating some linguistic diversity. Publication Strategy: The spread across many journals, with a high number of single-publication journals, might indicate a strategy of broad dissemination or could reflect the interdisciplinary nature of the research. Core Journals: Journals appearing multiple times (5 or more) could be considered "core" journals in this field, representing about 32.31% of all publications. This data suggests a field with a few core journals but also a wide range of publication venues. It

indicates a diverse and possibly interdisciplinary area of study, with a mix of traditional journal publications and potentially conference proceedings.

Results:

1. Top Publishers, New York is the leading publisher location with 76 entries (12.06% of the total). Bingley follows with 57 entries (9.05%). Cham, London, and Abingdon round out the top 5 with 34 (5.40%), 32 (5.08%), and 28 (4.44%).
2. This data suggests a publishing landscape that is globally distributed but with significant concentrations in certain key locations, particularly in the United States and Europe.
3. Concentration the top 10 locations account for about 51% of all entries, suggesting a moderate concentration in major publishing centers. Notable Points Some major publishing cities like London (5.08%) and Oxford (2.06%) have lower percentages than might be expected.
4. Document Type Distribution Articles are the most common document type, accounting for 266 documents (42.22% of the total).
5. The high number of articles and proceedings papers (74.6% combined) indicates a strong focus on original research output.
6. English is overwhelmingly the most common language, with 581 documents (92.22% of the total). This suggests that English is the primary language of communication in this field or publication set.
7. Despite English dominance, the table shows 14 other languages represented. This indicates some level of linguistic diversity.
8. Top Journals such as "Comm Com. Inf Sc." is the most frequent journal with 22 publications (4.06% of total) "Nauchnye Tek Bibl" and "Epj Web Conf" tie for second place with 14 publications each (2.58%). "Adv Soc Sci Educ Hum" follows with 13 publications (2.40%).
9. There's a significant "long tail" in the distribution: 215 publications (39.67%) are in journals that appear only once. 80 publications (14.76%) are in journals that appear twice. 33 publications (6.09%) are in journals that appear three times. 28 publications (5.17%) are in journals that appear four times.

Conclusion:

1. This scientometric study provides a comprehensive overview of academic publications related to libraries in the digital era, offering valuable insights into the current state and future direction of library and information science in the context of technological advancement. Key observations are as following.
2. 1. Digital Transformation: The significant presence of technology-focused journals (e.g., "Libr Hi Tech," "Electron Libr") and document types (like data papers) underscores the ongoing digital transformation in libraries. This reflects the field's adaptation to the digital age and its exploration of new technologies and methodologies.
3. 2. Global Perspective: While English dominates the publications (92.22%), the representation of multiple languages and international publishers indicates that the digital transformation of libraries is a global phenomenon. This suggests a worldwide effort to modernize library services and systems.
4. 3. Interdisciplinary Nature: The diverse range of journals and document types points to the interdisciplinary nature of digital library research. It appears to bridge library science, computer science, and social sciences, highlighting the complex, multifaceted approach required in the digital era.
5. 4. Rapid Dissemination: The significant proportion of early access documents (11.11%) suggests a field that is rapidly evolving and emphasizes quick dissemination of new findings. This aligns with the fast-paced nature of technological change affecting libraries.
6. 5. Research Focus: The predominance of articles and proceedings papers indicates a strong research orientation in the field. This suggests that libraries in the digital era are not just implementing new technologies but are actively involved in researching and developing innovative approaches.
7. 6. Emerging Trends: The presence of publications related to social media, digital conferences, and advanced computing (as seen in journal titles) reflects the exploration of cutting-edge technologies in library contexts.

8. 7. Traditional and Digital Balance: While there's a clear focus on digital aspects, the continued presence of traditional library management journals suggests that the field is balancing digital innovation with core library principles and practices.

Conclusion, this scientometric study paints a picture of a dynamic and evolving field where libraries are actively engaging with the challenges and opportunities of the digital era. The research landscape reflects a global, interdisciplinary effort to redefine and enhance the role of libraries in an increasingly digital world. It suggests that libraries are not merely adapting to technological change but are at the forefront of exploring how digital technologies can enhance information access, management, and dissemination. This collection would be particularly valuable for library professionals, information scientists, and policymakers looking to understand current trends, challenges, and innovations in digital library services and systems. It also provides a rich resource for researchers studying the impact of digitalization on library services, user behavior, and information management practices in the modern era.

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NATIONAL EDUCATION POLICY AND LIS EDUCATION

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Abstract

The National Educational Policy 2020 (NEP-2020) for the modern public and the new educational system. NEP-2020 has stressed the significance of libraries and books by featuring on different perspectives remembering improvement of pleasant and rousing books for Indian dialects, accessibility and openness of books in school/public libraries, reinforcing of libraries and building a culture of perusing the nation over. The library award part was presented under Samagra Shiksha, in the year to teach the perusing propensities among understudies of any age and reinforcing of school libraries in government schools. The new strategy likewise incorporates Data Correspondence Innovation computerized, on the web, special sorts of offices and administrations to a wide range of perusers of the country. The key to India's continued ascent and leadership on the global stage in terms of economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation is providing universal access to high-quality education. The best strategy for developing and maximizing our nation's abundant talents and resources for the benefit of the individual, society, country, and world is to provide high-quality education to all students. The Public Schooling Strategy 2020 (NEP 2020) was sent off by Service of Training in India The new strategy replaces the past Public Approach on Schooling, 1986.

Keywords: NEP 2020, Library and Information Science (LIS) education; Library Schools; Library professionals, Education, Policy, Libraries, Online, Digital, Resources

Introduction

"The National Education Policy 2020 envisions an India-centric education system that directly contributes to our nation's sustained transformation into an equitable and vibrant knowledge society by providing high-quality education to all." This article discusses the significance of libraries in education and highlights the role that libraries play in education at all levels. These days, libraries offer clients admittance to their assets nonstop to grow their insight and abilities. The resources of the Library are intended for use by patrons, making them nearly as important as food for human existence. In rapidly changing our tutoring framework, the library resources and clients have gone through extremist changes. The current Libraries store data and information in modernized structure for all age bundle people like the students, teacher, scientist, legislator and generally speaking populace of changing society all through the world. According to India's New Schooling Strategy, libraries will see a significant increase in workload. The significance of libraries to our educational system is emphasized in this article. The New Guidance Technique 2020 allies school, school and high level training in basically the same manner. The vital features of NEP 2020, including Library highlights, are the essential focal point of this article. The National Educational Policy 2020 (NEP) aimed to emphasize the library as an essential service in India's university systems. Libraries' services offer a wide range of benefits that play a significant role in education, research, and skill development.

India's Ministry of Education unveiled the National Education Policy 2020 on July 29, 2020. The new system replaces the previous Public Methodology on Tutoring, 1986. The policy provides appropriate guidance for elementary through higher education, including vocational training, in the Indian subcontinent. The arrangement focuses on school reform in India. The possibility of NEP 2020 is to some degree advance notice and it eventually relies upon the states, establishments, and schools to pick its execution. The National Education Policy 2020 envisions the following new educational system for India: Through the arrangement of top notch schooling to every one of, the India-driven schooling system imagined in Public Training Strategy 2020 straightforwardly adds to our country's manageable change into an evenhanded and energetic information society. This article examines the significance of libraries in education and the role they play in education at all levels. Today, libraries provide access to their resources round-the-clock to help users improve their knowledge and skills. The resources of the library are there for the use of library users, so they are just as important as food for human existence. The rapid change in our educational system has had a significant impact on the library's resources and patrons. Today, knowledge and information can be stored in digital libraries for people of all ages, including students, educators, scientists,

politicians, and the general public of changing societies around the world. As per India's new schooling strategy, libraries will assume a lot greater part.

Objectives of the Study

The following are the study's goals:

1. To give brief data of Public Schooling Strategy 2020.
2. To explain how libraries' role in the National Education Policy 2020 is changing.
3. To increment mindfulness about the New Training Strategy 2020;
4. To feature the job of library in school system;
5. To discuss the shifting educational landscape;
6. To create sufficient library resources.
7. To give brief data of Public Training Strategy 2020.
8. To portray the Changing job of libraries in Public Training Strategy 2020.

The Public Training Strategy 2020 (NEP 2020) was sent off by Service of Schooling in India on 29 July 2020. The new strategy replaces the past Public Approach on Schooling, 1986. In the Indian subcontinent, the policy provides appropriate guidance for elementary through higher education, including vocational training. The policy's goal is to change India's education system. The idea of NEP 2020 is somewhat warning and it ultimately depends on the states, foundations, and schools to choose its execution. India's new educational system is envisioned as follows in the National Education Policy 2020: Through the provision of high-quality education to all, the India-centric education system envisioned in National Education Policy 2020 directly contributes to our nation's sustainable transformation into an equitable and vibrant knowledge society.

Research Methodology

This article has been brought out based on assessment of late writing distributed on the web and other important sources and is somewhat clear review. There is a shy of past comparable examinations saw on the degree and chances of library according to New Training Strategy in India, it is an endeavor being made to comprehend and assess the utilization of Libraries as a vital piece of our school system. The professionals in the field of library and information science (LIS) in India are the subject of this paper. In India, traditional and digital libraries are currently coexisting. LIS schooling in India has not become responsive to the new arising circumstance. Students have not gained the necessary information and abilities to use information technology in the library schools. As a result, graduates of LIS programs have limited opportunities for competitive advantage in the information industry. The paper examines the difficulties in LIS training in the Indian setting. It addresses the collaboration and sharing of resources among LIS schools as well as the preparation of LIS graduates for leadership and management positions to support India's economic and national development. In addition, it discusses the recent emphasis placed on e-learning in LIS education in India, the impact of LIS education on graduates' work and careers, the LIS professional job market, the competencies that are required, and LIS professionals' need for ongoing professional development.

LIS Education

W. A. Borden started the first training course in India in library science at the Central Library in Baroda. Gradually, other universities and library associations started setting up library schools. Certificate programs were first offered by the Bengal Library Association and Madras Library Association, respectively, in. Later, postgraduate programs also began at other universities, such as The University of Delhi, which began offering facilities for doctoral-level research. In 1977, it was the first institution to establish the At various levels of education, numerous universities have introduced correspondence courses in addition to formal teaching courses. This gives lower-level library workers, as well as those who were unable to get into formal courses before, the opportunity to upgrade their skills, knowledge, and qualifications. Library Science is almost as well-known as other social science courses in the

university education system in India, where it is now comparable to them. Disregarding this, LIS training is as of now confronting a defining moment. The transition from manual to automated library operations can be attributed to a variety of factors. Today just modernized libraries can take part in systems administration at the public and global levels. The majority of computerized libraries lack competent staff in managerial positions at the top and middle levels.

Highlights of New Education Policy-2020

The New Training Strategy advocates school and school level instruction similarly. This article principally centers around NEP 2020, its features and effect on our School system. With scientific and technological advancements like the rise of big data, machine learning, and artificial intelligence, among others, knowledge is expanding rapidly. in this manner, gifted labor will be expected to make India as a created country as well as top biggest economy on the planet. In order to maximize the use of library resources, the Indian government is willing to encourage people to read. The current education system is fundamentally altered by the new education policy. Among the most significant changes are the establishment of a National Research Foundation to support high-quality, peer-reviewed research and efficient study at universities and colleges, as well as the creation of multidisciplinary universities and colleges—at least one in or near every district.

Special features of National Education Policy 2020

1. Widespread Admittance to training at All Degrees of tutoring from pre-elementary school to Grade 12;
2. education for all children between the ages of three and six;
3. Development of the curriculum and a new pedagogical pattern. The creation of a national mission to promote fundamental literacy and math skills;
4. Annual Evaluation: Board exams will be given twice a year, one main exam and one for improvement, if needed;
5. Setting up of another Public Appraisal Community, PARAKH (Execution Evaluation, Audit, and Examination of Information for Comprehensive Turn of events);
6. Strong and straightforward cycles for enlistment of educators and legitimacy-based execution;
7. Openness of professional training in school and advanced education framework;

National Education Policy 2020: A Forward-Looking Vision for LIS Education and Services

By launching the New National Education Policy (NEP) on July 29, 2020, the Indian government paved the way for transformative education system reform. The NEP proposes revising and reorganizing all aspects of the education structure to create a new system that is in line with the aspirational goals of 21st-century education while remaining in line with India's traditions and value system. NEP 2020 ownly affects schooling system all in all in which libraries and library and data science training assume a significant part in country building. The following are some of the many changes that could affect library science education and services: LIS Education-UG, PG with Multiple Entry and Exit Options and the National Education Policy (NEP) 2020; LIS Studies: Towards more Comprehensive Between disciplinary and multi-disciplinary exploration in Library and Data Science; Library as Virtual Learning and Asset Center, MOOC and OER to help and fortify LIS Training and Exploration;

Worldwide Admittance to Information Assets interfacing North-East Libraries: Plans for developing quality LIS education and libraries in accordance with NEP 2020, ideal learning environments and student support, bringing libraries to your device as envisioned in New Education Policy 2020, a national book promotion policy, making books available and accessible in school/public libraries, cultivating a reading culture across the nation, ICT-equipped school/public libraries in villages, using public library spaces for adult education, and developing appropriate career paths for library staff In accordance with NEP 2020, the current publication contains 24 (24) research articles contributed by library practitioners, educators, and researchers to make it 21st century LIS education and services in the shifting information environment and job market. The inter- and multi-disciplinary nature of LIS education, as well as libraries' ability to create a virtual learning environment, will present major

obstacles for LIS educators and practitioners. The articles contributed by rehearsing custodians, instructors and analysts are rich substance and calm gainful to keep up with the vision of NEP 2020.

National Educa Al Education Policy 2020 And Ch Tion Policy 2020 And Changing Role Of Anging Role Of Libraries

The purpose of this paper is to ascertain the national education policy for 2020 as well as the function of libraries and information centers. In any case, these possibilities have not been uncovered plainly in NEP. However, high-quality digital resources must be communicated by libraries with a strong collection. As per NEP 2020, a few instructive levels will be presented, including central training, preliminary schooling, center instruction, optional instruction, under-graduation, post-graduation instruction stage, Exploration Stage and Long lasting learning stage. NEP has underlined the meaning of libraries in various regions, including the conservation of public legacy and the advancement of understanding society. Additionally, library professionals must identify new areas in which they can enhance and expand their impact on higher education students by practicing fixed librarianship. The creator of this survey discussed how the public authority and colleges are changing their parts in libraries for NEP. The paper expresses that the administration libraries in the advanced education area should be laid out as habitats for understudy and exploration support as well as assume a custodial part. After the sixth grade, vocational education will also be offered; Therefore, up to the fifth grade, native-language instruction will be preferred. The two types of training have been removed from the disciplinary system and made interdisciplinary and facilitated. By taking both engineering and music classes at the same time, one can finish a college degree. Association Human Asset Advancement logical methodology will be created among the school understudies and significance has been given to give abilities expected to 21st hundred years. It is essential to comprehend the role that libraries play in enhancing the attractiveness and quality of books available in all national languages. In order to provide a library service that is both effective and efficient, funding schemes are required. Library services that are digitized and automated also play a crucial role in expanding global knowledge. Reconciliation and joint in the middle of between instructive establishment and libraries gets a change spread of library administrations. It is essential to comprehend the significance of libraries to educational advancement. The most significant aspects of the new education policy are listed below.

The Changing Role of Libraries in National Education Policy:

The National Education Plan (NEP) acknowledges the significance of libraries in education and asserts that they are necessary for encouraging reading, facilitating information access, and developing skills in critical thinking. The strategy perceives that libraries can act as communities for learning and exploration giving admittance to many assets, including books, diaries, and computerized media the perusing materials needs to create in all local dialects with normalized content. The Public authority as well as Confidential area foundations ought to cooperate to work on the nature of the materials. The NEP also emphasizes the significance of school libraries in fostering children's literacy and language development. It says that every school should have a library with books and other materials for students' ages to help them learn. The strategy likewise requires the improvement of computerized libraries, which can give admittance to many instructive assets to understudies in distant regions. In the Indian subcontinent, the policy provides appropriate guidance for elementary through higher education, including vocational training. The arrangement focuses on change of India's school system. The idea of NEP 2020 is somewhat warning and it ultimately depends on the states, foundations, and schools to choose its execution. The Public Training Strategy 2020 blueprints the vision of India's new school system as under:

Libraries and Teacher Education: -

The NEP likewise perceives the job of libraries in educator training. It suggests that all educator instruction organizations ought to have a wellstocked library with admittance to computerized assets. Trainee teachers will be able to access the most recent educational research and improve their teaching abilities as a result of this. Additionally, the policy suggests that schools of teacher education should encourage students to use libraries. This can be accomplished by coordinating library use into the educational plan and giving preparation on the most proficient method to access and utilize library assets. The books ought to be accessible to all kinds of students, including those with special needs, and should be available in school or public libraries. The perusing propensity ought to be advanced across all grades and kinds of understudies by utilizing different offices like, book fair,

occasions, presentations and so on. Both public libraries and schools should incorporate ICT applications. The electronic assets ought to likewise be created by the necessities of school and public libraries.

Libraries and Higher Education: -

The NEP perceives the basic job of libraries in advanced education. It suggests that all educational establishments should have libraries that are well-equipped and offer access to digital resources. Additionally, the policy calls for the establishment of research libraries, which will be able to facilitate access to specialized resources that will aid in research in a variety of fields. The government ought to provide the necessary infrastructure for adult and lifelong learning and encourage community learning by demonstrating the best regionally formatted reading materials. The NEP likewise perceives the requirement for libraries to assume a more critical part in advancing interdisciplinary exploration. Libraries should collaborate with faculty and researchers to create interdisciplinary collections that can support multidisciplinary research, according to the policy. The NEP's recommendations on libraries provide a much-needed framework for enhancing the quality of education in India by ensuring that students have access to well-equipped libraries at all levels of education. Academic libraries have always played a crucial role in the education system because they provide access to knowledge, resources, and information.[24] Also, improve every aspect of the library's collection. One of the critical difficulties in carrying out the NEP's proposals on libraries is the absence of assets and framework. In India, many schools and colleges lack the resources necessary to establish and maintain libraries. In this way, the public authority and training establishments need to focus on interest in libraries and give the vital assets and foundation. Making sure that libraries keep up with the rapidly evolving technology landscape is another challenge. With the development of advanced media and the web, libraries should adjust and give admittance to computerized assets. This necessitates a significant investment in infrastructure, training, and technology.

Libraries as centers for research support:

Additionally, the NEP emphasized the significance of university and institute research. It simply recommends that libraries be prepared with every one of the vital administrations that clients request. There is no doubt that a company's research efforts may benefit greatly from the assistance of libraries. People in general and institutional libraries habitually give assets to grassroots trend-setters and youthful entrepreneurs so they can design harmless to the ecosystem items and administrations and make a pool of upheavals. Each area of the country ought to lay out a few public and institutional libraries as center points for supporting exploration to help creators, hopeful entrepreneurs, and different individuals from the innovative economy. Being an agent requires having the essential data, the drive to dive deeper into the subject, and the longing to add to the field. By offering excellent assets with a particular accentuation on reference the executives and data recovery, libraries can assist specialists with accomplishing their objectives quicker. Specialized librarianship might be very helpful in this regard. Research is one area in which libraries may have a special interest. We require an isolated research librarian with knowledge of open-source technology, statistical analysis, research assistance tools, and retrieval strategies. Its objectives to establish the national research foundation emphasize the significance of having a research librarian. In addition to the usual organizations that fund research, NIRF will manage and sponsor funding for research. As a nodal official, the research librarian can assist NIRF in maintaining its objectivities. The IRINS system was recently developed by INFLIBNET to highlight and organize research projects carried out by Indian universities and organizations. As nodal officers, a number of librarians are diligently updating vidwans' profiles to increase their value. To help the college in playing out its job as a multidisciplinary organization. They should act as an efficient store for reference books and superior grade course readings. The librarian has been referred to as a teacher because he must comprehend at least some of each subject area in order to relate to each one.

Technology Integration and Use in Libraries:

India has established itself as a global leader in a variety of areas when it comes to implementing ICT and embracing cutting-edge technology. The country overall is currently carefully enabled and progressing to an information economy because of the Computerized India customized. Education plays a crucial role in quadrupling growth when combined with technology. Innovation and training are straightforwardly associated with each other and useful together. The door keeping of these administrations and meeting of client demands requires qualified and experienced experts to stay aware of the consistent speed of specialized changes. The use and reconciliation of innovation has progressed instructive practices and improved numerous features of the school system. Within the

NEP, the National Education Technology has been established as a separate entity to provide a platform for two-way communication regarding the application and implementation of technology to enhance current teaching and learning methods. The NETF will help make decisions about how technology in education should be made, used, and managed. NETF will use a steady stream of data from multiple sources and collaborate with a diverse group of researchers to analyze the data in order to make decisions based on data. Libraries have become hybrid, digital, and integrated technology-based solutions in response to the widening digital divide and its issues. By giving admittance to materials to instructing and learning, then, at that point, distinguishing executions.'

Libraries as a platform for lifelong learning: -

Just conventional instruction is accessible from the foundation. One must broaden their horizons after receiving the appropriate education. Libraries are a useful resource. Caste, religion, or sexual orientation are never taken into account when determining whether or not a person is a regular student. The reading materials a student needs to advance their studies are available in the libraries. The age range and amount of time spent in the classroom are set. Consequently, libraries have significantly influenced lifelong learning. Work, experience, passion, and personal ambition all influence the desire to continue learning throughout one's life. This study offers specific recommendations for enhancing the functions of libraries and places an emphasis on the anticipated academic roles that libraries will play in enhancing all educational programs. Qualitative research data from semi-structured interviews with 125 professors, associate professors, and working librarians from four universities affiliated with higher education institutions are combined with previous literature. Polls and interview devices were utilized to investigate the important information assortment instruments.

Role of Libraries in Implementing the New Education Policy 2020 in Higher Education in India

Libraries play a critical and multi-layered job in the execution of the New Schooling Strategy (NEP) of 2020 in advanced education in India. They capability as center points of information and are instrumental in supporting the instructive objectives framed in the NEP. This article analyzes the multifaceted and critical part that libraries play in the successful execution of the NEP, explicitly inside the setting of NEP 2020. It examines how libraries can elevate admittance to different information assets, empower examination, and cultivate decisive reasoning abilities among understudies. According to the NEP's vision, higher education institutions can create a more equitable and inclusive learning environment by utilizing libraries' potential as centers of learning. The essential focal point of this study is to thoroughly expand on the complex association of libraries, including the dynamic advancement of computerized education, development of exploration endeavors and imaginative drives, and help of a comprehensive and unprejudiced way to deal with gaining data for all portions of society. The article points out that libraries can help spread digital literacy, which is an important part of the NEP. As the utilization of computerized advances in schooling increments, libraries assume a crucial part in giving admittance to a large number of advanced assets, for example, digital books, online data sets, and different advanced learning materials. They can instruct students and faculty members on how to use digital tools and platforms effectively, resulting in a significant improvement in their digital literacy skills. Academic journals, research papers, and books are just a few of the many scholarly resources that can be accessed through libraries. Students and faculty members can participate in significant research projects thanks to this accessibility. In addition, they offer direction and guidance for conducting literature reviews, accessing relevant research databases, and staying up to date on the most recent developments in a variety of fields. Along these lines, libraries act as cooperative spaces for interdisciplinary exploration and advancement, working with information sharing and systems administration among understudies and employees, which is fundamental for NEP 2020.

New National Education Policy and Libraries:

A Library Focused as "Learning and resources Hub" in National Educational Policy 2020.

The NEP 2020 weights on universalization of Instruction to build a 100 percent Gross Enrolment Proportion at the school level. In order to accomplish this, the school and higher education libraries will need to ensure that the library has sufficient and up-to-date study and reading materials, as well as that they are easily accessible to all users. The role will encompass more than just these services; proactive strategies will be essential in the current climate. NEP 2020 has arrangements for cutting edge and most recent assets according to the new educational plan for society perusers as well concerning the instructors. The National Education Policy 2020 should place a greater emphasis on library services and facilities, even though the policy's focus on libraries is decreasing. However,

library issues should still be clearly understood and the value of libraries and information centers should be accessed.

Adequate Library Staff

In NEP 2020 on (21.9) - it will be basic to make accessibility of sufficient library staff to run the library administrations for the public perusers, and educators and devise fitting vocation pathways and CPD for them. Different advances will incorporate fortifying every single existing library, setting up provincial libraries and perusing rooms in burdened areas, making broadly accessible perusing material in Indian dialects, opening kids' libraries and versatile libraries, laying out friendly book clubs across India and across subjects, and cultivating more noteworthy coordinated efforts between training foundations and libraries. In addition, the Policy stipulates that libraries must stock a sufficient number of high-quality resources for readers from all areas. It is likewise demonstrated that schools and associations have no legitimate space and offices for libraries and spotlight on making a coordinated specific space and assets for clients till 2025 to make an alternate sort of worth of libraries for people in general and social orders.

Suitable infrastructures for the library:

All interested adults will have access to adult education, study, and lifelong learning if the appropriate infrastructure is in place. A key drive toward this path will be to utilize schools, school edifices after school hours and on ends of the week and public library spaces for grown-up instruction courses which will be Data Correspondence Innovation prepared and very much planned whenever the situation allows and for other local area commitment and improvement exercises. Sharing infrastructure for school, higher education, adult and vocational education, community and volunteer activities, and other activities will be crucial for ensuring the effective utilization of human and physical resources and fostering synergy among these five types of education and beyond. Adult Education Centers (AECs) could also be part of other public institutions like higher education institutions and vocational training centers for these reasons.

A Literature Survey on National Education Policy 2020 (NEP 2020) and Libraries

The National Education Policy 2020 (NEP 2020) is the name of the policy document that will be released by the Indian government in July 2020. By focusing on holistic and multidisciplinary education, encouraging research and innovation, and incorporating technology into the learning process, the NEP 2020 aims to transform India's education system. The NEP 2020 acknowledges the significance of libraries in cultivating a culture of reading and lifelong learning. By providing school and public libraries with sufficient books, digital resources, and trained librarians, the policy emphasizes the need to strengthen them. In addition, the NEP 2020 acknowledges the necessity of incorporating technology into library services, such as providing access to electronic books, electronic journals, and other digital resources. The arrangement likewise features the significance of advancing neighborhood and native information through the improvement of local area libraries. In general, the NEP 2020 sees libraries as important institutions that can help India promote a knowledge-based society.

Conclusion

Library is instructing and learning asset focus. The National Education Policy, 2020 has emphasized the significance of libraries and books by emphasizing a number of aspects, including the creation of engaging and motivational books in Indian languages, the accessibility of books in school and public libraries, the strengthening of libraries, and the development of a national reading culture. The new policy emphasized improving the infrastructure of libraries, developing reading materials, and cultivating an enjoyable reading culture. Under the Smagara Shiksha program, provide a grant for the development of libraries. To instill the habit of reading in our communities and educational institutions, it is essential to increase book availability and accessibility. The Public Schooling Strategy 2020 reflects wonderful changes over the ongoing situation of school system and the possibilities remembering future arranging guaranteeing the quality instruction for India. The NEP, 2020 serves as a philosophical guide for altering the educational landscape, making education more comprehensive, and laying out a path toward establishing a solid foundation for an independent India (Atmanirbhar Bharat).

This is the primary schooling strategy of the 21st century that has supplanted the 34-year-old Public Arrangement on Instruction (NPE), 1986. The five interdependent foundational pillars of NEP 2020. Access, Equity, Quality, and

Affordability. paved the way for transformative reform. This study called attention to the advancement of library as focus of phenomenal instructive assets. This article is likewise bringing thoughts of Library development and school system together for better comprehension the need and reason for the arrangement of the public authority of India NEP 2020. The central role that libraries play in education is acknowledged in the National Education Policy of India 2020. It requires the improvement of exceptional libraries at all degrees of instruction, including schools, instructor training organizations, and advanced education establishments. By providing access to a wide range of resources, such as books, journals, and digital media, libraries can function as centers for learning and research, which is acknowledged by the policy. The NEP's proposals on libraries give a system to upgrading the nature of training in India and planning understudies for the difficulties of the 21st 100 years. The Public authority ought to acknowledge the requirements of the library staff and proper staff must be satisfied to offer the better types of assistance from libraries. The strategy's emphasis on giving a comprehensive and multidisciplinary schooling, universalization of schooling, adaptable and multilingual instruction, innovation empowered learning, and educator preparing and proficient advancement can essentially work on the nature of training in India.

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ROLE OF LIBRARIES IN THE INDIAN KNOWLEDGE SYSTEM (IKS): AN OVERVIEW

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Abstract

The Indian Knowledge System (IKS) encompasses a vast repository of traditional knowledge across various fields, including science, philosophy, medicine, arts, and culture. Libraries, as custodians of knowledge, have played a pivotal role in preserving, organizing, and disseminating this rich heritage. This paper explores the historical evolution of libraries in India, their role in the IKS, and the contemporary challenges and opportunities they face in the digital age.

Introduction: India has a long-standing tradition of knowledge creation and dissemination, dating back to ancient times. The Indian Knowledge System (IKS) is characterized by its diversity and depth, encompassing various domains such as Vedic literature, Ayurveda, classical arts, and philosophical treatises. Libraries, as centers of learning and knowledge preservation, have been integral to the sustenance and propagation of IKS. This paper provides an overview of the role of libraries in the Indian Knowledge System, tracing their historical development and examining their contemporary significance.

NEP (2020) : The National Education Policy (NEP) of India, introduced in 2020, emphasizes the integration and promotion of Indian Knowledge Systems (IKS) within the education system. This policy seeks to revive and nurture traditional Indian knowledge, languages, arts, and culture alongside modern education.

Key Features of NEP Regarding Indian Knowledge Systems:

1. **Integration of IKS into Curriculum**: NEP advocates for the inclusion of IKS in school and higher education curricula. This includes traditional sciences like Ayurveda, Yoga, and Vedic mathematics, as well as traditional crafts, arts, and languages.
2. **Multidisciplinary Approach**: The policy encourages a multidisciplinary approach where students can learn across various fields including both modern and traditional knowledge systems.
3. **Promotion of Regional Languages**: NEP emphasizes the use and promotion of local languages as mediums of instruction up to Grade 5 and preferably beyond, to facilitate better understanding and preservation of local knowledge systems.
4. **Research and Documentation**: There is a focus on research and documentation of Indian knowledge systems to better understand and integrate them into the education framework.
5. **Higher Education**: In higher education, NEP promotes the creation of multidisciplinary education and research universities (MERUs) that will offer courses integrating traditional and modern knowledge.
6. **Skill Development**: Traditional skills and vocational education are also highlighted to ensure that students gain practical knowledge and skills related to traditional crafts and industries.
7. **Cultural and Ethical Values**: The policy underscores the importance of imbibing cultural and ethical values from Indian knowledge systems to foster holistic development among students.

Historical Evolution of Libraries in India

Ancient Period: Libraries in ancient India, often referred to as "granthalayas," were integral to educational institutions like the Nalanda and Takshashila universities. These libraries housed vast collections of manuscripts on a wide range of subjects, including astronomy, medicine, mathematics, and philosophy. Palm leaf manuscripts and birch bark texts were the primary mediums of knowledge storage.

Medieval Period: During the medieval period, libraries flourished under the patronage of rulers and scholars. The Mughal era, in particular, saw the establishment of numerous royal libraries, which became repositories of Persian, Arabic, and Indian manuscripts. These libraries were not only centers of knowledge but also hubs of cultural and intellectual exchange.

Colonial Period: The advent of the British colonial rule brought significant changes to the library system in India. The establishment of public libraries and the introduction of the printing press revolutionized knowledge dissemination. Libraries such as the Asiatic Society Library and the Connemara Public Library played crucial roles in preserving Indian manuscripts and promoting scholarly research.

Role of Libraries in the Indian Knowledge System

Preservation of Manuscripts: Libraries have been instrumental in preserving ancient manuscripts, which are invaluable sources of historical and cultural knowledge. Institutions like the National Manuscript Mission and the Bhandarkar Oriental Research Institute have undertaken extensive efforts to catalog and digitize these manuscripts, ensuring their accessibility to future generations.

Dissemination of Knowledge: Libraries serve as vital centers for the dissemination of knowledge, providing access to a diverse range of resources. They facilitate research and learning by offering access to books, journals, and digital resources. Libraries in educational institutions, such as universities and colleges, play a crucial role in supporting academic and scholarly activities.

Promotion of Indigenous Knowledge: Libraries have a significant role in promoting indigenous knowledge systems. By curating collections that reflect the diversity of Indian culture and tradition, libraries help in the revival and propagation of traditional knowledge. Initiatives like the Digital Library of India aim to digitize and make accessible a vast corpus of Indian literature and manuscripts.

Support for Research and Scholarship: Libraries provide essential support for research and scholarship in various fields. They offer access to rare and specialized resources, enabling researchers to delve into the depths of Indian knowledge systems. Collaborative efforts between libraries and research institutions further enhance the scope and impact of scholarly work.

Contemporary Challenges and Opportunities

Digital Transformation: The digital age presents both challenges and opportunities for libraries. The digitization of resources has made knowledge more accessible but also raises issues related to digital preservation and copyright. Libraries need to adopt robust digital infrastructure and strategies to manage digital resources effectively.

Funding and Resource Constraints: Many libraries in India face challenges related to funding and resource constraints. Adequate financial support and investment in library infrastructure are essential to ensure their continued relevance and effectiveness.

Bridging the Knowledge Divide: Libraries have a crucial role in bridging the knowledge divide by providing equitable access to information. Initiatives aimed at improving library services in rural and underserved areas are essential to ensure inclusive knowledge dissemination.

Conclusion

Libraries have been and continue to be, pillars of the Indian Knowledge System. From ancient granthalayas to modern digital libraries, they have played a pivotal role in preserving, organizing, and disseminating knowledge. As India moves forward in the digital age, libraries must adapt to new challenges and seize opportunities to remain relevant and effective. By doing so, they will continue to be vital custodians of the rich and diverse Indian Knowledge System.

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NEW EDUCATIONAL POLICY AND THE TRANSFORMATION OF LIBRARIES: OPPORTUNITIES AND CHALLENGES

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Abstract

The New Educational Policy (NEP) has introduced significant reforms aimed at transforming the educational landscape, emphasizing the integration of technology and the promotion of lifelong learning. This paper explores the implications of the NEP on libraries, which are pivotal in supporting these educational reforms. It delves into the opportunities presented by the NEP, such as the potential for libraries to become central hubs of digital learning and information access. Conversely, it also examines the challenges that libraries face, including the need for technological upgrades, staff training, and equitable access to resources. By analyzing these factors, the paper aims to provide a comprehensive understanding of how libraries can adapt and thrive in the evolving educational environment.

Introduction

The introduction of the New Educational Policy (NEP) marks a significant shift in the approach to education, aiming to create a more inclusive, flexible, and technology-driven learning environment. One of the key components of this policy is the transformation of libraries, which are essential in supporting the NEP's goals. Libraries have traditionally been repositories of knowledge, offering access to a vast array of physical and digital resources. With the NEP's emphasis on digital learning and the integration of technology, libraries are now positioned to play an even more critical role in the educational ecosystem. The NEP envisions libraries not merely as storage spaces for books but as dynamic, interactive learning environments that facilitate continuous education. This transformation is underpinned by several opportunities. For instance, libraries can leverage digital technologies to enhance access to information, support diverse learning needs, and foster a culture of reading and research among students. Furthermore, libraries can serve as community centers for lifelong learning, providing access to educational resources and programs for all age groups.

Objective of Study

The primary objective of this study is to explore and analyze the implications of the New Educational Policy (NEP) on the transformation of libraries, focusing on the opportunities and challenges presented by this policy shift. Specifically, the study aims to:

1. **Examine the Role of Libraries in the NEP**: Investigate how libraries are positioned within the NEP framework and their anticipated contributions to achieving educational goals.
2. **Identify Opportunities for Libraries**: Highlight the potential opportunities for libraries to enhance their services, resources, and infrastructure in alignment with the NEP's emphasis on digital literacy, inclusive education, and lifelong learning.
3. **Assess Technological Integration**: Evaluate the integration of emerging technologies in libraries, such as digital repositories, e-learning platforms, and AI-driven resources, and their impact on educational outcomes.
4. **Analyze Challenges and Barriers**: Identify the challenges and barriers faced by libraries in adapting to the NEP, including issues related to funding, infrastructure, staff training, and access to digital resources.
5. **Propose Strategic Recommendations**: Develop strategic recommendations for policymakers, library administrators, and educators to effectively leverage the opportunities and address the challenges in transforming libraries under the NEP.
6. **Measure Impact on Learning and Accessibility**: Assess the impact of the transformed library services on learning outcomes, accessibility, and inclusivity, particularly for marginalized and underserved communities.

By achieving these objectives, the study aims to provide a comprehensive understanding of the transformative role of libraries in the context of the New Educational Policy and offer actionable insights for fostering an innovative and inclusive educational ecosystem.

Importance of Studying NEP

Alignment with Global Standards
The NEP emphasizes the alignment of educational standards with global practices. By studying this policy, stakeholders can ensure that libraries evolve to support these standards, providing access to global resources and fostering a culture of international collaboration.

Inclusivity and Accessibility
One of the core tenets of the NEP is inclusivity. Research into how libraries can adapt to be more inclusive—offering resources in multiple languages, formats, and accessible to people with disabilities—is vital. This ensures that all students, regardless of their background or abilities, have equal access to educational resources.

Integration of Technology
The NEP advocates for the integration of technology in education. Libraries must transform to support digital learning environments, offering e-books, online databases, and virtual learning spaces. Studying the NEP helps identify the technological needs and implementation strategies to modernize libraries effectively.

Opportunities

Enhanced Learning Resources
Libraries have the opportunity to expand their collections beyond physical books to include digital resources, multimedia content, and online databases. This can create a richer, more diverse learning environment for students.

Lifelong Learning
Libraries can become hubs for lifelong learning, providing resources not just for students but for the entire community. This aligns with the NEP's focus on continuous education and skill development.

Community Engagement
Libraries can leverage their position to foster greater community engagement. By hosting workshops, lectures, and interactive sessions, libraries can become centers for community learning and engagement, supporting the NEP's holistic approach to education.

Collaboration and Networking
Libraries can facilitate collaboration among educational institutions, researchers, and students. This networked approach can lead to shared resources, joint research initiatives, and a stronger educational ecosystem.

Challenges

Funding and Resource Allocation
Transforming libraries to meet the NEP's goals requires significant investment. Securing funding and allocating resources effectively is a major challenge. Research into sustainable funding models and cost-effective strategies is essential.

Training and Development
Librarians and staff need to be trained in new technologies and pedagogical approaches. Ensuring ongoing professional development is crucial to keep pace with the rapid changes in educational technology and practices.

Digital Divide
The digital divide remains a significant challenge. Ensuring that all students have access to digital resources, especially in rural or underserved areas, is critical. Libraries must address issues of connectivity, device availability, and digital literacy.

Balancing Tradition and Modernity

While embracing new technologies, libraries must also preserve their traditional roles and resources. Balancing the integration of digital tools with the maintenance of physical collections and spaces is a delicate task.

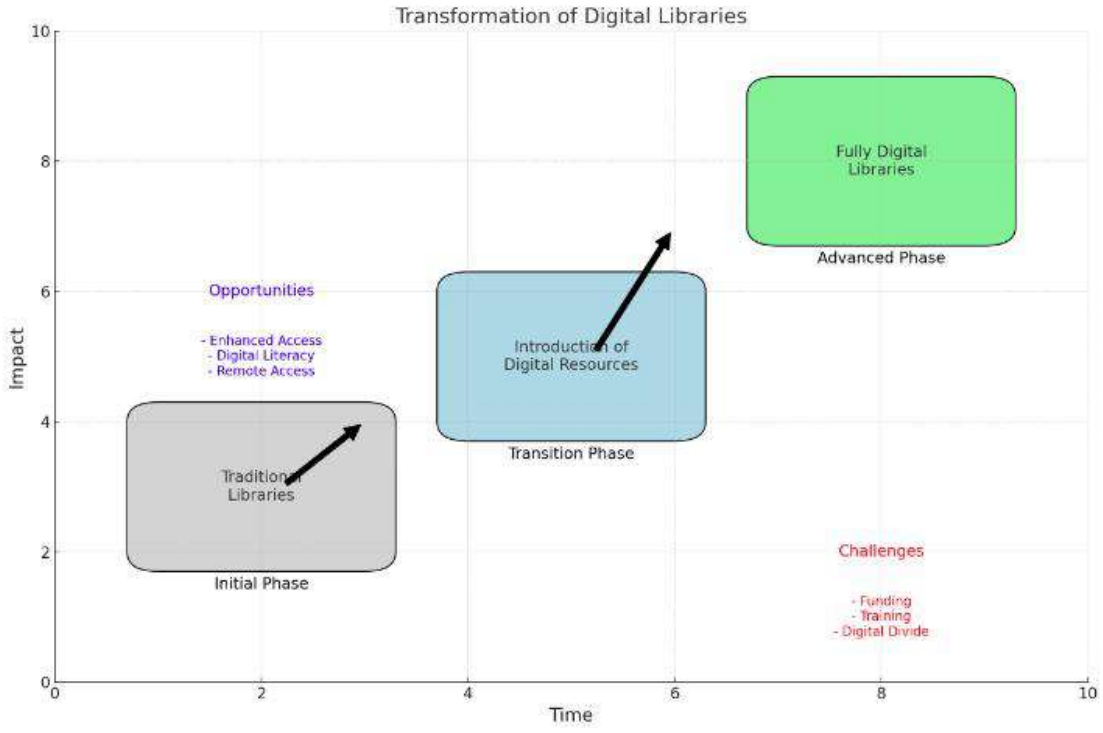

Figure illustrating the transformation of digital libraries

Initial Phase: Traditional Libraries

- Libraries primarily stocked with physical books and materials.
- Basic infrastructure for physical access and lending.

Transition Phase: Introduction of Digital Resources

- Integration of digital resources such as e-books, online journals, and databases.
- Development of digital literacy programs and remote access capabilities.

Advanced Phase: Fully Digital Libraries

- Extensive digital collections and virtual libraries.
- Advanced digital tools and services, including makerspaces and innovation hubs.

Conclusion

The transformation of libraries in response to new educational policies presents both significant opportunities and challenges. By embracing digital technologies, fostering collaborative learning environments, and ensuring inclusivity, libraries can remain vital to educational success. However, addressing funding constraints, training needs, the digital divide, and privacy concerns are critical to realizing these opportunities fully. This article underscores the importance of strategic planning and community involvement in navigating this transformative period for libraries.

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ROLE OF COLLEGE LIBRARY WHICH APPRECIATED BY NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC).

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Abstract

Implementing best practices in libraries aligned with the National Assessment and Accreditation Council (NAAC) standards is crucial for enhancing the academic environment, supporting research, and ensuring efficient resource management. Key practices include maintaining a balanced and up-to-date collection, providing modern infrastructure and facilities, and offering robust access and user services. Additionally, libraries should conduct regular information literacy programs, support research activities, and provide continuous staff training. Effective library governance, community engagement, and technological integration are essential, along with a commitment to quality assurance and continuous improvement. These practices ensure that libraries meet NAAC standards, contributing to the institution's overall academic excellence.

Keywords: - NAAC Standards, Collection Development, Infrastructure, User Services, Information Literacy

Introduction

Implementing best practices in libraries that align with the National Assessment and Accreditation Council (NAAC) standards is vital for enhancing the overall quality and effectiveness of academic libraries in higher education institutions. These practices encompass various facets, including collection development, infrastructure enhancement, user services, information literacy programs, research support, staff training, governance, community engagement, technological integration, and quality assurance. By adhering to these practices, libraries not only meet the rigorous standards set by NAAC but also contribute significantly to fostering a conducive learning and research environment within the institution. This introduction highlights the importance of adopting these best practices to ensure libraries effectively support the educational and research missions of their respective institutions while striving for continuous improvement and excellence in library services.

The Role of a College Library in NAAC Accreditation:-

The role of a college library in NAAC accreditation is pivotal as it directly contributes to the institution's overall academic excellence and quality assurance. Here are key roles and contributions of a college library in NAAC accreditation:

1. Supporting Academic Programs: The library provides essential resources and materials that support the academic programs offered by the institution. This includes textbooks, reference materials, journals, and digital resources that are aligned with the curriculum.

2. Facilitating Research: Libraries play a crucial role in supporting research activities among faculty and students. They provide access to scholarly databases, research tools, and assistance in literature searches and data retrieval, thereby enhancing the institution's research output and quality.

3. Promoting Information Literacy: Libraries conduct information literacy programs and workshops to equip students with skills in finding, evaluating, and using information effectively. This empowers students to become independent learners and critical thinkers.

4. Providing Learning Spaces: Libraries offer conducive environments for study, research, and collaboration. They provide quiet study areas, group study rooms, computer labs, and access to digital resources, fostering an atmosphere conducive to learning and academic growth.

5. Ensuring Access and Equity: Libraries promote access to information and resources for all members of the academic community, including faculty, students, and staff. They ensure equitable access to resources regardless of physical location through digital and remote access services.

6. Supporting Institutional Goals: Libraries align their services and resources with the strategic goals and priorities of the institution. They contribute to enhancing teaching, learning, and research outcomes, thereby supporting the overall mission of the college.
7. Adhering to Quality Standards: In the context of NAAC accreditation, libraries must adhere to quality standards in collection development, infrastructure, user services, information literacy, research support, staff development, governance, community engagement, technological integration, and continuous improvement. Compliance with these standards contributes to the overall assessment and accreditation process of the institution.
8. Contributing to Institutional Excellence: A well-functioning library enhances the academic reputation and overall excellence of the institution. It plays a critical role in attracting and retaining students, faculty, and researchers by providing essential resources and services that support their academic and research endeavours.

In summary, the college library's role in NAAC accreditation encompasses supporting academic programs, facilitating research, promoting information literacy, providing learning spaces, ensuring access and equity, supporting institutional goals, adhering to quality standards, and contributing to institutional excellence. Its contributions are integral to the holistic assessment and accreditation of the college by NAAC, to provide references for the roles of college libraries in NAAC accreditation, here are some sources that discuss these aspects:

1. Collection Development and Management:

a. Maintain a well-rounded, up-to-date collection of books, journals, e-resources, and databases relevant to academic programs.
b. Regularly review and update the collection, removing out dated or low-usage materials.
c. Include diverse resources to support interdisciplinary studies.

2. Infrastructure and Facilities:

a. Provide a well-organized, accessible physical and digital library space.
b. Ensure adequate seating, study areas, and quiet zones for individual and group study.
c. Offer modern facilities like computer labs, Wi-Fi, photocopying, and printing services.

3. Access and User Services:

a. Implement a robust library management system (LMS) for efficient cataloguing, circulation, and resource access.
b. Provide remote access to digital resources and databases through a secure online portal.
c. Offer inter-library loan services and access to national and international databases.

4. Information Literacy and User Education:

a. Conduct regular information literacy programs, workshops, and orientation sessions.
b. Offer training on effective use of library resources, research methodologies, and academic writing.
c. Develop online tutorials and guides to assist users in navigating library resources.

5. Support for Research and Academic Activities:

a. Maintain a comprehensive collection of research materials, including theses, dissertations, and conference proceedings.
b. Provide access to citation management tools, plagiarism detection software, and other research support services.
c. Assist faculty and students with literature searches, reference management, and data creation.

6. Staff Development and Training:

a. Ensure library staffs are well-trained, knowledgeable, and customer-service oriented.
b. Provide on-going professional development opportunities to keep staff updated with the latest trends and technologies.
c. Encourage staff participation in seminars, workshops, and conferences.

7. Library Governance and Management:

a. Develop and implement clear policies for library management, including acquisition, circulation, and usage policies.

b. Establish a Library Advisory Committee with faculty and student representatives to provide guidance and feedback.
c. Conduct regular audits and assessments to ensure compliance with NAAC standards and continuous improvement.

8. Community Engagement and Extension Services:

a. Engage with the academic community through exhibitions, lectures, and cultural events.
b. Promote library services and resources through newsletters, social media, and other communication channels.
c. Establish partnerships with other libraries and educational institutions for resource sharing and collaborative programs.

9. Innovation and Technological Integration:

a. Implement cutting-edge technologies like RFID for efficient resource management and user tracking.
b. Develop a digital repository for institutional publications, open educational resources (OER), and other digital content.
c. Explore the use of AI and data analytics to enhance user experience and resource utilization.

10. Quality Assurance and Continuous Improvement:

a. Regularly collect and analyse user feedback to identify areas for improvement.
b. Set measurable goals and objectives for library services and assess performance against these benchmarks.
c. Stay informed about NAAC guidelines and best practices to ensure on-going compliance and enhancement of library services.
d. Adhering to these best practices, a library can significantly contribute to the academic and research environment of the institution, aligning with the quality standards set by the UGC NAAC.

Conclusion:

Implementing best practices in libraries that align with the National Assessment and Accreditation Council (NAAC) standards is essential for ensuring excellence in academic library services. By focusing on collection development, infrastructure enhancement, user services, information literacy, research support, staff training, governance, community engagement, technological integration, and quality assurance, libraries can effectively support the educational and research missions of their institutions.

These practices not only facilitate access to diverse and up-to-date resources but also promote inclusivity, sustainability, and ethical conduct within library operations. By fostering partnerships, promoting open access and accessibility, and embracing evidence-based decision-making, libraries contribute significantly to the overall quality and reputation of higher education institutions.

Continuous improvement and adaptation to emerging trends in technology and pedagogy are crucial for libraries to remain relevant and effective in meeting the evolving needs of students, faculty, and researchers. By adhering to these

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INFORMATION LITERACY RELATED TO LIBRARY SERVICES, COLLECTION CONSERVATION AND STAFF HEALTH: SPECIAL REFERENCE TO COVID-19

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Abstract

The COVID-19 pandemic has had large-scale ramifications for India. The strict lockdown enforced by the government to curb the spread of the virus in India precipitated a humanitarian and economic crisis. As the pandemic spreads across the country, greater challenges in terms of library services and fulfill an information need to be tackled. This paper aims to review the library management in pandemic situation. The approach combines public domain COVID-19 data with impact on libraries, library services in lockdown, resuming libraries, conservation of locked collection, staff health and investigates how information was managed by librarians. It includes precautions measures early-stage with high and low corona virus disease impacts on libraries. This article has brought out the opportunity to learn recent technological advancements in order to maximize the usage of library resources and services in worldwide lockdown and pandemic situations prevailing in the country. Also, this article provides an overview of preventive measures and current trends in libraries to play a proactive role in the present and post-pandemic situation.

Keywords:- Impact of Covid-19, Library Services in Lockdown, conservation of Collection, S-Services, Post Lockdown,

Introduction

A library is the best resource to save people from rumours and misinformation in a pandemic. With physical libraries being shut, librarians are active in providing online information services to the general public. Many libraries are conducting information literacy programmes alerting people about COVID-19. It is suggested that during the locked down period, people can do leisure reading and writing. Moreover, through directed reading, bibliotherapy can be provided as therapeutic adjuvant in medicine and psychiatry in the solution of personal problems. Reader advisory services can be availed from the librarians via electronic media which may help in relieving the agony due to the pandemic and the lockdown situation.

During this COVID 19 pandemic, all librarians have learned to work online. Now, when returning to and reopening libraries, library professionals need practical guidelines about how to re-start and manage libraries post lockdown, with specific reference to staff and readers, collections and infrastructure.

Librarians have doubts about various issues related to sanitization, social distancing, and new services & facilities in the libraries. Also, about various priorities in terms of digital contents, focus on innovative search strategies and engaging users with various kinds of digital reference services.

Since the institutions have closed, all academic and research work has gone online and hence the library also has to go online. Also, our social lives are going to change, sitting together, having lunch together, all this will change. Distancing will be the new norm. Also, the question asking “how many readers have visited the library today?” will have to change. Sanitization will be of paramount importance and wearing masks etc will be part and parcel of our lives.

Now how do we manage our physical libraries? How do we manage our digital libraries? These are two important questions. Libraries for students are very important. Students will want quick information and help in evaluating sources. Technologically the students are savvy but still need help. Librarians need to know all tools and to be able to use these effectively. Orientation programmes and Information literacy programmes will all have to be online now.

There is need for momentum in the National Digital Library also and it needs to have more material from regional publishers. These regional publishers are not having digital platforms. Regional content is going to be a major problem which we need to address.

Virtual reference is also going to be very important in the post lockdown phase. To engage our readers in the digital world will be a major challenge. At the first priority, there has to be a guide to Online Educational resources. Librarians must be subject guides and teach students about Deep Web and other resources.

This Pandemic Situation is a very unprecedented situation causing unforeseen problems, at a time when the usage of physical libraries is less and many institutions have not even recruited librarians. The future of Libraries in post lockdown scenario and current challenges faced by Libraries in terms of lack of staffing, infrastructure etc. and how this is connected to the future of educational institutions. At present many libraries are closed and wondering how to open.

There are three different scenarios or views by the Library and Information Science Community. In the first scenario professionals felt that physical libraries would remain as they are. The physical mode is important as man is a social animal and there is need for humans to interact. The number of users in the library may reduce as the number of seats will have to be reduced for distancing and the physical layouts will have to change. Cleanliness will have to be maintained. Staff will need training and many staff will be working from home so online material will have to be provided as well as space and physical books. Subject referencing will be very important.

The second scenario is where there will be a combination of physical and online services. While all are presently using online resources, the need for physical resources will come back. After this online teaching period, classroom teaching is bound to come back as creativity etc. can flourish only with classroom interaction.

In the third scenario, he envisaged that everything will become online and all our interactions with readers etc. will have to become digital.

As per the discussions with renowned professionals, the second scenario is the most likely. They emphasized that finances in Indian Higher education are not currently sustainable as they are inefficient. There will have to be new models for sustaining higher education and making it accessible and affordable to all. The main changes that are necessary as per follows…

- Moving away from buying content to usage of content.
- Moving from mass services to personalized and customized services
- Connect of user to content will be most important
- Change from searching content to discovering content
- Library websites have to be changed to be more user friendly and help user to search material
- Information Literacy, induction programmes and orientation programmes will have to be online
- Investment in technology is very important now
- Library has to showcase technology. Whatever the institute has purchased has to be displayed in library
- Educational technology has to move from knowledge transfer to knowledge creation mode
- Library should be an incubation centre for entrepreneurship
- Library should be a public space for access to latest technology. Laptops etc. should be lent out.
- Library is the place to showcase staff achievements, publications etc.

Changes In Library And Information Science Syllabus

Various changes needed in LIS Curriculum on the basis of the current experiences and post lockdown scenario. As per the following publications, one of which was written in 1876 and covers the emergence of the public libraries in USA. The second publication is the '*The Future of the Professions: How Technology Will Transform the Work of Human Experts*' by Richard Susskind and Daniel Susskind. This book challenges the relevance of the professions in the 21st century and talks about how technology will transform the work of professionals. It also urges readers to rethink the way that expertise is shared in society and outlines the people and systems that, in the long term, will replace the professions**.** The third book '*A World Without Work*

Technology, Automation and How We Should Respond' by Daniel Susskind quotes that "advances in artificial intelligence mean that all kinds of jobs are increasingly at risk.''

Subject Librarianship

As per the need and due to this pandemic situation there is a need of subject Librarians. These subject librarians need to be experts of information resources. If a user asks for any material, the librarian should not be giving a bunch of documents but very specific, very few documents. The librarian now has to be, more than ever before, a reading recommendations expert. As per the 1876 US publication and there was a recommendation that librarians be designated as Professors of Books or Professors of reading and that there should be the same number of these Professors as the number of subjects taught. While in this age where machines are increasingly going to be taken over, librarians have to show that they have different skills. It is time for a paradigm shift to subject librarianship.

Challenges Faced By The Users Due To Covid-19.

During the COVID 19 period, every institute shifted to online teaching and using online documents. but there is various difficulties in front of teachers and students i.e slow internet, non-availability of electronic gadgets etc. created a situation where they could not use the online resources. The students from low income marginalized communities may not be able to access online material. Lack of funding post lockdown may create a situation of not being able to afford to buy necessary books and other publications.

Internet connectivity is a problem with rural areas. Technology is a problem as also purchase of resources. In India, here that perhaps for some time, we should go back and look at our older collections and not go for new material. There is rich knowledge in our library already and we should use this, also there is a need to be sharing of resources or shared libraries now as the cost of setting up libraries is very high.

Government of India talks about smart cities but does not plan for public libraries. When fiber optics are being taken to the villages for administrative purposes, the same could be used for setting up a good library also in the village. This is a mindset to be changed. When many universities do not have a librarian for long periods of time, we can see the importance given to libraries by administrators and policy makers.

Post Lock Down Libraries: Facing Major Issues

The Library and Information Science professionals from the all over world are facing some major issues or have fear in their mind about Safe work places, environmental safety, role of library leadership, learning digital platforms for providing library services, physical & emotional wellbeing of employees, providing flexible remote working facilities, collaborating with other libraries, creating proper signage using pictures, posters, cartoons at prominent places in library, developing guidelines for wearing masks and taking other hygienic measures like providing sanitizers, avoiding mass gatherings, not using equipments of others.

Libraries Shall Do After Resuming

- ✓ Post lockdown libraries should provide remote access for online teaching, research and Learning
- ✓ Libraries must provide access to digital resources. Many publishers are providing free access to e-resources, INFLIBNET resources are also available
- ✓ Libraries must provide regional language resources
- ✓ Conduct online webinars for staff and readers
- ✓ Manage the physical library spaces
- ✓ Disinfection treatment of libraries
- ✓ Use of Sanitization in library premises, using hand free sanitization equipment
- ✓ Maintaining physical distancing and emotional wellbeing of employees
- ✓ Keeping psychological distance with students when they come back to the library
- ✓ Strict General guidelines on cleanliness of each and every library place, use of Lizol for cleaning,
- ✓ Managing electricity as libraries are re-opening after a long period
- ✓ Developing library policy for closing down
- ✓ Temporarily suspending library programs which will get mass gatherings like storytelling, library orientation
- ✓ Developing library policy for social distancing
- ✓ Provision for mask and gloves for staff and training them how to use them
- ✓ Standards for cleaning bathrooms, railings and door knobs, telephones, keyboards, workstations, emptying of waste baskets etc.

- ✓ Providing digital reference services
- ✓ Educating public in case of advancement of epidemic
- ✓ How many students should be allowed in the library at a time
- ✓ What type of markings to be done for social distancing
- ✓ Do not allow students to touch library walls, equipments
- ✓ Installation of Arogyasetu app and up gradation time to time
- ✓ Use of Organic and non-harmful materials
- ✓ Libraries can have homemade ginger, turmeric and pepper drink for staff
- ✓ Providing soap and warm water for staff
- ✓ Supplying hand sanitizer in the library
- ✓ Visit library by appointment or pre-booking only
- ✓ Investing more on digital content and remote access
- ✓ Provide restricted book lending services
- ✓ Creating awareness about digital resources by putting posters in library premises
- ✓ Avoid open access to collections
- ✓ Creating plan for gradually reopening libraries
- ✓ Communication all new rules to readers online as well as onsite
- ✓ Keep returned books for 24 hours to one week in a box as per government guidelines
- ✓ Using sanitizers while performing circulation duties
- ✓ Risk from paper, cardboard and copper is less than plastic and steel materials
- ✓ Develop a tutorial on how to best use the library materials
- ✓ Resource sharing among member libraries
- ✓ Providing consolation through WhatsApp and video conferencing
- ✓ Providing links to freely accessible resources
- ✓ Offer Wi-Fi and Zoom subscriptions
- ✓ Collect and preserve materials related to pandemic
- ✓ Training library staff to work remotely
- ✓ Providing resources related to unemployment in preset n situation
- ✓ Library websites should have separate page for COVID 19

Preservation/Conservation of Library collection

Library collections need to protect from light, humidity, temperature, pollution etc. Shutting down libraries for long time changes internal humidity, initiates decaying mechanism which will promote growth of fungus, insects and rodents. So conservation survey of library buildings and material should be conducted post lockdown, if library is air-conditioned, air-conditioning should be on for 24 hours. Library has different types of materials like paper based to digital medium. So practical guidelines on amount light, humidity control in library premises should be followed. Library collection should not be exposed to Ultra violet light. Alum & Rosin used in sizing on paper can create acidity in paper. Formaldehyde, Formic acid and acetic acid are volatile organic compound which can damage paper. Turmeric and Neem leaves can be used for preservation of materials. Use of traditional Khus curtain for protection of materials. Post lock down conservation survey of library building and collections need to be conduct by every libraries and, report of conditions of library building and collections should be prepare. A specialist service may be hired to do this survey and preparing the report.

Health and hygiene for staff and readers post lockdown

COVID-19 pandemic has changed the way world works as the possibility of infection continues to be real. Safer Workplaces is a new social norm by reinforcing the importance of safe practices at the personal and workplace level and acceptance of the new normal in post lockdown. It is necessary to instill a culture of safety across the organization (both top-down as well as bottom up)

Leadership Responsibility

The library leadership will play the most significant role in keeping the workplace safe. They should make 'Safety' as part of the library mission. Daily regular safety reviews & strategic plans to tackle it should be done post lockdown. Separate budget should be set aside for emergency response, and implementation of safety protocols as well as continuous assessment of situation should be done as per the government instructions and

guidelines. The Librarian and Library Staff should undergo intensive training on safety protocols, incident reporting, Listening & guiding their colleagues as well as for surveillance and continuous improvement in library environment. The Librarian should form Library COIVD 19 committee, comprising of Head of Department. One Senior Teaching faculty, 1 Senior Administrative staff, Senior Non-teaching staff and cleaner. This committee should draw out written policy/protocol for library. Identify emergency responders and send them for training.

General Guidelines

Incorporate Standard Operating Procedures (SOPs) to ensure infection prevention and control measures are executed in a systematic way-- Continuity Plan.

Every individual entering library premises should:

- Undergo thermal screening and health checks before entering Library.
- Maintain physical distance.
- Use more sanitizers, reusable face cover, gloves
- Adequate hand wash and alcohol-based sanitizers should be made available at all entry, exit points as well as meeting rooms and all common areas.
- Reusable face cover to be worn by all staff at all times. Adequate stock should be maintained by the library /staff at all times.
- Have disinfected and cleaner office spaces. Ensure that frequently touched surfaces are kept clean and disinfected at all times. Frequent sanitization and disinfecting of workplace, common facilities, transport facilities and all human touch points should be ensured
- Reduce physical touch points, example- face recognition tools to replace biometrics, automatic machine retrieval of books from shelves
- Whole concept of space to be re-imagined in library. Libraries must maintain one meter distance between individuals as recommended.
- New workplace policies need to be planned. For example, reserve desk in advance, have shift for staff with adequate gaps between shifts and staggered lunch breaks for staff. Etiquettes for use of canteen, elevator and other common places need be adopted by all library staff.
- Emotional Wellbeing of faculty- Have discussion / consultations with employees so that workplace is safe and functional. Maintain Emotional wellbeing of employees by increasing
- Display across the workplace mandating physical distancing as well as Dos and Don'ts for the employees.
- Only essential work-related travel of employees should be allowed during working hours
- All employees must use their own office equipment only. In case pooled equipment are to be used, proper sanitization of equipment must be done before asking employees to use it
- Intensive training on good hygiene practices should be ensured for all employees.
- Non-essential visits of parents or vendors to the institutions should be avoided, to the extent feasible
- Library needs to define and place clear instructions for visitors at the entrance.
- Each visitor should be checked for temperature and should be provided with a face cover and hand sanitizer.
- Adequate signage should be placed for the visitors to navigate inside the library facilities/settings
- Nearby Hospitals and Clinics authorized should be identified and listed in the library.
- Encourage all staff to report any safety and health concerns. Employees showing any symptom of COVID-19 should be sent for check-u
- Quarantine room to be earmarked for isolating employees with COVID-19 symptoms till they are safely moved to the pre- identified medical facility.
- Appropriate PPE should be given to the employee while his/her stay in the quarantine room.
- The quarantine room should be thoroughly sanitized and disinfected after each occupancy

More Guidelines to follow:

1. **Mask**- Wear a reusable face cover when you step out of your house and change to a fresh mask when you reach library.

2. **Physical Distance**- Always maintain a physical distance of at least 1 meter at all time when with another person.

3. **Hygiene**- Wash your hands with soap and water for at least 40-60 secs or sanitize your hands (for at least 20 secs each time frequently). Do not touch your face with unwashed hands.

4. **Avoid Spitting**- Do not spit in the open public spaces. Spitting must be done only in washrooms where water is available to drain it off the surface

5. **Avoid Mass Gatherings**- Do not resume activities conducted pre lock down in libraries and avoid social, political, and cultural and other mass gathering in complexes etc. It should be strictly prohibited till the pandemic is over.

6. **Be Empathetic**- Support anyone who may show symptoms of COVID-19, their caregivers or anyone else around you. Do not discriminate

7. **Self-monitor your health**- If you have fever, cough or difficulty in breathing, call helpline number immediately. Self-isolate yourself until further instruction from the treating physician is received.

8. All employees should use the Arogya Setu App

9. Identify faculty/staff who have conditions that put them at higher risk of serious illness (older people >60 years) & those with chronic conditions. Like hypertension, lung or heart problems, diabetes, undergoing cancer treatment or some other immune--suppression conditions as well as pregnant staff's). Advise them to take additional precautions, such as work from home. (Accordingly work needs to be planned). (Policy to work from home to be drawn by authorities).

Housekeeping operations

Disinfection- Ensure appropriate & adequate equipment for cleaning Ensure all sanitizer/disinfecting solutions are available.

Mops- Ensure all mops are washed thoroughly with detergent after usage, and dried in sunlight

Protect Workers- All housekeeping staff, cleaners and sanitary workers should wear disposable surgical hand gloves while cleaning.

Dealing with employees indicating infected

If a faculty/staff has a high temp. (Fever) (>37.5o C) and/or displays any symptoms for COVID-19, immediately take him/her to an isolation area in the library (preferably in the same building).

Get them to go for check-up and a naos- pharyngeal swab for an RT-PCR test by an authorized laboratory/ health facility to which institution is tied up.

Dealing With Employees Showing Sign of Covid

- Moved to isolation area, should avoid touching people, surfaces objects, cover their mouth and nose with a disposable tissue when they cough or sneeze & put the tissue in a bag or pocket later throw the tissue in a bin with a lid.
- If mild and moderate symptoms, the faculty/staff should be asked to quarantine at home until the test result is known.
- Faculty/staff with severe symptoms should be immediately moved to the identified health facility.
- Transport facility should be arranged for sick faculty/staff while maintaing physical distance, as required.
- The vehicle should be fully disinfected after the transport.
- The driver and the companion, if any, should also wear a mask during the travel.

Manage staff who have come in contact:

- Self-isolate at home for 14 days from the last time they had contact with the confirmed case.
- If they develop symptoms, or their existing symptoms worsen within the 14-day observation period, visit health care facility.
- Staff who have not been in close contact with the original confirmed case do not need to take any precautions other than monitoring their health for symptoms and can continue to attend work.

Cleaning the workplace if an employee shows positive signs:-

- Evacuate the immediate area of work.
- The affected area should be cleaned and disinfected immediately and work in that area resume only on the next day.

Dealing with staff anxiety if any one becomes +vet:

- Clear communication is important, directing faculty to reliable sources of information about COVID-19 is important to clear doubts.
- Head should be supportive & understanding, as far as possible flexible on work arrangements.

Social stigma associated with COVID-19

- Do not discriminate against anyone who is COVID positive or anyone who has come in contact with any COVID patient.
- Promote empathetic listening and positive messaging around COVID-19

When travelling to work.

- Wear re-useable mask.
- Wear a full sleeves overcoat or carry extra set of clothes change when you reach work.
- Wear washable foot wear to prevent contaminating work space.
- Maintain distance with co-passenger
- Wash hands before leaving home, sanitize hands during travel, frequently wash hands as soon as you enter work place.
- Follow cough/sneeze etiquette.
- Try to keep distance between you & another

Conclusion

Indian Institutions have seen a significant shift from in-person to online course delivery. However, overall there is relatively little change in how libraries are serving their users at this point. Libraries are putting a range of prevention and mitigation measures in place, especially increased cleaning by library and custodial staff, providing hand sanitizer for patrons, and canceling public events. Somewhat surprisingly, indicate using the strategy of "regular communication to staff with updates and guidelines on safety measures." The biggest change we found that libraries are making is with respect to remote work policies.

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MASSIVE ICT TRANSFORMATION OF LIBRARIES: ITS TRENDS, CHALLENGES & THEIR OPPORTUNITIES

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Abstract

Libraries, once seen as strongholds of standard knowledge deposits, have gone through a significant change as of late, driven by innovative progress and changing social needs. This abstract investigates the developing scene of libraries, plunging into the conspicuous patterns that have molded their metamorphosis and the difficulties they confront in adjusting to this dynamic condition. The computerized insurgency has been an essential impetus for the change of libraries. The shift from print to digital was prompted by new trends and technologies as well as the usage of specific digital library software. This led to changes in the documentation, communication, and digitization processes. The computerized change of gatherings, the rise of online databases, and the ubiquity of ebooks have upset how data is gotten to and spread. Libraries aren't confined to actual spaces any longer; they have turned into computerized focuses, accessible whenever and anyplace. This move has extended the scope of libraries and presented difficulties in overseeing computerized resources, guaranteeing information security, and ensuring the protection and well-being of clients. Navigating copyright issues can prove complicated. Bringing people together and public engagement have become pivotal to the modern library vision. Libraries are no more than information repositories; they are dynamic places that foster teamwork, studying, and cultural sharing. This development has brought about a redefining of library services, with a focus on programs, workshops, and events that cater to diverse community needs. However, balancing traditional scholarly pursuits with community-centered efforts presents difficulties regarding the allocation of resources and maintaining the integrity of scholarly pursuits. Making information available to all and the rise of materials freely available have reshaped the role of libraries as advocates for equitable access to knowledge. Libraries are increasingly involved in initiatives that promote publishing with everything available to read, materials for education available to everyone, and dismantling barriers that block information. While monetary constraints, subscription versions, and necessitating sustainable funding brings ongoing difficulties in realizing the vision of universal access.

Key Words: - Innovative, Computerization, Repository, Knowledge, Digital Print, Trends, Library Technologies.

Introduction: The role and function served by information centers has evolved in a positive manner, led by progress in technology, adaptations in how patrons access knowledge, and adjustments to community requirements. This multifaceted progression involves various parts of the services, facilities, and interactions provided. Gaining awareness of the patterns and obstacles connected to this beneficial repurposing is important for information centers to stay applicable and helpfully serve their neighborhoods in this digital period. Digital changes involve coordinating many areas of work, processes, skillsets, and models to benefit from opportunities and adaptations brought by combining digital tools and their quick growth affecting communities. Considering current situations and potential futures is essential when enacting digital changes. For libraries run by governments, for public libraries, and for institutional collections dealing with ict issues, this has mainly influenced access. The digital evolution of libraries continues shaped by emerging tendencies and technologies bettering information access, enhancing user experiences, and streamlining library operations. Here are some important tendencies and tools contributing to libraries' ongoing digital adaptation. additionally, the rapidly advancing technology introduces a constant test for libraries to stay knowledgeable of developments like artificial intelligence, virtual truth, and block chain. Integrating these technologies into library services demands not merely a monetary investment but also up skilling library professionals and confirming that these technologies align with the ethical principles of information stewardship. This abstract concludes by highlighting the need for libraries to navigate the delicate balance between embracing technological progressions and preserving their core values as guardians of knowledge. As libraries continue to evolve, comprehending and addressing these tendencies and obstacles will be crucial in shaping their part in spreading wisdom.

Overview of requirements for digital transformations of libraries

traditionally built from paper, places of knowledge are evolving into lively digital networks. Our organization, knowing change comes to sharing facts, and dreams of a leading technology library. This plan matches our goal of spreading the chance to join in and make new ideas to find the truth. As want grows for virtual items, the need for a helpful, person-focused space gets ever clearer. The digital library aims to surpass space limits, offering a smooth and enriched time for a wide group of users, from pupils and thinkers to all people. Digital transformation is revolutionizing libraries' role to shift them from traditional repositories of books to dynamic hubs of information and technology. The libraries are embracing digital tools and technologies to enhance accessibility, promote literacy, and provide innovative library services. This transformation involves the digitization of the collection, the adaptation of online resources, and the integration of cutting-edge technology like ai and big data management of the libraries. Libraries are evolving into collaborative spaces, fostering community engagement and serving as centres for the lifelong learning centre. In the digital age, libraries are adapting and demonstrating a strong commitment to remaining vital contributors to education and knowledge-sharing with storage centers. This highlights their changing role.

The present scenario of library collection development to library users provide traditional library services such as digital information services the collection development and selection terms and conditions of the library committee are to be made in the changing context of the nature of library resources.

Traditional way of library collections	**Electronic way of library collections**
Dissertation	1. Etds
Journals	2. E-journals
Books	3. E-books
Bounds volumes	4. Journals archives
Newpaper clipping file	5. E-newpaper clipping collection
Photo album files	6. Images archiving systems
Reference collections	7. Reference digital tools

New technologies in traditional information services

new technologies help to improve the conventional system efficiently and quickly.

Library services	**traditional ways**	**modern ways**
Cas	1. Printing form	1. Electronic form
Document delivery service	2. By post	2. By email
Indexing	3. By manual	3. By machine
Document sharing	4. Inter library loan	4. Resource sharing
Translation	5. By manual	5. By machine

Application of latest technologies in information age

in the modernized age of information society and its services, technologies play a vital role in information selection, processing, storage, information retrieval, information and communication technology, and dissemination. The invention of computers, communication, and web technologies are major milestones in the information age.

Web Technology	1. Online Information Service
Library Books Search By The Manuals	2. By The Library Software
Users Circulations	3. RFID Technology
Book Scanning	4. OCR Technology
Manually Records	5. SSD/ HDD
Many Journals Purchasing	6. Consortium

Trends in library transformation

Digitalization of collections: libraries are increasingly digitizing their collections, making books, journals, and other resources accessible online. This trend enhances the availability and accessibility of information to a wider audience.

Technological integration: libraries are embracing technology to enhance user experiences. This includes the integration of automation systems, self-checkout kiosks, and the adoption of library management software to streamline operations.

Space reimagining: libraries are moving away from traditional book-centric spaces to multifunctional, collaborative environments. This trend involves creating spaces for community engagement, workshops, and events, catering to diverse user needs.

Focus on digital literacy: libraries are increasingly becoming hubs for digital literacy, offering workshops, training sessions, and resources to help users navigate and make the most of digital information.

open access and open science: libraries are advocating for and promoting open access to scholarly research content. They play a pivotal role in supporting open science initiatives and fostering collaboration and knowledge sharing.

Community engagement: Libraries are evolving into community centres, hosting events, workshops, and activities that cater to the diverse interests and needs of their communities. This helps libraries become integral parts of the social fabric.

Data management and research support: Libraries are taking on a more active role in supporting research activities, including data management, citation assistance, and access to research tools. These align with the view-changing landscape of scholarly communication.

Challenges in library transformation:

Financial constraints: Implementing technological upgrades and maintaining relevant resources can be expensive. Libraries often face financial challenges in keeping up with the costs associated with transformation.

Digital divide: While digitalization brings numerous benefits, it also exacerbates the digital divide. Some communities may lack access to the necessary technology, hindering their ability to benefit fully from digital library services.

Privacy and security concerns: As libraries become more digital concerns about user privacy and data security arise. Libraries must navigate the balance between providing personalized services and safeguarding user information.

Staff training and skill development: The transformation requires library staff to acquire new skills and adapt to changing technologies. On-going training is essential to ensure that librarians can effectively serve patrons in an increasingly digital environment.

Balancing physical and digital resources: Libraries need to strike a balance between maintaining physical collections and investing in digital resources. Managing this transition is a challenge, especially when catering to diverse user preferences.

Copyright and licensing issues: Providing digital access to resources involves navigating complex copyright and licensing agreements. Libraries must ensure compliance while striving to offer extensive and inclusive collections.

Measuring impact and effectiveness: Quantifying the impact of library transformation initiatives and assessing their effectiveness can be challenging. Developing meaningful metrics to gauge success and user satisfaction is an ongoing challenge for libraries.

Conclusions: In conclusion, the transformation of libraries is an ongoing and dynamic process shaped by various trends and challenges. Successfully navigating this transformation requires a strategic approach that balances technological innovation, community engagement, and the preservation of core library values. By staying attuned to the evolving needs of their users and proactively addressing challenges, libraries can continue to play a vital role In The Information Landscape of the future.

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LIBRARY COLLECTION OF HUMAN RESOURCE DEVELOPMENT CENTRE AT UNIVERSITY OF HYDERABAD.

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Abstract

This paper contains the study of collection of printed materials as well as non printed materials in the Human Resource Development Centre Libraries. This paper study also the library automation and digital libraries at Human Resource Development Centre of University of Hyderabad.

1. Introduction

India falls a third with regard to the size of higher education system after USA and China. With UGC, as the top body which acts as an advisor to the India's government, maintains high standards and acts as a node between the state and central governments. Rapid advancement has been seen in the expansion of higher learning in India, particularly in the first decade of the 21st century. During the phase 2000-2011, as numerous as 20,000 colleges and 8 million plus students have got a place in the in post-secondary education system.
The Human Resource Development Centre will oversee the administration of using one or more national institutions and be responsible for planning, organizing, carrying out, overseeing, and assessing induction and orientation programs for recently hired college and university instructors. Refresher training for currently employed instructors as well as orientation sessions for senior administrators, department heads, officers, principals, and other relevant parties will be arranged by an HRDC. They'll assist with as well organize the student induction program and run the teacher induction program.

2. Objectives of the Research study:

1. To study the collection of printed materials of HRDC libraries.
2. To study non-printed materials of HRDC Libraries.
3. To study library automation and digital libraries of HRDC.

3. Plan of the Research Study:

Primary data has been collected by surveying the HRDC library with the help of a questionnaire.

The Researcher has gathered secondary information from the internet websites, annual reports of the HRDC, documents of the UGC, published research papers, yearbooks, research theses, research journals, newspapers and magazines.

4. Research Methodology & Collection of Data Tools:

Survey method is using for collection the data. Researcher design the questionnaire in this questionnaire structured/standardised and unstructured/non-standardised questions are used. In survey method researcher used the techniques of direct and indirect oral communication. The questions are set with the objectives.

Primary data has been collected by surveying the HRDC library with the help of a questionnaire. The secondary data available from annual reports, journals and websites.

5. Review of Literature:

Agarwal Vibhuti, (2000) provides a thorough overview of how to establish a serials collection in an academic library in his book "Library Serial Collection," which was published in 2000. The book provides further information about aspects of journals in print form. A brief addendum is located in the last chapter's few pages, where a small number of accessible electronic journals on Compact Disk Read Only Memory (CD ROM) diskettes

are discussed. Although online journals were widely accessible in 2000 and before, the author shows his ignorance or overexposure to situations that are print version oriented directly. The book is helpful to augment learning in any case, as many college libraries still choose to focus on print publications due to the increased cost of online journals.

According to Kumar, (2012) academic libraries are currently facing various difficulties. However, these difficulties can be addressed by using best practices, such as creating a virtual presence, web-based services, and information brochures. He comes to the conclusion that the institution's total performance would continuously improve as academic libraries follow best practices.

Shanmugam and Balasubramanian, (2020) published "Knowledge Sharing of E-Resources among Academic Staff College of Central University Pondicherry." In this study report According to the data, 34.21 percent of respondents visit the library to "prepare a course assignment." Other common reasons include reading newspapers, making notes, reading books and magazines, and learning about social activities. It is determined that respondents' attitudes towards the resources and knowledge sharing of the ASC at Pondicherry Central University are influenced by independent variables.

6. HRDC University of Hyderabad.

Table No. 6.1 HRDC Library Collection Printed Materials

Name of HRDC	No. of Books	No. of Titles	No. of Reference Books	No. of Other Books	Peer Review Journals	Bound Journals	Reports	Dissertations/Thesis	Institutional Publications	Newspapers	Project
University of Hyderabad	3822	-	105	30	3	25	-	-	-	1 to 5	314

The library has a collection of 3,822 books, 105 reference books, 30 other books, 3 peer reviewed journals, 25 bound journals, 1 to 5 newspapers and 314 projects. They have not responded to the question on no. of titles, reports, dissertation/thesis and institutional publications in the questionnaire. *(Refer table no. 6.1)*

Table No. 6.2 Library Collection Non-Printed Materials

Name of HRDC	E- Resources	INLIBNET N-LIST	DELNET	EDUSAT	UGC Consortia / University Remote Access	Multimedia Tools
University of Hyderabad	No	×	×	×	×	√

HRDC University of Hyderabad, Andhra Pradesh has not subscribed to E- Resources only multimedia tools are shown in the library. *(Refer table no. 6.2)*

Table No. 6.3 Library Automation and Digital Library

Name of HRDC	LAN Facility	Digital Library	Library Software Name	Nature of Automation	Websites	Library websites
University of Hyderabad	Yes	No	No	In Process	Yes	No

Local Area Network (LAN) is available. There is no separate tab to library webpage on HRDC website. There is no any provision for digital library and library software. *(Refer table no. 6.3)*

7. Conclusions & Findings:

In the HRDC University of Hyderabad has not as much number of books in their libraries. library has to purchase books to every year in the allocated budget by University Grand Commission. Hyderabad city is the hub of information technology but in the HRDC Hyderabad University no any kind of provision of E – Resources in their libraries. Only LAN facility is available in the library but still library has not installed open-source software and not purchase the library software for library automation. Today is the world on technology, new trends in the library are adopted by the University of Hyderabad HRDC libraries.

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THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN INDIAN ACADEMIC LIBRARIES AND THE EDUCATION SYSTEM

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Abstract

This research paper examines the pivotal role of Information and Communication Technology (ICT) in transforming academic libraries and the education system in India. With a special focus on academic libraries, the study explores how ICT has revolutionized information access, storage, retrieval, and dissemination in educational institutions. The paper investigates the impact of ICT on library services, resource management, and user experience, while also analyzing its broader implications for the Indian education system. Through a comprehensive review of literature and analysis of current trends, this research highlights the challenges and opportunities presented by ICT integration in Indian academic libraries and education. The findings underscore the critical importance of ICT in enhancing the quality and accessibility of education in India, while also identifying areas for future development and research.

Keywords: Information and communication Technology, Education, Digital Literacy

Introduction

In recent decades, the rapid advancement of Information and Communication Technology (ICT) has profoundly impacted various sectors of society, with education and libraries being at the forefront of this digital revolution. In India, a country with a rich educational heritage and a rapidly growing technology sector, the integration of ICT in academic libraries and the broader education system has become increasingly significant.

Academic libraries, as the heart of educational institutions, play a crucial role in supporting learning, teaching, and research activities. The advent of ICT has transformed these libraries from traditional repositories of printed materials to dynamic, digital information centers. This transformation is particularly noteworthy in India, where academic libraries are striving to bridge the digital divide and provide equitable access to information resources.

The Indian education system, one of the largest in the world, has also been significantly influenced by the integration of ICT. From primary schools to universities, technology has become an integral part of the teaching-learning process, administrative functions, and educational content delivery. The National Education Policy 2020 further emphasizes the importance of technology in education, highlighting the need for digital infrastructure and ICT-enabled learning environments.

This research paper aims to explore the multifaceted role of ICT in Indian academic libraries and its broader impact on the education system. By examining current practices, challenges, and opportunities, the study seeks to provide insights into the transformative potential of ICT in enhancing the quality and accessibility of education in India.

The paper will address the following key areas:

1. The evolution of ICT adoption in Indian academic libraries

2. ICT applications in library services and resource management

3. The impact of ICT on user experience and information literacy

4. Challenges in implementing ICT solutions in Indian academic libraries

5. The role of ICT in supporting e-learning and distance education in India

6. Future trends and opportunities for ICT integration in libraries and education

ICT Uses and Tools in Academic Libraries

The integration of Information and Communication Technology (ICT) in Indian academic libraries has revolutionized their functionality, services, and overall user experience. This section explores the various uses of ICT and the tools commonly employed in academic libraries across India.

1. Library Management Systems (LMS)

Library Management Systems have become the backbone of modern academic libraries in India. These integrated systems automate various library operations, including:

- Cataloging and classification

- Circulation (check-in/check-out)

- Acquisitions

- Serials management

- Online Public Access Catalog (OPAC)

Popular LMS solutions in Indian academic libraries include Koha, NewGenLib, and SOUL (Software for University Libraries), developed by INFLIBNET.

2. Digital Libraries and Institutional Repositories

Academic libraries in India are increasingly developing digital libraries and institutional repositories to preserve and provide access to digital content. These platforms use software such as DSpace, EPrints, and Greenstone to manage:

- E-books and e-journals

- Theses and dissertations

- Research papers and articles

- Institutional publications

- Multimedia resources

3. Resource Discovery Tools

To enhance resource discoverability, many Indian academic libraries have implemented:

- Discovery services (e.g., EBSCO Discovery Service, Primo)

- Federated search engines

- Link resolvers for seamless access to full-text content

4. Reference Management Software

Libraries provide access to reference management tools to support research activities. Common software includes:

- Mendeley

- Zotero

- EndNote

5. E-learning Platforms

Academic libraries often collaborate with their institutions to support e-learning initiatives through:

- Learning Management Systems (LMS) like Moodle
- Massive Open Online Courses (MOOCs) platforms
- Virtual classrooms and webinar tools

6. Mobile Applications

Many Indian academic libraries have developed mobile apps to provide services such as:

- Mobile OPAC
- Reservation and renewal of materials
- Access to e-resources
- Library notifications and alerts

7. Radio Frequency Identification (RFID)

RFID technology is being adopted by academic libraries for:

- Self-check-in/check-out systems
- Inventory management
- Security and theft detection

8. Cloud Computing

Cloud-based services are increasingly used for:

- Hosting library websites and OPACs
- Collaborative cataloging
- Shared storage of digital resources

9. Social Media and Web 2.0 Tools

Academic libraries utilize social media platforms and Web 2.0 tools for:

- User engagement and outreach
- Information dissemination
- Collaborative learning and knowledge sharing

10. Data Analytics and Visualization Tools

Libraries are beginning to use data analytics tools to:

- Analyze usage patterns
- Inform collection development decisions
- Improve service delivery

11. Assistive Technologies

To ensure inclusive access, academic libraries are incorporating:

- Screen readers
- Braille embossers

- Magnification software

- Text-to-speech converters

12. Virtual and Augmented Reality

Some advanced academic libraries in India are exploring the use of VR and AR for:

- Virtual library tours

- Interactive learning experiences

- Visualization of complex data and concepts

The adoption of these ICT tools and applications varies across Indian academic libraries, often depending on factors such as funding, infrastructure, and institutional support. However, the trend towards increased ICT integration is clear, reflecting the growing recognition of technology's role in enhancing library services and supporting the broader educational mission of academic institutions in India.

Through a comprehensive analysis of these aspects, this research aims to contribute to the ongoing discourse on the role of technology in shaping the future of education and library services in India. Technology has disrupted all areas of our life and education is no different. Especially after the pandemic, more schools are looking towards online learning as a permanent teaching method along with traditional classroom teaching. But while most of the institutes have used some form of online teaching in the past year, they lack a systematic approach to virtual learning.

ICT stands for Information and Communication Technology. It is concerned with the storage, retrieval and manipulation, transmission and receipt of digital data. Some of the most common examples of ICT are mobile phones and televisions.

In order for the teaching staff or the students to be updated with what's happening around the globe and how great the tech industry is doing; they need to have the support of virtual learning and communication to improve the way of learning and delivery of education in every way.

Every aspect of our life is driven by technology. We are growing more and more reliant on technology. It not only makes our life simpler but also more efficient.

Use and benefits of ICT in Education

The use of IT is multifaceted. It provides students the vast open field of learning in their own pace. And having the support of ICT in the form of study materials, e-books, helps the students to increase their focus and attention to detail while learning. Having access to all the materials helps a student retain the studies for a long and also can be referred to it in case of doubts and problem solving.

Furthermore, ICT in education enhances communication and collaboration. Online forums, video conferencing and virtual classrooms enables students to connect with peers and educators from around the globe.

Teachers also benefit from ICT as it helps them to use different digital tools and platforms which increases their focus more on the individualized and core of teaching.

The introduction of ICT holds so many advantages in the process of learning and plays a vital role in leveraging the knowledge of students.

- Teachers can use different ways and platforms to teach the students, making the comprehension comfortable for students.
- This also calls for using different techniques and strategies while teaching which increase the engaging the students all throughout the learning sessions.
- It improves the student- educator interactions.
- It also enhances easy evaluations and better conceptual understanding

Some of the active surveys conducted by the concerned departments first hand brings out such results as shown below:

Q. 1 - Do you think that ICT tools like Internet, Mobile, Laptop, Kindle, etc. can improve your English Communication?

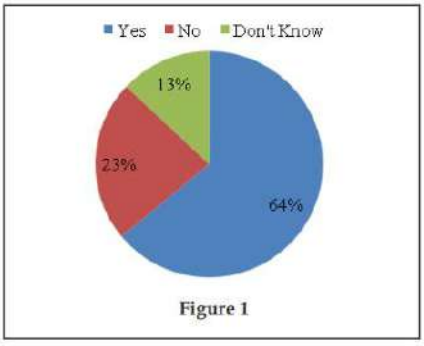

Figure 1

Q. 2 - Do you think that ICT tools has potential to improve your knowledge

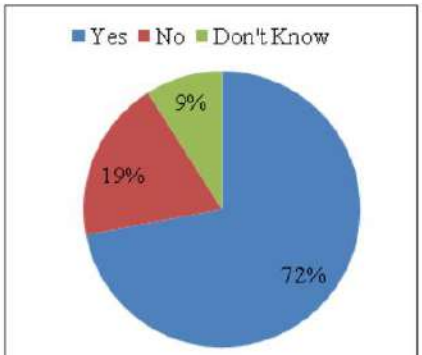

Figure 2

Q. 3 - Do you think that your teachers encourage for online learning or e-learning

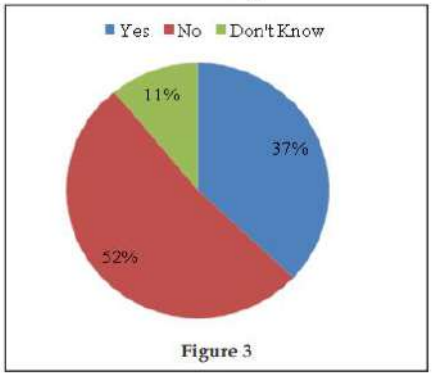

Figure 3

The above survey conducted concludes that the about 50% of the audience are aware and concerned about the ICT in education and they are willingly open to digital learnings and believes that the ICT in educations holds a good major role in providing knowledge to the learners in the best way possible. Yet when we see the third chart, the result comes out to be ironical as that says that the encouragement of teachers for encouraging learners for online or e-learning is very less. Almost 52% says 'no' when it comes to getting a thumbs up for online learning. The results are shocking because the learner has to be encouraged in order to make them understand the core and high time importance of getting updated with the technology and digital platforms for learning beyond the four walls.

One fine way to help teachers encourage students for digital learning could be to provide better training or workshops on how important digital learning is and that they should also help them learn on how to use these digital learning platforms for the best. The classrooms of the 21st century is rapidly changing with the help of technology. ICT has revolutionized the way the education industry functions. But while it is extremely beneficial, the proper use of ICT is also equally important. The **importance of ICT in the education sector** is huge, and soon it will be an integral part of all school systems. Along with implementing the tools, it is necessary to train the educators to harness the true potential of ICT. Digital literacy among teachers and students transforms the way we use technology to learn. With ICT, we can build school systems that are more efficient, cost-effective, and inclusive of everyone.

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INFORMATION LITERACY IN DIGITAL ERA

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Abstract

Information literacy is the set of skill and knowledge that allows people to find out, evaluate and use of various information that they need, information technology skills are the basic skills to be acquired in the use of the information. Lifelong learning is regarded as a basic necessity for each individual to achieve success in the twenty first century whereas, information literacy is the basis for lifelong learning hence, and these two are inter-related. In this paper we explain that due to the advancement of information and communication technology and the rapid changes in society, various important learning trends have developed. For the literacy education of learners, many new literacy terms have developed, such as media literacy, new age literacy, media and information literacy.

Keywords: Information, Information Literacy, Digital Era and Media literacy.

Introduction

India has experienced growing population of literate and educated citizens due to various efforts in universalisation of elementary education through programs. Today everyone wants a information for his problem solving and decision making. Information literacy is an area of constant growth and development. In the digital age, where the most valuable currency is often relevant information, there is a high demand for people who can efficiently and effectively access, critically evaluate and utilize information to solve the problem at hand. Digitization has led to the new information formats and new modes of information distribution. Users often prefer ICT to access the required information since the retrieval is faster. The shift from print to digital information has made users to acquire new knowledge and skills in formation seeking.

Definitions:

1. **Information** is an abstract concept that refers to something which has power to inform.
2. The communication or reception of knowledge or intelligence called information**.**
3. **Literacy** simply means the fundamental ability to read, write and calculate.
4. **Information literacy** concentrates on cognitive and transferable skill, such as problem solving, evaluation and communication skills.
5. **Information literacy** refers to the ability to find, evaluate and use sources effectively. The term covers a broad range of skills including the ability to the term is often used interchangeably with digital literacy.
6. **Media Literacy** is an expanded conceptualization of literacy that includes the ability to access and analyze media messages as well as create, reflect and take action, using the power of information to make a difference in the world.
7. **Digital Era** is characterized by a period in which the circulation of information occurs very easily and quickly, affecting the circulation of knowledge in society.

What is mean by Information Literacy?

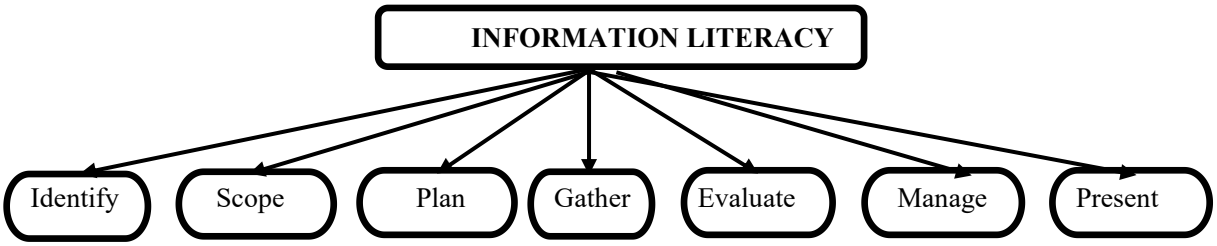
- Acknowledge the need for information.
- Analyze what information is needed.
- Observe that information.
- Evaluate information critically for relevance and credibility.
- Use information to solve a problem or answer a question.
- Use information legally and ethically.

An information literate person is able to following points:-

- Access the information effectively and efficiently.
- Evaluate information competently and critically.

- Uses information creatively and accurately.
- Contributes positively to the learning community and society.
- Appreciates literature and other creative expression of information.
- Practices the ethical behavior in regard to information and information technology.
- Endeavor for excellence in information seeking and knowledge generation.
- Pursues information related to personal interests.

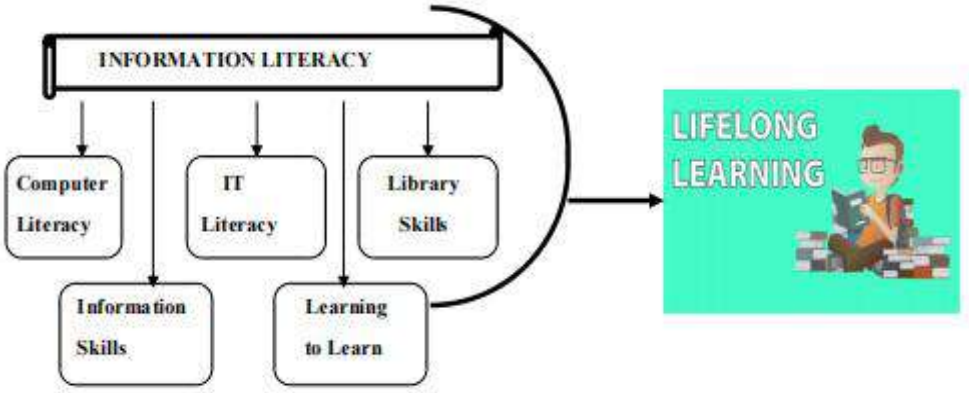
Information literacy landscape:



Information literacy For Lifelong Learning:

Information literacy lies at the core of lifelong learning. In this Era, lifelong learning has become one of the main themes in education sector. Therefore the students and researchers need to be educated with regard to the abilities and skills of how to learn, or learning to learn by developing the aspects of reasoning. Information literacy empowers people in seek, evaluate, use and create effectively to achieve their personal, occupational, educational, personal and social intention. It's a primary human right in a digital world and promotes social involvement. Information literacy and lifelong learning are inter-related. Inter-related means they have self-motivated & self-directed, self actuating and self empowering. It can be says that the information literacy is set of skills and Lifelong Learning is a good practice.

An illustration of the relationship between information literacy and lifelong learning skills is shown below:



Above diagram shows that information literacy is a set of skills and has various components such as Information skills, Library skills, Computer literacy, IT literacy and Learning to Learn. These components act as a key to open the all types of information of lifelong learning to all peoples. Once people information literate then he/she is capable to prepare for the journey of the continuous lifelong learning.

Role of Librarian in Promoting Information Literacy for Lifelong learning:

Librarians have to play a vital role to provide and promote Information Literacy in Society. Libraries can provide access to digital resources; technology training and programs that help people develop the skills they need to navigate the digital world ethically and effectively. Librarians need to play an important role in the education process by making people aware of a need and motivate the use of information a new knowledge. Information literacy facilitates learning process. Students and researchers learn faster and well through the vehicles of

information literacy. In learning main focus on achieving skills, knowledge and attitudes, associated with specific subject areas. The information literacy curriculum plays a major role in order to cultivate these skills among the university and research institute students and researchers. The curriculum can be implemented by the librarian with the help of academic and administrative staff to determine the information.

Information Literacy in Digital Age:

In the digital era, where a world of information is just a click away, libraries have stepped into a new and essential role as champions of information literacy and critical thinking. Libraries traditional roles as repositories books, libraries have become dynamic center where individuals learn to navigate the vast seas of digital data. Transformative role of libraries in promoting and providing these essential skills in an increasingly complex and digital world.

- Libraries serve a classrooms for information literacy education. Libraries equip people with tools needed to be savvy consumers and creators of digital content.
- In a digital era online and offline collections of trustworthy resources and provide access to databases and journals. Libraries help strengthen the foundation of well-informed decision making.
- Libraries and librarians offer a digital literacy training courses covering various chapters from online privacy and responsible social media use. Information literacy is an indispensable skill in today's digital era.
- Librarians provide resources and guidance on evaluating the credibility of sources, detecting bias and recognizing logical fallacies.
- Libraries offer media literacy programs that teach individuals how to deconstruct media content, discern fact from opinion and recognize the influence of bias.
- Libraries provide access to fact-checking resources and organizations.
- Libraries and librarians teach individuals how to conduct effective online search and navigating online databases.
- Libraries serve as venues for book discussions, debates and public lectures, fostering the exchange of ideas and the development of critical thinking skills.

Conclusion:

Libraries and Librarian providing information resources in print and electronic format, today's libraries often serves as a hub for an educational and cultural activities through the lifelong learning skills. Information literacy is one such potential tool that empowers all its learners. In addition information literacy is a survival skill in the information and digital age.

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USE OF E-DATABASES BY TEACHERS OF RAYAT SHIKSHAN SANSTHA'S COLLEGES IN PUNE DISTRICT

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Abstract

The utilization of electronic resources (e-resources) and electronic databases (e-databases) in higher education is crucial for improving teaching, research, and learning. This paper examines educators' preferences and challenges related to these digital tools. We analyze the types of e-resources commonly used by teachers, such as academic journals, digital textbooks, multimedia resources, and open educational resources (OER). Our findings show that academic journals and online databases are the most frequently used, followed by digital textbooks and multimedia resources, indicating a strong reliance on scholarly and interactive materials in teaching. We also explore various challenges faced by educators, including difficulties in information retrieval, lack of training, and technical issues. The paper discusses how these challenges affect the effective use of e-resources and suggests strategies for addressing them. Through this analysis, we aim to provide insights into improving the integration of digital resources in educational settings to support enhanced educational practices and outcomes.

Keywords: Electronic Resources-Databases, Higher Education, Teaching Effectiveness

Digital Learning Materials, Open Access Journals

In recent years, the rapid advancement of information technology has revolutionized the educational landscape, leading to the widespread adoption of electronic resources (e-resources) in academic institutions. Among these, electronic databases (e-databases) have become a cornerstone for academic research and teaching. E-databases are digital collections of academic journals, conference papers, e-books, and other scholarly materials that can be accessed online. They offer a wealth of information that is readily available to educators and students, enhancing the overall educational experience. In the past few years, the swift progress of information technology has transformed the educational field, resulting in the extensive use of digital resources in academic settings. Electronic databases, in particular, have become fundamental to academic research and learning, serving as repositories of online academic journals, conference papers, e-books, and other scholarly content. These databases provide a vast amount of easily accessible information for both educators and students, enriching the educational environment.
Rayat Shikshan Sanstha, located in Maharashtra, India, is a well-known educational institution recognized for its widespread presence of schools and colleges. Founded in 1919 by the influential social reformer Karmaveer Bhaurao Patil, the organization is dedicated to offering high-quality education to students from various socio-economic strata, with a special focus on rural and underprivileged populations.

Definition of E-databases

Electronic databases (e-databases) are organized collections of digital information that can be accessed electronically through various digital platforms. These databases contain a vast array of academic resources, including journal articles, conference papers, reports, e-books, and other scholarly content. They are designed to facilitate efficient searching, retrieval, and management of information, supporting research, teaching, and learning activities (Johnson, 2014). These databases are typically subscription-based services provided by academic institutions, libraries, or commercial vendors. They often include advanced search functionalities, enabling users to perform complex queries and access precise information relevant to their academic or professional needs (Tenopir, 2003). Electronic databases are a significant step forward in the arrangement and availability of digital data. They enable streamlined research, education, and learning by offering organized and searchable compilations of scholarly materials.

Objective of the Study

- To investigate the frequency and extent of electronic database (e-database) utilization among Teachers in Rayat Shikshan Sanstha's colleges affiliated with Pune University, Pune District.
- To identify the types of e-databases most commonly accessed by Teachers for purposes such as teaching, research, and professional development.
- To explore Teacher's perceptions, attitudes, and satisfaction levels regarding the availability, accessibility, and usefulness of e-databases in their academic activities.
- To examine the factors influencing Teacher's adoption and utilization of e-databases, including technological proficiency, institutional support, and individual preferences.
- To assess the challenges and barriers encountered by Teachers in integrating e-databases into their teaching and research practices, and to propose strategies for overcoming these challenges.

Scope and Limitation of Study

- This study focuses on teachers in Rayat Shikshan Sanstha's colleges affiliated with Pune University in Pune District, Maharashtra.
- The investigation encompasses the utilization of electronic databases (e-databases) for teaching, research, and professional development purposes.
- The study explores various types of e-databases, including online journals, e-books, and educational platforms.
- Factors influencing teachers' adoption and usage patterns of e-databases, such as technological proficiency, institutional support, and individual preferences, are examined.

Literature Review

The use of electronic resources (e-resources) and electronic databases (e-databases) by teachers in higher education has been extensively researched, reflecting its significant impact on teaching effectiveness, learning outcomes, and institutional development. Li and Liu (2018) conducted a comprehensive review on e-resource utilization in academic libraries, highlighting the crucial role these resources play in supporting research, teaching, and learning. Their analysis addressed challenges such as budget constraints and information overload, and proposed strategies for overcoming these issues. Rowlands et al. (2008) investigated the integration of social media into scholarly communication, noting its increasing importance in research workflows and collaboration, while also addressing concerns related to its use in academic contexts. JISC (2020) emphasized the transformative potential of interactive simulations, virtual reality, and open educational resources (OER) in higher education, presenting these innovations as crucial tools for enhancing student engagement and active learning. Wiley and Green (2012) championed open access publishing models and OER, advocating for their role in democratizing knowledge and fostering collaboration among educators and researchers. The efficacy of traditional peer review practices was questioned by Bohannon (2013), prompting discussions on the need for reform in academic publishing, with Mulligan et al. (2013) further exploring researchers' attitudes toward peer review and calling for greater transparency and diversity. Bjork et al. (2014) discussed global trends in open access publishing, identifying barriers to universal access and progress in open access initiatives, while Suber (2012) provided a thorough overview of the open access movement and its implications for scholarly communication. McLuhan (1964) explored the influence of media technologies on culture and cognition, introducing the concept of the "global village" and predicting the rise of digital networks. Reymond (2016) examined the impact of e-books on the publishing industry, highlighting their potential to democratize literature access and redefine authorship. Rowley (2012) addressed the challenges and opportunities of integrating e-books into library collections, whereas Gomez et al. (2018) compared e-books with printed textbooks, noting advantages such as enhanced accessibility and interactivity. Practical insights into database systems design were provided by Connolly and Begg (2014), while foundational and advanced concepts in database management were explored by Date (2003), Ramakrishnan and Gehrke (2003), and Elmasri and Navathe (2016). Dias (2017) investigated the impact of digital multimedia technologies, and Mayer (2009) discussed multimedia learning principles, emphasizing cognitive load theory and instructional design strategies. Liu et al. (2017) reviewed research on multimedia learning, highlighting its benefits for engagement and knowledge retention.

Research Methodology and Data Collection

This study investigates the use of E-databases by faculty members in three colleges affiliated with Savitribai Phule Pune University to understand usage patterns, preferences, and challenges. The study uses both quantitative and qualitative methods to investigate electronic resource utilization by faculty members in colleges affiliated with Pune University in Pune District, Maharashtra. A structured questionnaire was used for quantitative data collection, while semi-structured interviews provided qualitative insights. The questionnaire gathered information on various aspects of e-resource utilization, and interviews were conducted with a diverse group of Teachers. The combination of quantitative and qualitative data provides a comprehensive understanding of e-resource utilization among Teachers.

Table : Selection of Sample

Name of the College	Abbreviation	Female Teachers	Male Teachers	Total
Annasaheb Awate Arts, Commerce & Hutatma Babu Genu Science College, Manchar	AAHBC	18	17	35
S. M. Joshi College, Hadapsar	SMJCH	19	19	38
Dr. Babasaheb Ambedkar College, Aundh	DBACAP	5	7	12
Total		42	43	85

The study used a stratified sampling method, dividing faculties into three strata based on colleges they belonged to. Within each college, a simple random sampling technique was used to select a sample of faculties. A total of 85 faculties were sampled, with 42 female and 43 males. This approach aimed to provide an overview of gender distribution across the selected colleges.

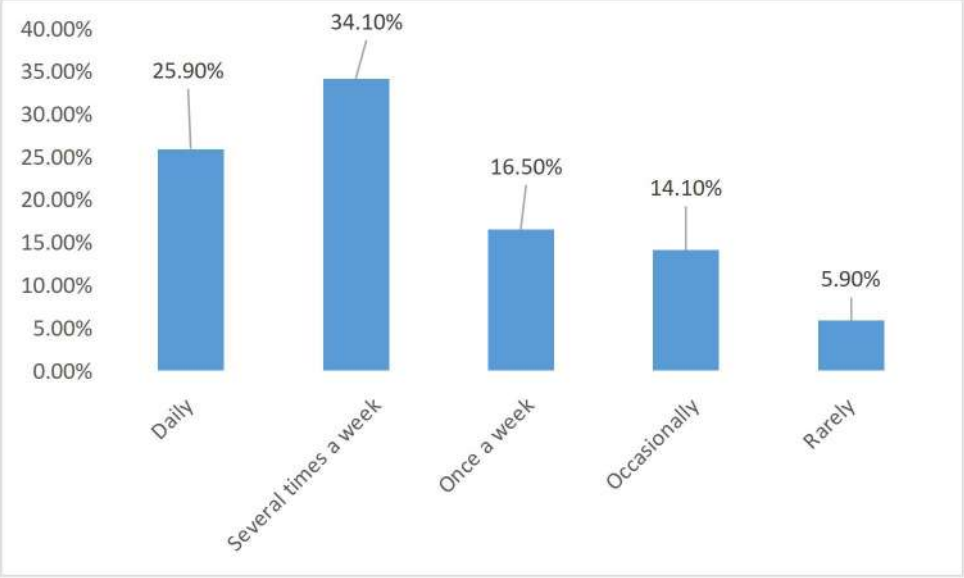
Frequency of E-Database Usage among Teachers

The usage frequency of E-Databases among faculty members offers valuable insights into their patterns and preferences. This analysis helps to understand how often faculty access electronic resources for teaching and research, providing a comprehensive view of their engagement with digital resources. By examining usage frequency, we can identify trends and variations in E-Database utilization, which informs strategies to better support and integrate these resources into educational practices.

Frequency of E-Database Usage among Teachers

Sr. No.	Frequency of Use	Male Faculties	Female Faculties	Total Faculties	Percentage (%)
1	Daily	12	10	22	25.9
2	Several times a week	14	15	29	34.1
3	Once a week	8	6	14	16.5
4	Occasionally	7	5	12	14.1
5	Rarely	2	3	5	5.9

Frequency of E-Database Usage among Teachers



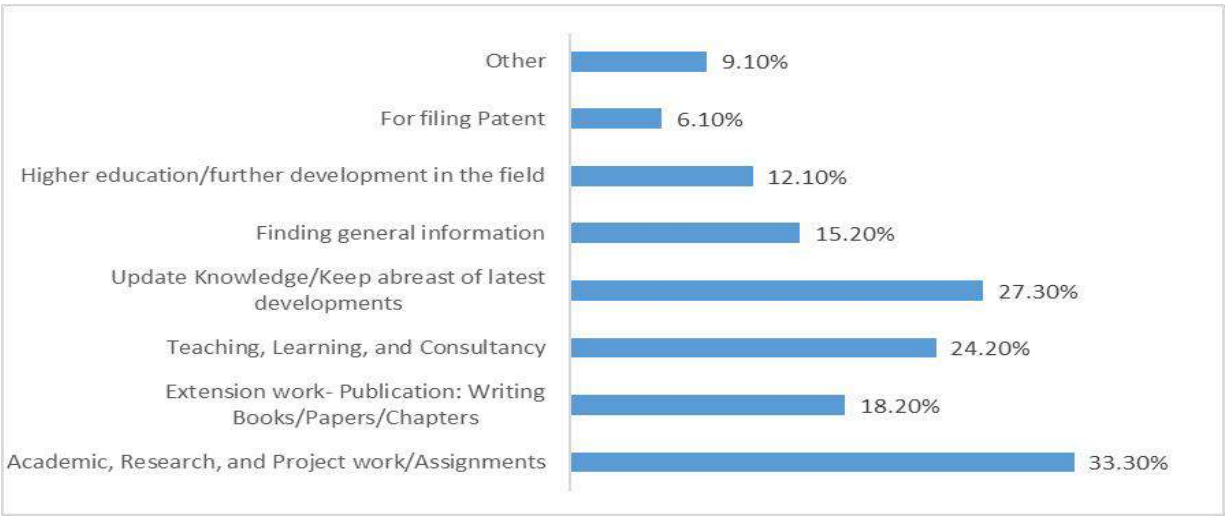
The analysis of E-databases usage among faculties reveals that the majority (25.9%) access E-resources several times a week, followed closely by those who use them daily (34.1%). A smaller proportion reported using E-resources once a week (16.5%), occasionally (14.1%), rarely (5.9%), or never (3.5%). These findings indicate that educators rely significantly on E-databases, incorporating them into their teaching and research routines on a regular basis. The widespread usage underscores the importance of E-databases in modern educational practices and highlights the need for continued support and investment in digital infrastructure within academic institutions to enhance teaching and learning outcomes.

Objective of the utilization of E-databases and e-resources

This analysis explores the various purposes for using electronic resources. It sheds light on the main reasons for accessing digital materials and how these resources are used to fulfil specific educational and research needs.

Objectives of E-Resource Utilization

This analysis reveals that the most common objective for utilizing e-resources is for academic, research, and project-related activities, constituting 33.3% of respondents. Following closely behind are objectives related to updating knowledge and teaching/learning, at 27.3% and 24.2% respectively. Accessing resources for finding general information and for filing patents are the least common purposes reported, at 15.2% and 6.1% respectively.



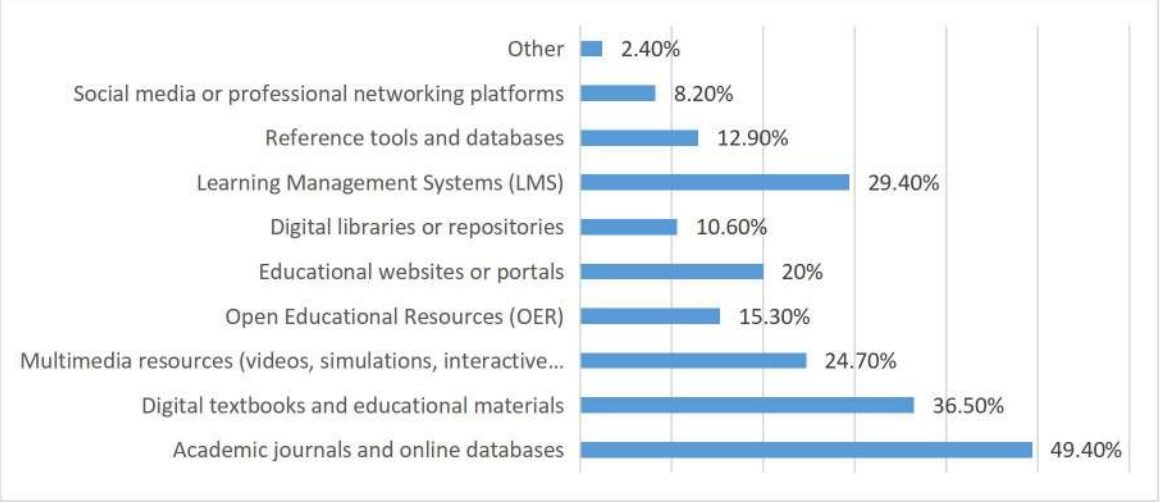
Types of E-Resource usage by Teachers

The use of electronic resources (e-resources) has significantly transformed teaching and learning methods in educational institutions. It's important to understand the various types of e-resources that educators use to improve teaching techniques and enhance educational results. This study aims to analyze the different types of e-resources that educators employ in their teaching. By examining the prevalence of various e-resource categories, those involved in education can gain valuable insights into the changing landscape of digital teaching and can develop targeted initiatives to support the diverse needs of educators.

Types of E-Resource usage by Teachers

Sr. No.	E-Resource Type	Male Teachers	Female Teachers	Total Teachers	Percentage (%)
1	Academic journals and online databases	22	20	42	49.4
2	Digital textbooks and educational materials	15	16	31	36.5
3	Multimedia resources (videos, simulations, interactive presentations)	11	10	21	24.7
4	Open Educational Resources (OER)	7	6	13	15.3
5	Educational websites or portals	9	8	17	20
6	Digital libraries or repositories	5	4	9	10.6
7	Learning Management Systems (LMS)	13	12	25	29.4
8	Reference tools and databases	6	5	11	12.9
9	Social media or professional networking platforms	4	3	7	8.2
10	Other (please specify)	1	1	2	2.4

Types of E-Resource usage by Teachers



The analysis of e-resource utilization among teachers has revealed that academic journals and online databases are the most frequently used resources, with 49.4% of teachers relying on them. Digital textbooks and educational materials are also widely used by 36.5% of teachers, indicating a shift towards digital resources. Multimedia resources, such as videos and simulations, are utilized by 24.7%, enhancing instructional engagement. Open Educational Resources (OER) are accessed by 15.3%, while educational websites or portals are used by 20%. Digital libraries or repositories are employed by 10.6% of teachers, while Learning Management Systems (LMS) are utilized by 29.4%, underscoring their role in course management. Reference tools and databases are used by 12.9%, and social media or professional networking platforms have the lowest usage at 8.2%. The "Other" category, representing less common resources, is used by just 2.4% of teachers.

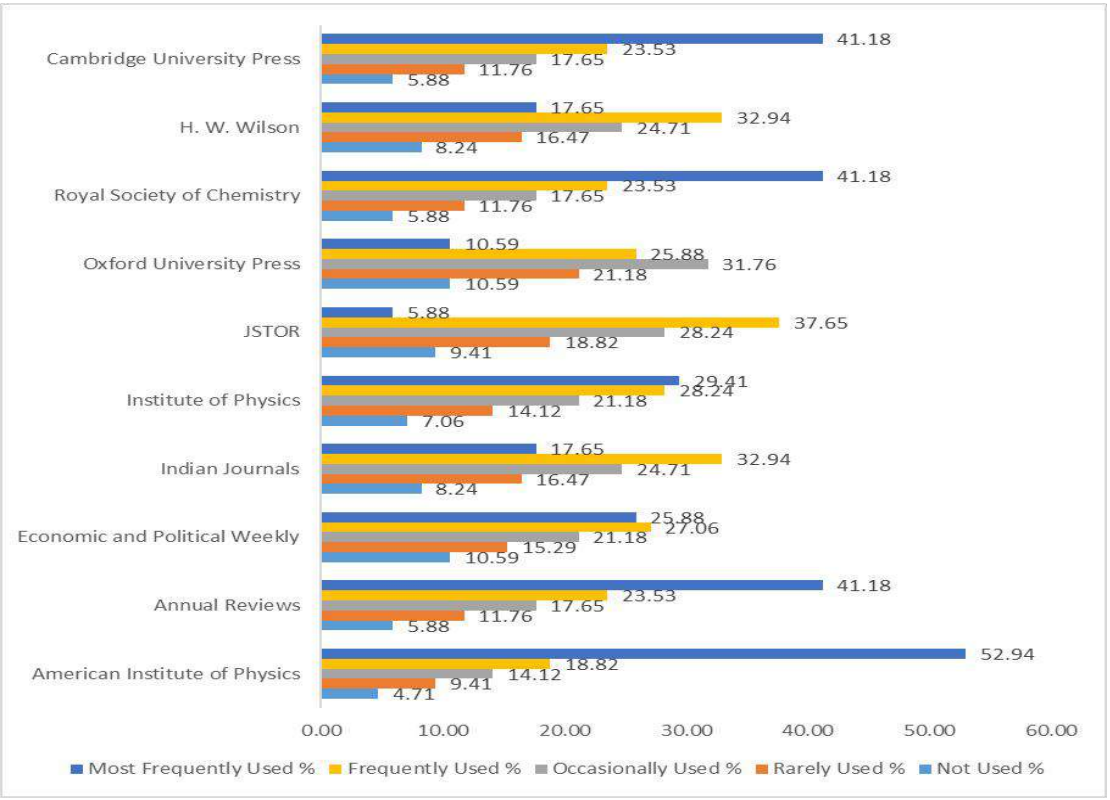
E-Journal / Databases Accessed through NLIST

Access to electronic journals and databases is vital for modern academic research and teaching. Understanding how educators use these resources is important for optimizing support services and fostering a culture of digital scholarship. This analysis aims to explore educators' usage of E-Journals databases accessed through NLIST, providing insights into their preferences and behaviours. The data sheds light on educators' engagement with scholarly content and can inform strategies to enhance research productivity and the teaching-learning experience in higher education institutions.

E-Journal / Databases Accessed through NLIST

Sr. No.	Databases	Not Used	Rarely	Occasionally	Frequently	Most Frequently
1	American Institute of Physics	4	8	12	16	45
2	Annual Reviews	5	10	15	20	35
3	Economic and Political Weekly	9	13	18	23	22
4	Indian Journals	7	14	21	28	15
5	Institute of Physics	6	12	18	24	25
6	JSTOR	8	16	24	32	5
7	Oxford University Press	9	18	27	22	9
8	Royal Society of Chemistry	5	10	15	20	35
9	H. W. Wilson	7	14	21	28	15
10	Cambridge University Press	5	10	15	20	35
Total		**61**	**125**	**186**	**233**	**231**

E-Journal / Databases Accessed through NLIST



American Institute of Physics (AIP):AIP database shows varied usage among teachers: 5.9% never use it, 11.8% rarely use it, 17.6% use it occasionally, 23.5% use it frequently, and 41.2% use it most frequently.

Annual Reviews: Among teachers, 11.8% never use Annual Reviews, while 23.5% rarely use it. Additionally, 17.6% use it occasionally, 29.4% use it frequently, and 41.2% use it most frequently.

Economic and Political Weekly (EPW): EPW has a distribution of usage: 17.6% never use it, 11.8% rarely use it, 29.4% use it occasionally, 41.2% use it frequently, and 51.8% use it most frequently.

Indian Journals: For Indian Journals, 23.5% of teachers never use it, while 11.8% rarely use it. Furthermore, 23.5% use it occasionally, 35.3% use it frequently, and 41.2% use it most frequently.

Institute of Physics: Usage of Institute of Physics database is as follows: 23.5% never use it, 11.8% rarely use it, 29.4% use it occasionally, 41.2% use it frequently, and 51.8% use it most frequently.

JSTOR: Among teachers, 29.4% never use JSTOR, while 17.6% rarely use it. Moreover, 35.3% use it occasionally, 47.1% use it frequently, and 58.8% use it most frequently.

Oxford University Press: Usage of Oxford University Press database varies: 23.5% never use it, 17.6% rarely use it, 35.3% use it occasionally, 47.1% use it frequently, and 41.2% use it most frequently.
Royal Society of Chemistry: For the Royal Society of Chemistry database, 23.5% never use it, while 17.6% rarely use it. Additionally, 35.3% use it occasionally, 47.1% use it frequently, and 35.3% use it most frequently.

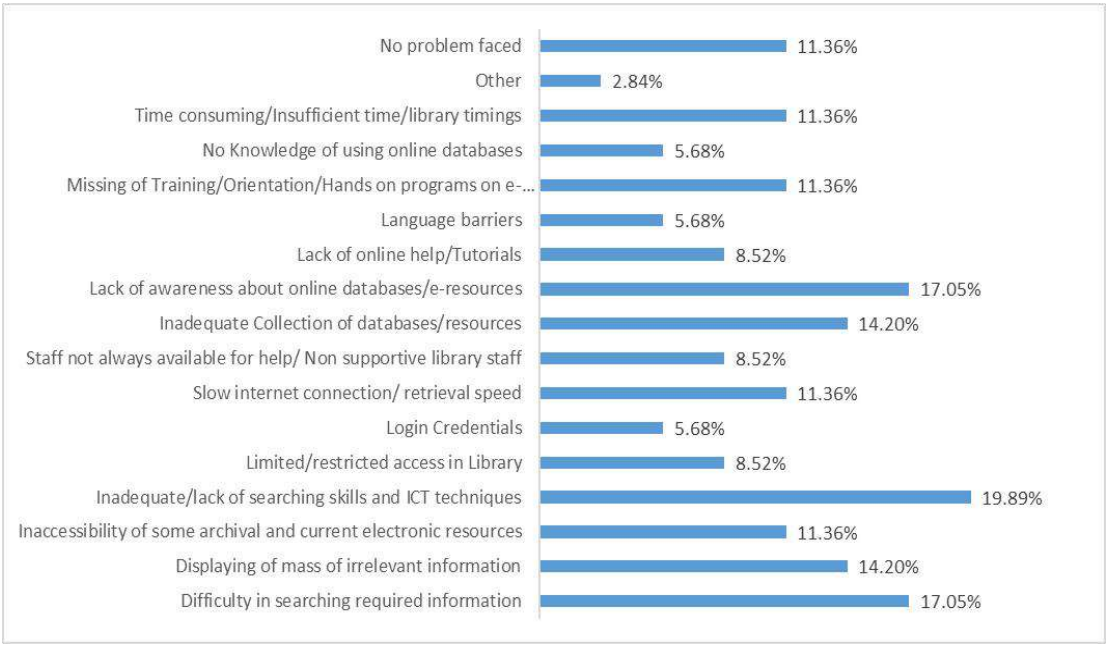
H. **W. Wilson:**H. W. Wilson database usage is distributed: 11.8% never use it, 23.5% rarely use it, 35.3% use it occasionally, 47.1% use it frequently, and 41.2% use it most frequently.
Cambridge University Press: Usage of Cambridge University Press database is as follows: 11.8% never use it, 23.5% rarely use it, 35.3% use it occasionally, 47.1% use it frequently, and 29.4% use it most frequently.

The analysis of e-database usage among teachers demonstrates diverse engagement patterns across different platforms. JSTOR and Economic and Political Weekly (EPW) are among the most frequently used, with a substantial proportion of teachers accessing them most frequently. In contrast, American Institute of Physics (AIP) and Indian Journals show a broader range of usage frequencies, from infrequent to frequent use. Annual Reviews, Oxford University Press, and Institute of Physics databases also see notable frequent use, although some teachers report never using them. H. W. Wilson and Cambridge University Press show moderate engagement with a significant number of teachers using them frequently, while a smaller percentage never use them. Overall, the data reflects varying levels of preference and engagement with e-databases among teachers, indicating a mix of high-frequency and occasional use depending on the resource.

Problems Encountered in Utilizing E-Databases

The examination of problems encountered in utilizing e-databases reveals a spectrum of challenges that significantly impact teachers' ability to effectively leverage these digital resources. This analysis aims to identify and understand the specific difficulties faced by educators, ranging from technical issues such as inadequate searching skills and slow internet speeds to accessibility concerns and limited support

Problems Encountered in Utilizing E-Databases



The analysis of the data reveals several key challenges faced by teachers in utilizing electronic Databases. The most frequently reported issues include inadequate or lacking searching skills and ICT techniques, affecting 19.89% of teachers, and difficulty in searching for required information, reported by 17.05%. These concerns indicate a need for improved training and skill development. Problems related to the relevance and accessibility of information are also notable, with 14.2% of teachers experiencing difficulties with irrelevant information and another 14.2% citing inadequate databases and resources. Accessibility issues, such as the inaccessibility of archival and current resources and slow internet connection or retrieval speed, affect 11.36% of teachers each, highlighting the need for enhanced digital infrastructure. Additionally, support-related challenges are significant, with 8.52% of teachers reporting limited library access, insufficient support from library staff, and lack of online help or tutorials. Other concerns include login credential issues, language barriers, and missing training programs, affecting 5.68% to 11.36% of teachers. Despite these challenges, 11.36% of teachers reported facing no problems, suggesting that some users do not encounter significant barriers. Overall, these findings underscore the need for better training, improved resource management, and enhanced support systems to optimize the use of electronic resources in educational settings.

Conclusion

The comprehensive analysis of electronic databases usage among teachers and the associated challenges provides valuable insights into both the utilization patterns and the obstacles faced in academic settings. The data indicates a strong preference for academic journals, online databases, and digital textbooks, highlighting their critical role in supporting teaching and research activities. However, several challenges persist, including issues with searching skills, relevance of information, and accessibility of resources. Problems such as slow internet speeds, inadequate support, and insufficient training further complicate the effective use of these tools. Addressing these issues through improved training programs, enhanced digital infrastructure, and better resource management is essential to optimizing the use of electronic resources. By focusing on these areas, institutions can enhance the efficiency of information retrieval and support teachers in their educational endeavours, ultimately fostering a more effective and responsive academic environment.

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A SCIENTOMETRIC PROFILE ON ANNUAL REVIEW OF GENETICS IN SCOPUS

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Abstract

The present study is based on the Scientometricis analysis of 139 research article published in SCOPUS on Annual Review of Genetics during the period of 2012-2016. This Study will review on year-wise distribution, Authorship pattern of contributions, Author wise distribution, Institution wise distribution, country-wise distribution, reference of the article, Length of Article wise distribution. The findings must reveal various aspects of the characteristics and patterns of contributions of the study.

Keywords:- Scientometrics, Genetics, Authorship pattern.

Introduction

Now a day's Scientometric is one of the truly interdisciplinary research fields extended to almost all scientific fields. Scientometric applications are used to measure scientific activities, mainly by producing statistics on scientific publications indexed in databases. Scientometrics is the branch of science that describes the output traits in terms of organizational research structure, resource inputs and outputs, develops benchmarks to evaluate the quality of information output. Also Scientometric studies characterize the disciplines using the growth pattern and other attributes. These applications are extremely valuable methods for evaluating research output, to know about the author productivity and citation analysis in science and technology. Further Scientometric tools can be used to measure and describe countries, universities, research institutes, journals, specific research topics and specific disciplines (Singh, 2014).

Definition Analysis

Scientometrics:

According to bankapur, M.B. and Kumabar, (1993) "Scientometrics is a more general that Bibliometrics. It is interesting to know, that both disciplines have a large overlap. It is surprised to learn certain comments stating that both disciplines have a large overlap. It is surprised to learn certain comments stating that Scientometrics, using Bibliometrics techniques id a part of Bibliometrics".

Scientometrics Analysis:

According to (2006), wouters, a cart intension has always existed between academic Scientometrics and political /practical, Scientometrics, the letter of which has been described as a hybrid of social science and bur rerate expertise.

Scopus:

Scopus is Elsevier's abstract and citation database launched in 2004. In 2009, the Content Selection and Advisory Board (CSAB) were formed to develop an objective system of evaluation and validation of peer-reviewed journals for inclusion or exclusion in Scopus against transparent and fair criteria. Covers nearly 36,377 titles (22,794 active titles and 13,583 Inactive titles) from approximately 11,678 publishers, of which 34,346 are peer-reviewed journals in top-level subject fields Life Sciences, Social Sciences, Physical Sciences and Health Sciences. It covers three types of sources: Book Series, Journals, and Trade Journals. All journals covered in the Scopus database, regardless of who they are published under, are reviewed each year to ensure high-quality standards are maintained. Searches in Scopus also incorporate searches of patent databases. It gives four types of quality measure for each title, those are *h*-Index, CiteScore, SJR (SCImago Journal Rank) and SNIP (Source Normalized Impact per Paper). Anyone can find all titles on the Scimago Journal Ranking website. According to the Scimago Journal Rankings, Nature has

the highest *h*-index (1011 as of 2016), and CA - A Cancer Journal for Clinicians has the highest SJR (39.285 as of 2016) and CiteScore 2016 (89.23 in the 99th percentile). Scimagojr.com used to give country ranking based on Total Published Documents, Citable documents, Citations, Self-Citations, Citations per Document and *h*-index. As per this website USA (*h*-index: 1965) is in first place, UK (*h*-index : 1213) is in the second place and Germany (*h*-index : 1059) is in third place based on national *h*-index

Literature Review

Khaparde & Pawar (2013) studied the authorship pattern and author's collaborative research in Information Technology with a sample of 17917 articles collect from LISA during 2000-2009.The average number of authors per article is 1.80. In the study the degree of collaboration (C) during the overall 10 years (2000-2009) is 0.71 but the year wise degree of collaboration is almost same in all the years of mean value 0.49. According to 10 years of period, the multi- authorship articles are higher and predominant on single authorship. The study found that the researches in Information Technology are keep toward team research or group research rather than solo research.

Khaparde, Vaishali (2013) the paper studied the Bibliometric Analysis of Research Publication of Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, from 1975 to 2012. It analyzed all the 774research publications from the 144 journals. It examines year- wise distribution of papers, authorship pattern, journal in which author publish, it revealed that the number of publications has increased consistently from the year 1975 to the year 2012. 25% of the total publications have been made in 2009, 2010, and 2011. And the majority of the publications are made with 4 authors. And also the majority of the research paper published in journal of heterocyclic chemistry.

(Alhamdi, Khaparde & Wankhede Raju, 2014) The present study deals a Scientometric analysis of 56 papers published in the Library and Information science & Technical Abstract (LISTA) on internet use in the subject of library &Information science during the period 2004 - 2013. Data is collected and analyzed by using the SPSS software. The study focused on various aspects: such as document types, growth Rate (GR) and doubling time (DT) of publications and citations, year-wise, authorship pattern, institutions involved, most prolific authors of the journal. The study revealed that most of the papers (71.4%) of papers were contributed by multiple authors. USA is the top producing country with 8 (14.3%) publications of the total output. All the articles were published in English language. The mean doubling time for the first five years (i.e. 2004 to 2008) is only (1.05) which is increased to (6.07) during the last five years (2009 to 2013). Maximum 35 (62.5%) out of 56 of the authors are not mentioned their email address in the paper.

Objective Of The Study:

1. To study the Data Analysis & Interpretation
2. To study the Author's Productivity
3. To study the year-wise distribution of publishing and citation.
4. To study the growth Rate (GR) and doubling time (DT) of publications
5. To find out the authorship and degree of collaboration pattern in the publication
6. To identify the length of Article.
7. To find out organization-wise distribution of publication.
8. To find out country-wise distribution of publication.

Scope And Limitation Of The Study:

The present study is based on the Scientometrics Profiles of Annual Review of Genetics in SCOPUS. The present study is based on over all 139 contributions during 2012-2016.

Data Collection

Data can be numerically expressed that is quantified quantifiable or objective (Fasibs off and Dely, 1990) the data was collected from SCOPUS, with the help of excel. Total 139 contributions during 2012-2016.

Data Analysis And Interpretation:

Scientometrics analysis is a branch of bibliometrics. It is an important research tools for understanding of the subject it aims at measuring the utility of documents and relationship between documents and fields.

The present study is based on the Scientometric profile of Annual Review of Genetics in SCOPUS 2012-2016.The present study is based on over all 139 contributions during 2012-2016.

Data Analysis & Interpretation

In views of the objectives of the present study, analysis the terms "Annual Review of Genetics" in the database "SCOPUS" on during 2012-2016.

Table No 01. Data Analysis & Interpretation

Year	Total No. of Articles	Total No. of Author	AAPP	PPA
2012	32	85	2.65	0.38
2013	26	69	2.65	0.38
2014	25	70	2.80	0.35
2015	30	85	2.83	0.35
2016	26	77	2.97	0.33
Total	**139**	**386**	**2.78**	**0.37**

The data pertaining to author productivity has presented in the Table No.1 shows that the total Average number of authors per paper is 2.78 for the relatively equal average number of authors per article when compared the total average number of authors per article. The average productivity per author is 0.37 during the year 2012 – 2016. Productivity has been calculated with the following formula. Average Authors per Paper = No. of Authors / No. of Papers Productivity per Author = No. of Papers / No. of Authors.

Table No.02 Year wise Author productivity

Year	Single Author	Malty Author	Total Author
2012	4	28	32
2013	6	20	26
2014	1	24	25
2015	3	27	30
2016	4	22	26
Total	**18**	**121**	**139**

Table No. 03 Authorship pattern

Year	2012	2013	2014	2015	2016	Total
Single Author	4	6	1	3	4	18
Two Author	15	11	12	16	10	64
Three Author	8	3	6	5	2	24
Four Author	2	2	4	2	6	16
Five Author	1	2	1	2	3	9
Six Author	1	1	1	1	0	4
More than Six Authors	1	1	0	1	1	4
Total	**32**	**26**	**25**	**30**	**26**	**139**

Fig No. 03 Authorship pattern

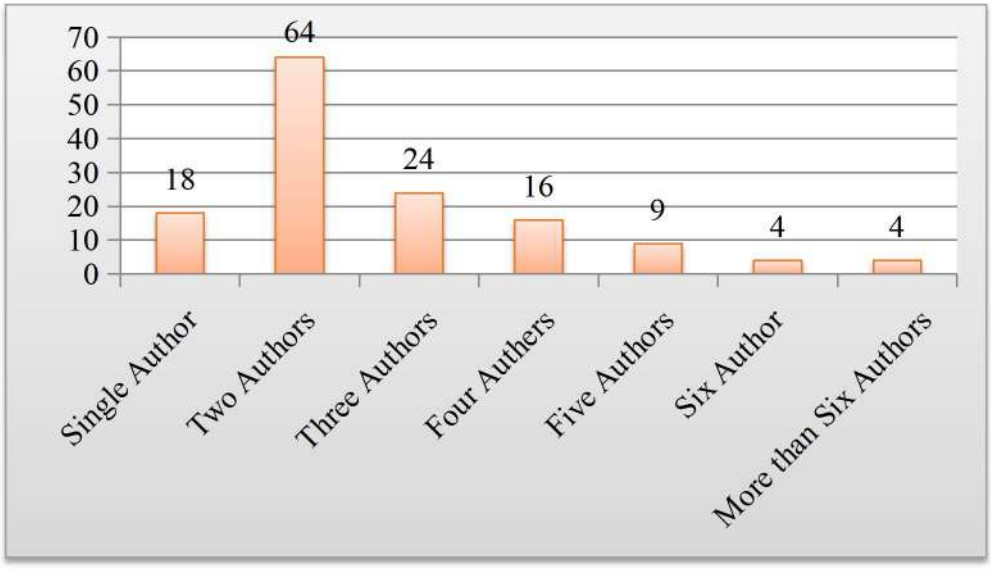

Table No.03 and Fig No.03 show the authorship pattern of the papers published during the period of study. The highest numbers of articles had been published by Two authors 64. This is followed by 24 authors in three authors. The minimum numbers of authors is six authors of 4.

Most Productive Authors:

Table No. 03 Shows Most Productive Author

Sr. No.	Authors	Total	Percentage
1	Bai M.-Y.	2	0.52
2	Haber J.E.	2	0.52
3	Han M.	2	0.52
4	Pires J.C.	2	0.52
5	Author Publishing One (1x378)	378	97.93
Total		**386**	**100.00**

It can be observed from Table No.03 that, the most productive authors are Bai m-Y, Haber J.E, Han M and Pires J.C. each contributed 2 papers. The rest 378 (97.93 %) authors each published one articles.

Table No. 04 Institute-Wise Distribution of Articles Published

Sr. No.	Affiliations	Total	Pesentege
1	Laboratoire de Physiologie Cellulaire et Végétale, CNRS/Université Joseph Fourier Grenoble I/INRA/CEA, 38054 Grenoble Cedex 9, France	8	2.07
2	Department of Molecular and Applied Microbiology, Leibniz Institute for Natural Product Research and Infection Biology, Hans Knöll Institute (HKI), Jena, Germany, Institute for Microbiology, Friedrich Schiller University Jena, Jena, Germany	7	1.81
3	Center for Cancer Research, National Cancer Institute, Frederick, MD 21702, United States	6	1.55
4	Department of Biochemistry and Molecular Biology, University of Massachusetts, Amherst, MA, United States	6	1.55
5	Department of Microbial Pathogenesis, Boyer Center for Molecular Medicine, Yale School of Medicine, New Haven, CT 06536, United States, Yale Microbial Diversity Institute, West Haven, CT 06516, United States	6	1.55
6	Department of Molecular Biology, Princeton University, Princeton, NJ, United States	6	1.55
7	Laboratory of Microbiology, Department of Agrotechnology and Food Sciences, Wageningen University, 6703 HB Wageningen, Netherlands	6	1.55
8	Cancer Research UK London Research Institute, London, United Kingdom, University College London Hospital and Cancer Institute, CRUK Lung Cancer Centre of Excellence, London, United Kingdom	5	1.30
9	Center for Circadian Biology, University of California-San Diego, San Diego, CA, United States, Kavli Institute for Brain and Mind, University of California-San Diego, San Diego, CA, United States	5	1.30
10	Molekulare Botanik, Universität Ulm, 89069 Ulm, Germany	5	1.30
11	Department of Genetics, University of Georgia, Athens, GA, United States, Institute of Bioinformatics, University of Georgia, Athens, GA, United States	4	1.04
12	Department of Microbiology and Immunology, Peter Doherty Institute for Infection and Immunity, University of Melbourne, Melbourne, VIC, Australia	4	1.04
13	Department of Plant Biology, Carnegie Institution for Science, Stanford, CA 94305, United States	4	1.04
14	Department of Tumor Biology, Institute for Cancer Research, Norwegian Radium Hospital, Oslo University Hospital, Nydalen, Oslo, Norway, Institute of Cancer Genetics and Informatics, Norwegian Radium Hospital, Oslo University Hospital, Nydalen, Oslo, Norway, Department of Informatics, University of Oslo, Blindern, Oslo, Norway	4	1.04
15	Howard Hughes Medical Institute, Department of Molecular, Cellular, and Developmental Biology, University of Colorado, Boulder, CO, United States	4	1.04
16	Michael Smith Laboratories, University of British Columbia, Vancouver, BC, Canada, Department of Microbiology and Immunology, University of British Columbia, Vancouver, BC, Canada, Department of Biochemistry and Molecular Biology, University of British Columbia, Vancouver, BC, Canada	4	1.04
17	Université de Toulouse, UPS, Center de Biologie du Développement (CBD), Toulouse, France, CNRS, CBD UMR 5547, Toulouse, France	4	1.04
18	University of Queensland, Queensland Brain Institute, Brisbane, QLD 4072,	4	1.04

	Australia, University of Queensland, Diamantina Institute, Translation Research Institute, Brisbane, QLD 4072, Australia		
19	Three Institution Publication (3x26)	78	20.21
20	Two Institution Publication (2x54)	108	27.98
21	Single Institution Publication (1x108)	108	27.98
Total		**386**	**100.00**

An institution is a community or group that supports education, science, and other endeavors. An institution is a long-term, purpose-driven organizational body. Frequently, it's a research organization (research institution) established to carry out studies on particular subjects. A professional body can also be an institute. In certain nations, an institute can function as a department within a university or other higher education establishment, or it might function as a stand-alone educational establishment devoid of the traditional status of a university institute.

Table No. 05: Country-Wise Distribution of Articles

Sr. No.	Country	Total	Percentage
1	United States	237	61.40
2	United Kingdom	25	6.48
3	France	20	5.18
4	Germany	20	5.18
5	Austria	18	4.66
6	Canada	13	3.37
7	Netherlands	8	2.07
8	China	7	1.81
9	Switzerland	7	1.81
10	Italy	6	1.55
11	Japan	6	1.55
12	Norway	5	1.30
13	Spain	4	1.04
14	Denmark	3	0.78
15	Hong Kong	2	0.52
16	South Korea	2	0.52
17	Brazil	1	0.26
18	India	1	0.26
19	Taiwan	1	0.26
Total		**386**	**100.00**

It can be observed from Table No. 05 that, there were as many as 19 countries carrying out research and produced 139 articles. Table no.05 provides ranked List of countries contributing to this field, the number of publications of each country and their share in percentages. United States is the top producing country with 237 (61.40%) publications of the total Output. Also it can be stated that papers not mentioned their country of publication are more than other countries in this study.

Relative Growth Rate [r (a)] And Doubling Time [dt (a)] For Publications:

Relative Growth Rate (Rgr):

The Relative Growth Rate (RGR) is the increase in number of articles/ pages per unit of time. This definition is derived from the definition of relative growth rates in the study of growth analysis of individual plants and effectively applied in the field of Botany Hunt (1919), Blackman (1919) defined, which in turn had its origin from the study of the rate of interest in the financial investment. The mean Relative Growth rate (R) over the specific period of interval can be calculated from the following equation.

R

1-2 = Loge 2 W - loge IW

Whereas,

1-2 R = mean relative growth rate over the specific period of interval.

Loge IW = log of initial number of Articles.

Loge 2 W = log of final number of articles after a specific period of interval.

2 T - 1 T = the unit difference between the initial time and final time.

The year can be taken here as the unit of time. The RGR for articles is hereby circulated.

Therefore,

1-2 (aa-1 year-1) can represent the mean relative growth rate per unit of year over a specific

period of interval.

Doubling Time (Dt)

There exists a direct equivalence between the relative growth rate and the doubling time. If the numbers of articles/pages of subject double during a given period then the difference the logarithms of numbers at the beginning and end of this period must be logarithms of number 2. If natural logarithm is used this difference has a value of 0.693. Thus the corresponding doubling time for each specific period of interval and for both articles and pages can be calculated by the formula,

Doubling time (Dt) = 0.693/ R (A)

Therefore,

Doubling time for articles D(t) = 0.693/1-2 R (aa-1 year-1)

Table No. 06: Relative growth rate & doubling timing of articles

Year	No of Articles	Cumulative Frequency	W1	W2	RGR	Mean[R(A)]	DT(A)	Mean DT(A)
2012	32	32		3.46				
2013	26	58	3.46	4.06	0.6		1.15	
2014	25	83	4.06	4.41	0.35	0.294	1.98	1.732
2015	30	113	4.41	4.72	0.31		2.23	
2016	26	139	4.72	4.93	0.21		3.3	

From the Table no.06 it noticed that the mean relative growth for the first five years 2012 to 2016 is (0.294). While the Doubling time for different years [DT (A)] gradually increased from (1.732).Thus as the rate of growth of publication was decreased, the corresponding Doubling Time was increased.

Table No. 07: Number of Page wise Distribution of the Article

Year	1-5	6-10	11-15	16-20	21-25	26-30	More than 31	Total
2012	0	2	2	6	18	3	1	32
2013	0	0	1	4	10	8	3	26
2014	0	0	0	5	11	8	1	25
2015	0	0	1	3	19	6	1	30
2016	0	0	1	6	12	3	4	26
Total	**0**	**2**	**5**	**24**	**70**	**28**	**10**	**139**

It can be observed from Table no.07, that the highest number of 70 articles contains 21 To 25 pages, followed by 28 articles contain 26 To 30 pages.

Table No. 08: Language-wise Distribution of Art

Language	Frequency	Percentage
English	139	100
Total	**139**	**100**

From table no. 08 Show that, the language wise distribution of Article on SCOPUS. Total 139 Article were published in "Annual Review of Genetics" from 2012 to 2016. All the articles were published in English language.

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IMPACT OF DIGITAL TECHNOLOGIES ON ACADEMIC LIBRARIES

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Abstract

The paper effectively explores the impact of digital technologies on academic libraries, highlighting the transformation from physical repositories to dynamic digital hubs. It emphasizes the benefits of accessibility, resource management, collaboration, literacy, and personalized learning. The challenges of digital equity, data security, and infrastructure are acknowledged, along with the importance of professional development. The concluding note underscores the libraries' evolving role in the digital age, balancing tradition with innovation to support education, research, and knowledge creation.

Key Words

Digital libraries, Library Technologies, Digital Technologies, Academic Libraries, Impact of Digital Technologies,

Introduction

The integration of digital technologies within academic libraries represents an essential transformation in the realm of higher education and scholarly research. Traditionally viewed as sanctuaries of printed knowledge, academic libraries are now at the forefront of technological innovation, reshaping their roles and services to meet the evolving demands of the digital age (Johnson, 2018). This transformation is driven by rapid advancements in information technology, the exponential growth of digital content, and the shifting expectations of a tech-savvy academic community (Gorman, 2020).

Digital technologies have fundamentally altered the way information is accessed, curated, and disseminated within academic libraries. The proliferation of electronic resources, such as e-books, online journals, and databases, has revolutionized scholarly communication, enabling instant access to a vast array of information that transcends geographical boundaries (Anderson, 2019). This paradigm shift is not merely a superficial change but a profound reconfiguration of the academic library's core functions, from collection development and information retrieval to knowledge preservation and user engagement (Smith, 2021).

In the contemporary academic environment, digital technologies facilitate the creation of dynamic and interactive learning spaces that promote collaboration and innovation. The digital library ecosystem encompasses a diverse array of tools and platforms, including institutional repositories, digital archives, and integrated library systems, which collectively enhance the accessibility and discoverability of scholarly resources (Miller & Keller, 2019). Furthermore, the advent of data analytics and artificial intelligence offers unprecedented opportunities for personalized learning experiences, predictive analytics, and advanced research support (Wang et al., 2020).

Despite these advancements, the integration of digital technologies within academic libraries also presents a series of complex challenges. Issues related to digital equity, data privacy, and the sustainability of digital infrastructure demand critical attention (Thompson, 2018). Moreover, the evolving changes necessitate a redefinition of the librarian's role, emphasizing the need for continuous professional development in digital literacy, data management, and information technology (Martin & Smith, 2022).

As academic libraries navigate this transformative journey, they are tasked with balancing the preservation of traditional scholarly values with the innovative potential of digital technologies. This dual mandate underscores the enduring relevance of academic libraries as vital institutions that not only support but also shape the trajectory of higher education and research in the digital era (Lynch, 2017).

Objectives of Implementing Digital Technologies in Libraries

- **Expand Accessibility:** Ensure that information and resources are accessible to all users, regardless of their location or physical abilities.

- **Enhance Preservation:** Digitize rare and valuable materials to preserve them for future generations and make them more widely available.
- **Streamline Operations:** Implement automated systems for cataloguing, tracking, and managing resources to improve efficiency.
- **Promote Lifelong Learning:** Offer a range of digital learning tools and resources to support continuous education and skill development.
- **Foster Community Engagement:** Create online platforms and virtual events to engage users and build a sense of community.

Benefits and Importance of Digital Technologies in Libraries

- **24/7 Access to Scholarly Resources:** Digital technologies provide round-the-clock access to a vast array of scholarly resources. This availability allows students, researchers, and faculty to access information from any location, thereby overcoming geographical and temporal barriers to knowledge (Johnson, 2018).
- **Streamlined Organization and Management:** Advanced digital cataloguing systems enhance the organization, retrieval, and management of library resources. This increases operational efficiency, enabling librarians to focus on more complex tasks that add significant value to the academic community (Gorman, 2020).
- **Preservation and Accessibility of Rare Documents:** The digitization of rare and fragile documents ensures their preservation for future generations. It also makes these valuable resources accessible to a broader audience, and safeguards academic and cultural heritage (Anderson, 2019).
- **Dynamic, Interactive Learning Environments:** Digital platforms create dynamic, interactive learning environments that facilitate collaboration among students, faculty, and researchers. This promotes the sharing of ideas and promotes innovation (Miller & Keller, 2019).
- **Enhancing Digital Literacy:** Libraries provide essential training and resources to enhance digital literacy. This supports continuous education and skill development among students, faculty, and library staff so as to prepare them for the digital age (Smith, 2021).
- **Robust Data Security Measures:** Implementing robust data security measures protects sensitive information and ensures user privacy. This compliance with legal and ethical standards maintains the trust of the library's users (Thompson, 2018).
- **Promoting Equity and Inclusion:** By providing necessary support and resources, libraries work towards reducing disparities in digital access. This promotes equity and inclusion within the academic community (Martin & Smith, 2022).
- **Personalized Learning Experiences:** Data analytics and AI enable personalized learning experiences and tailored research support. This caters to individual user needs and preferences, making academic endeavours more effective and engaging (Wang et al., 2020).
- **Staying at the Forefront of Innovation:** Continuous exploration and adoption of emerging technologies keep libraries at the forefront of innovation. This enhances services and user experiences while staying abreast of technological trends (Lynch, 2017).
- **Continuous Professional Development:** Ongoing training and development opportunities help librarians acquire new skills in digital literacy, data management, and information technology. This fosters a culture of continuous learning and adaptation (Martin & Smith, 2022).

Impact of Digital Technologies on Academic Libraries

The integration of digital technologies has revolutionized academic libraries and transformed them from traditional repositories of physical books into dynamic digital information hubs. This shift is driven by rapid advancements in information technology, the growing prevalence of digital content, and the changing expectations of a tech-savvy academic community. Digital technologies have profoundly impacted the way information is accessed, managed, and disseminated, bringing numerous benefits while also presenting new challenges. This detailed exploration highlights the significant impacts of digital technologies on academic libraries, emphasizing their benefits and importance.

1. Increased Accessibility and Convenience

- **Remote Access:** Students, researchers, and faculty can access library resources from anywhere at any time, eliminating the need for physical presence.
- **Expanded Reach:** Libraries can serve a wider audience, including distance learners and international researchers, through digital platforms.

2. Enhanced Resource Management

- **Efficient Cataloguing:** Digital cataloguing systems streamline the organization and retrieval of resources, reducing time and effort for both users and librarians.
- **Automation:** Automated systems handle routine tasks such as checkouts and returns, improving operational efficiency.

3. Preservation and Archiving

- **Digital Preservation:** Rare and fragile documents can be digitized, ensuring their longevity and broader accessibility.
- **Cultural Heritage:** Digital archives help preserve cultural and academic heritage, making important documents available to future generations.

4. Support for Collaborative Learning and Research

- **Interactive Platforms:** Digital technologies create interactive learning environments that facilitate collaboration among students, faculty, and researchers.
- **Virtual Collaboration:** Tools and platforms support virtual teamwork, enhancing the collaborative potential in academic research.

5. Promotion of Digital Literacy and Lifelong Learning

- **Training Programs:** Libraries offer training programs to enhance digital literacy among students, faculty, and staff, preparing them for the demands of the digital age.
- **Continuous Education:** Online tutorials, webinars, and workshops support lifelong learning and skill development.

6. Data Security and Privacy

- **Robust Measures:** Implementation of stringent data security measures protects sensitive information and ensures user privacy.
- **Compliance:** Libraries adhere to legal and ethical standards, maintaining user trust and data integrity.

7. Addressing the Digital Divide

- **Equity Initiatives:** Libraries work towards reducing disparities in digital access by providing necessary support and resources to underrepresented groups.
- **Inclusive Services:** Efforts to promote digital equity ensure that all users have equal access to digital resources.

8. Personalized Learning and Research Support

- **AI and Analytics:** Data analytics and AI provide personalized learning experiences and tailored research support, enhancing academic outcomes.
- **Adaptive Platforms:** Digital platforms adapt to individual user needs, offering customized support and resources.

9. Innovation and Adaptation

- **Emerging Technologies:** Libraries continuously explore and adopt new technologies, staying at the forefront of innovation and enhancing user experiences.

- **Technological Trends:** Keeping abreast of technological trends ensures that libraries remain relevant and effective in the digital era.

10. Professional Development of Librarians

- **Skill Acquisition:** Ongoing training helps librarians acquire new skills in digital literacy, data management, and information technology.
- **Continuous Learning:** Libraries foster a culture of continuous learning and adaptation, ensuring that staff can effectively navigate the digital environment.

The impact of digital technologies on academic libraries is profound and multifaceted, encompassing significant benefits in terms of accessibility, resource management, preservation, collaboration, literacy, security, equity, personalization, innovation, and professional development. While these advancements offer substantial improvements to library services and user experiences, they also bring new challenges that must be addressed. By embracing digital technologies, academic libraries can continue to play a vital role in supporting education and research, ensuring that they remain relevant and effective in the rapidly evolving digital age.

Challenges and Considerations

1. Digital Equity and Access: Ensuring equitable access to digital resources for all students, including those from underrepresented or disadvantaged groups, remains a significant hurdle. Libraries need to develop and implement strategies to bridge the digital divide, such as providing digital literacy training and access to necessary hardware and software.

2. Data Privacy and Security: Protecting user privacy and securing sensitive data in a digital environment is critical and complex. Libraries must establish robust data protection policies and employ advanced security measures to safeguard user information and maintain trust.

3. Sustainability of Digital Infrastructure: Maintaining and upgrading digital infrastructure can be resource-intensive, requiring significant financial and technical investment. Libraries should plan for sustainable funding models and continuously assess the cost-effectiveness and scalability of their digital technologies.

4. Digital Literacy and Training: Both users and library staff need ongoing training to keep up with rapidly evolving digital technologies. Libraries should invest in regular professional development programs and offer comprehensive digital literacy education to their users.

5. Preservation of Digital Content: Ensuring the long-term preservation of digital content poses technical and logistical challenges**.** Libraries must adopt best practices in digital preservation, including using reliable storage solutions and creating redundant backups.

6. Managing Digital Overload: The vast amount of digital information available can overwhelm users, making it difficult to find relevant resources. Libraries should develop effective information retrieval systems and provide guidance to help users navigate and evaluate digital content.

7. Integration with Existing Systems: Integrating new digital technologies with existing library systems can be complex and require significant technical expertise. Libraries need to ensure compatibility and interoperability between old and new systems to provide seamless user experiences.

8. Intellectual Property and Copyright Issues: Navigating copyright laws and intellectual property rights in a digital context can be complicated. Libraries must stay informed about legal regulations and ensure compliance to avoid legal issues and protect the rights of content creators.

9. User Engagement and Adaptation: Encouraging users to adapt to and fully utilize new digital technologies can be difficult. Libraries should actively engage users through outreach programs, user-friendly interfaces, and feedback mechanisms to enhance user adoption and satisfaction.

10. Balancing Traditional and Digital Services: Balancing the maintenance of traditional library services with the integration of new digital technologies requires careful planning. Libraries must find a harmonious balance that

respects the value of traditional resources while embracing digital advancements to meet the diverse needs of their users.

Conclusion

The digital technologies have significantly transformed academic libraries from static collections into dynamic information hubs, enhancing accessibility, resource management, and fostering innovative learning environments. While challenges like digital equity and infrastructure persist, embracing these advancements along with continuous professional development empowers libraries to remain relevant and ensure their enduring role in supporting education, research, and knowledge creation in the digital age.

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DESIGN AND DEVELOPMENT OF INSTITUTIONAL REPOSITORY IN RAMKRISHNA PARAMHANSA MAHAVIDYALA, DHARASHIV : A CASE STUDY

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Abstract

The paper throws the lights on Basic Concepts of Institutional Repository (IR), its developments, about College and Its Library. This articles looks at IRs which in the academic world, help to re-define the production, dissemination and the use of intellectual output from an institution. IRs are based on the principles of Open Access archives / initiatives where relevant information is made available free of cost using Open Source Software i.e. DSpace. The paper explores the process of design and development of Institutioanal repository in College Library of Ramkrishna Paramhansa Mahavidyalaya, Dharashiv.

Keywords: Institutional Repository, Open Source Software, Dspace, COllege, College Library, SLIM21, Wixsite, ILMS Dharashiv and Library Automation.

Introduction

The challenge for digital preservation is not just the volume of data. The hardware and software used to store and access digital information are constantly upgraded and superseded. Technology obsolescence is generally regarded as the greatest technical threat to ensuring continued access to digital material. The speed of changes in technology means that the timeframe during which preservation action must be taken is very much shorter than for paper, often measured in just a few years. Digitization projects in libraries seem ubiquitous as libraries become increasingly involved in the acquisition, development, and management of digital information and libraries typically target archival and special collections materials. Projects to digitize vast collections of books began as early as 1971 with Project Gutenberg and are now getting widespread media attention with the launch of Google Book Search, the Internet Archive, and others (Coyle, 2006).

Institutional repositories are a new but important area within the educational landscape. Through free and unrestricted online availability, they make it easier for researchers to disseminate and share research outputs and thus support the open access goal of scholarly communication. As noted by Scholarly Publishing and Academic Resources Coalition (SPARC), institutional repositories are becoming a major component of the evolving structure of scholarly communication (Crow, 2002).

Institutional repositories are now being created to manage, preserve, and maintain the digital assets, intellectual output, and histories of institutions. Librarians are taking leadership roles in planning and building these repositories, fulfilling their roles as experts in collecting, describing, preserving, and providing stewardship for documents and digital information. Repositories provide services to faculty, researchers, and administrators who want to archive research, historic, and creative materials. Thus, development of institutional repository has become a necessity to reveal the scientific research output for which Library and Information professionals have to take keen interest and initiation.

Ramkrishna Paramhansa Mahavidyalaya: A Profile

Ramkrishna Paramhansa Mahavidyalaya, Dharashiv is the first college established in 1959 by Shri Swami Vivekanand Shikshan Sanstha, Kolhapur, one of the established institutions in Maharashtra founded by Shikshanmaharshi Dr. Bapuji Salunkhe with a motto-Dissemination of Education for Knowledge, Science and Culture. Osmanabad is the district in Marathwada Region which is drought prone and economically backward and here only investment is Education. The College is affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad and has been included under 2(F) and 12B category of the UGC. The college is reaccredited in the 4th cycle with A grade by NAAC with CGPA 3.23. The UGC has identified the college as _The College with Potential for Excellence‘ (Phase – II). The Dr. Babasaheb Ambedkar Marathwada University, has identified our college as Quality College and also awarded ―Ideal Examination Centre‖. The college is located in the prime area of the city

having pleasant and healthy atmosphere. Presently, the strength of the college is 1594 having 723 male and 871 female students. The college students has bagged First prize at University level AVISHKAR research convention consistently from last five years. 36 students has been successfully completed 36 research projects under the scheme UGC-BSR. Our eight students have bagged prestigious Shiv Chhatrapati award of Government of Maharashtra.

The College has following full-fledged facilities -

- Library with 94,437 books
- 41 Journals + 16 Newspapers
- N-LIST E-resources
- University Remote Access
- Computer Lab with 10 computers
- MAGZTER Database
- Hostel's
- Gymkhana

College Library

The library is the lung of every educational institute, which breathes knowledge and information into the minds of the students. Library has well-equipped Library and Information Centre with an elaborate collection of books, e-books, CD-ROMs, journals, e-journals, project reports, audio-visual materials and other resources to serve its users. The Library Advisory Committee considers the development proposals of the library and budget allocations and policy decisions. It also provides directions for a structured and balanced growth of the library and to provide improved facilities and innovative services. Allocation and utilization of funds and introduction of developmental programs and requirements of the users are addressed and approved by the Library Committee.

Library Collection Statistics

Sr. No	Year	No. of Books	Expenditure (Rs.)	No. of Journals	Expenditure (Rs.)
1	2016 – 2017	904	233604/-	85	233504/-
2	2017 – 2018	3485	298529/-	52	298529/-
3	2018 – 2019	340	97675/-	33	193250/-
4	2019 – 2020	290	80620/-	29	174250/-
5	2020 – 2021	330	97143/-	24	126400/-
6	2021 – 2022	335	91634/-	19	71250/-
7	2022 – 2023	466	74548/-	32	101235/-

Table No.1 Statistics of the year 2016 – 2023

Library Staff

LC's Library and Information Centre has good team of qualified Professional Staff.

Library Services

ASPC's Library and Information Centre is providing the following services to its users.

- Circulation
- Reference Service
- Current Awareness Service
- Selective Dissemination Service
- Reprographic Service
- Audio-Visual service

- News Paper Clipping Service
- WEBOPAC (Online Public Access Catalogue)
- Interlibrary Loan

Library Automation

"Library Automation" is a process of using computer- based system to do house - Keeping operations. Such as acquisition, circulation, classification, cataloguing, stock verification, etc. Our College is one of the Best College of its kind in Marathwada Region to have a computerized Library Services using SLIM21 ILMS. Computerization started since January, 2013 and built a complete database of over 94,437 books. Further we have Online Services provided to our users through UGC & INFLIBNET N-LIST program with INTER LIBRARY LAN SYSTEM consisting of 7 terminals connected to, the library and information center Server storing our database. The Online Public Access Catalog (OPAC) is used to carry out online searches of library database by Author, Title; Keywords and Accession Numbers, which enables users to provide good reference service to staff and students.

It deals with the automation of the entire library system thereby reducing paperwork and increasing efficiency. A Library plays a vital role in any education. College has the latest and best possible books, magazines, journals, audio-visual aids for the student and faculty members. The students use these books for their academics, general knowledge etc. Our Library has one of the best and wide collections of related Academic books and journals. The functioning of the existing system was studied and following details were determined.

SLIM21 ILMS Software

SLIM21 software developed by Algorhythms Consultants Pvt.Ltd., Pune for library automation. Initially, the library implemented SLIM 2.0 (DOS version). Then in the Year 2003, we upgraded it to SLIM++. As academic libraries need to upgrade not only its collections but also the technology from time to time to provide readers coming from diverse engineering streams, we have shifted to SLIM21 from SLIM++ in the Year 2008. SLIM21 is a comprehensive library automation package customized to perform all the operations and activities of a fully electronic library. It supported WebOPAC, Catalog maintenance, Circulation, Serial Management, Acquisition, Processing and MARC Cataloguing.

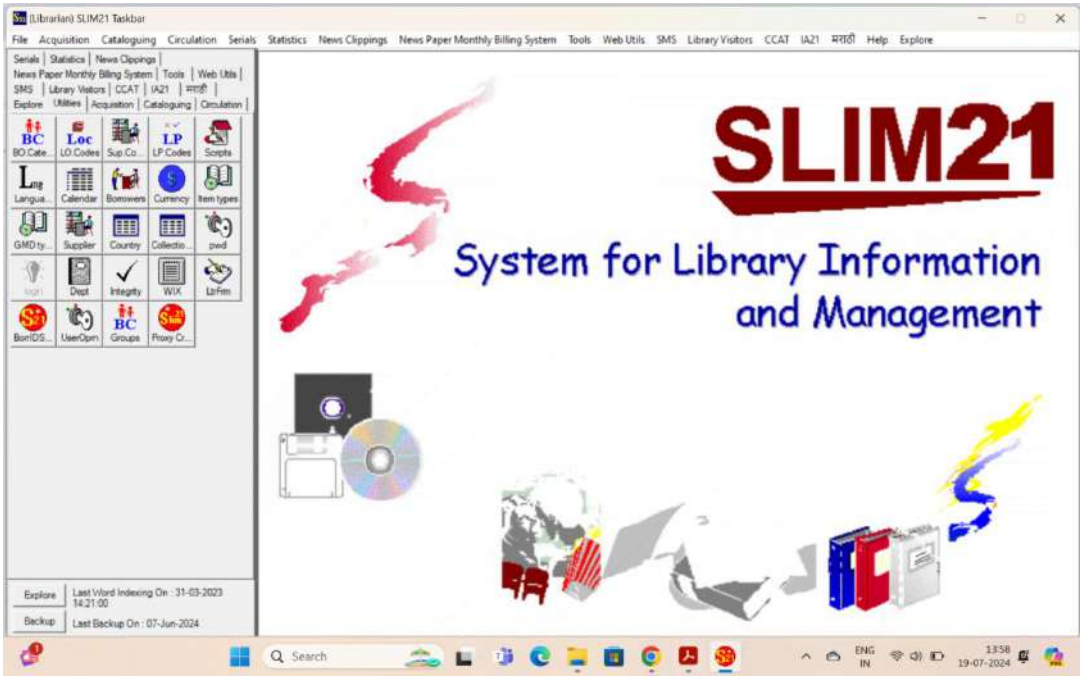

Fig. No. 1 SLIM21 Home Screen

Library Website (https://librarypcollege.wixsite.com/libraryrpcollege)

Library has its separate website created using Wixsite. It helps the users to find out the information about Management, College, Library Statistics, OPAC as well as Institutional Repository includes Faculty Publications, Syllabus and Previous Year Question Papers.

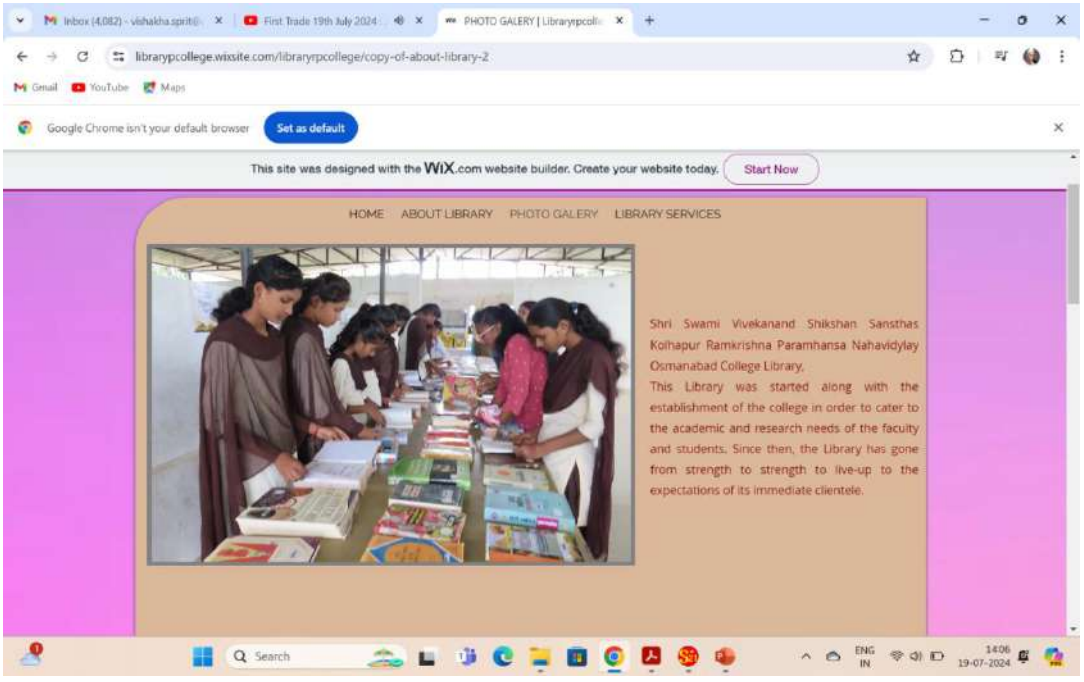

Fig. No. 2 College Library Website

Institutional Repository (DSPACE)

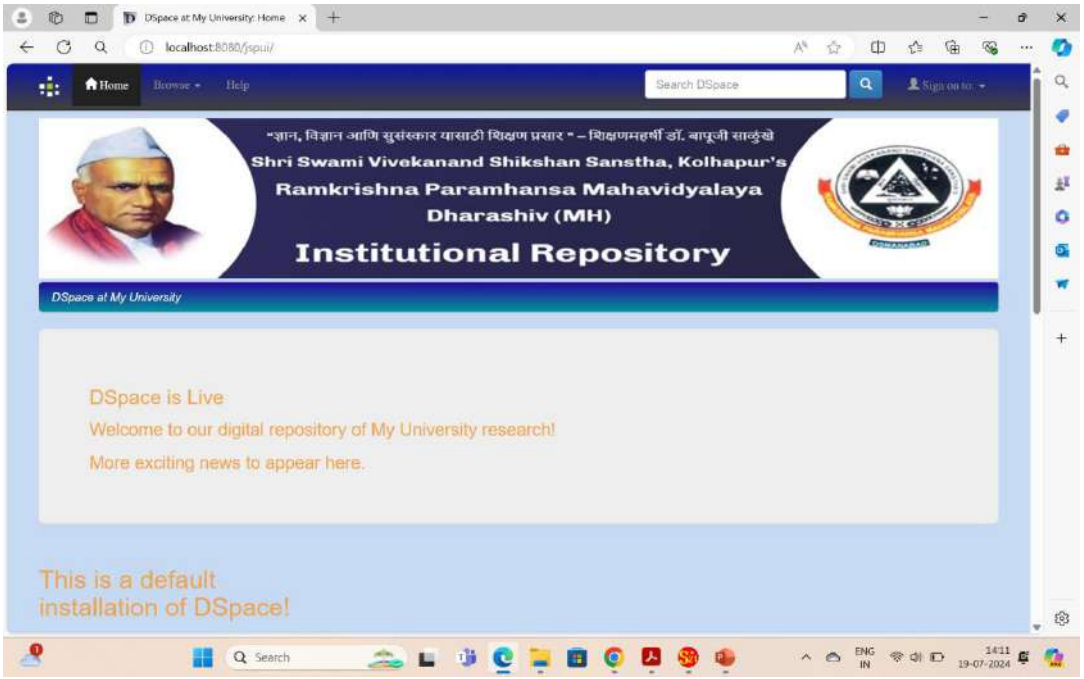

Fig. no. 3 Institutional Repository (Homepage)

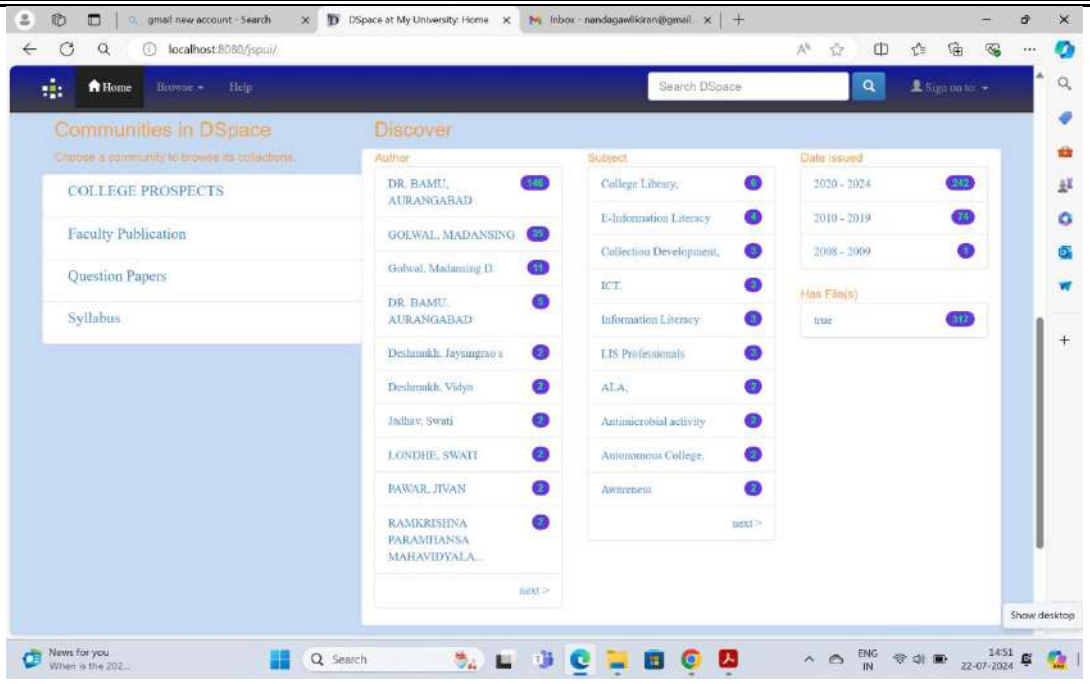

Fig. no. 4 Institutional Repository (Community Creation)

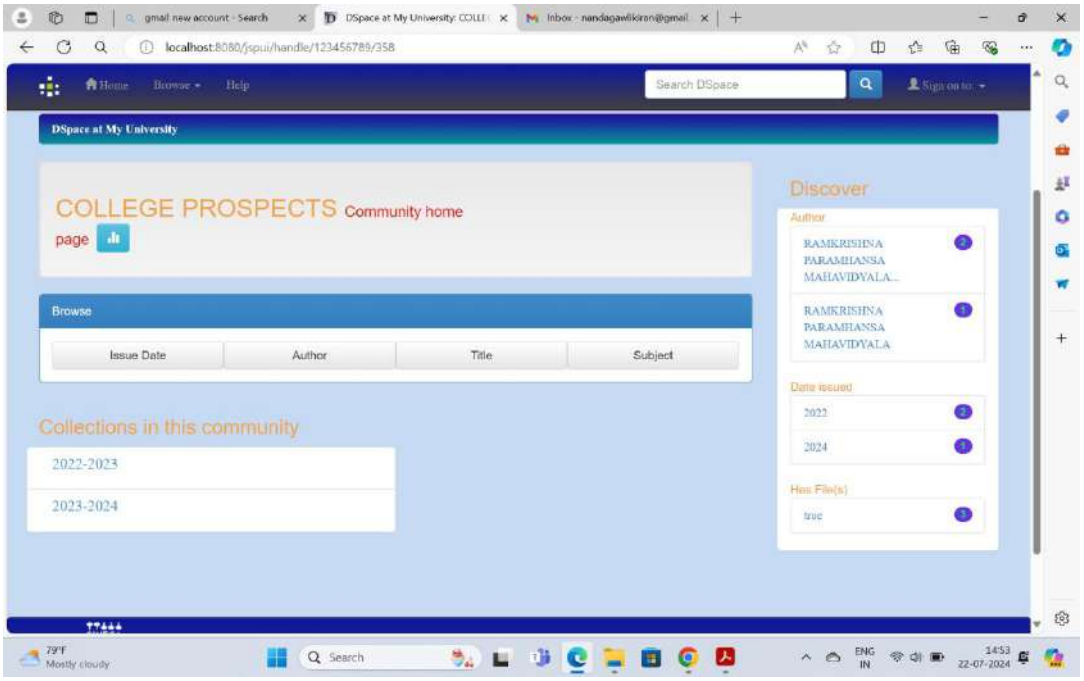

Fig. no. 5 Institutional Repository (College Prospects)

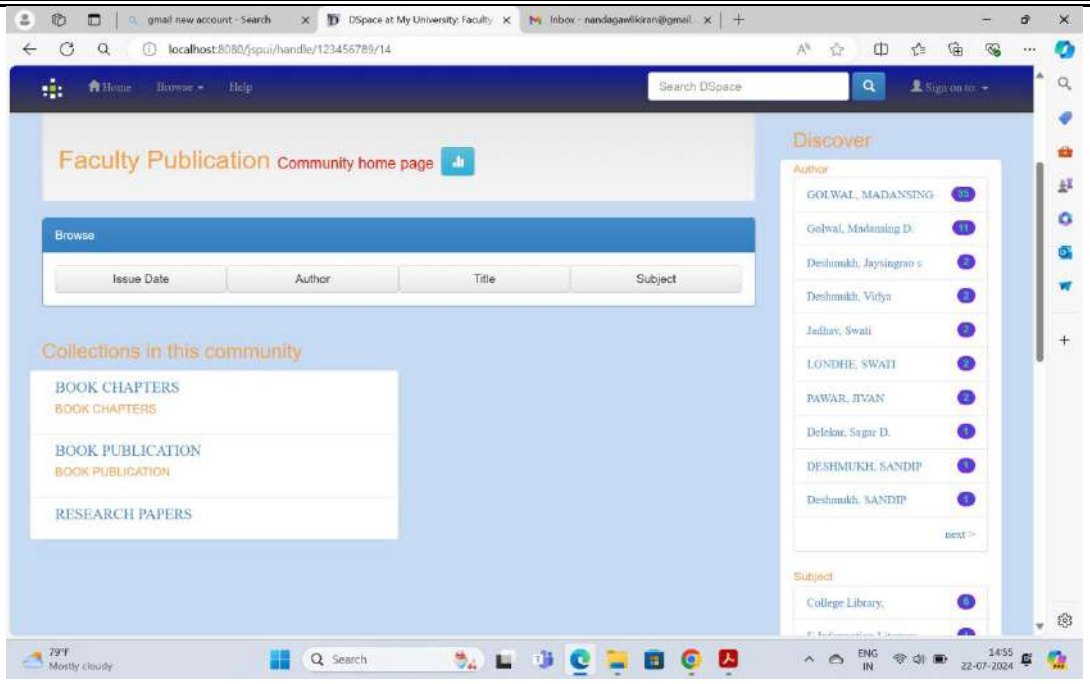

Fig. no. 6 Institutional Repository (Faculty Publications)

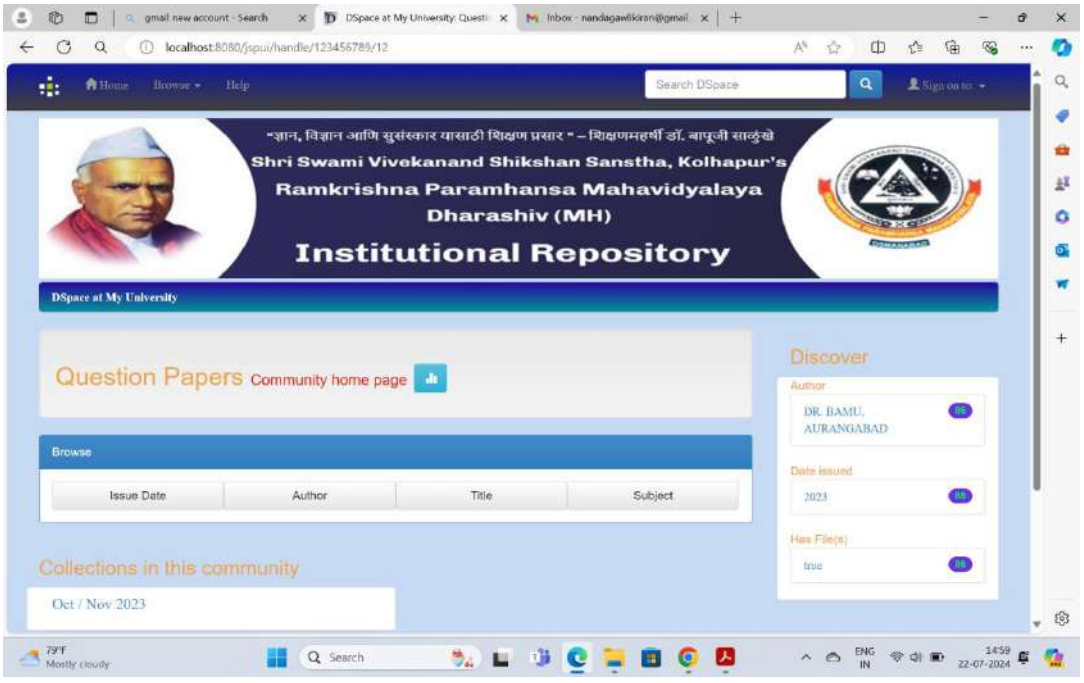

Fig. no. 7 Institutional Repository (Question Papers)

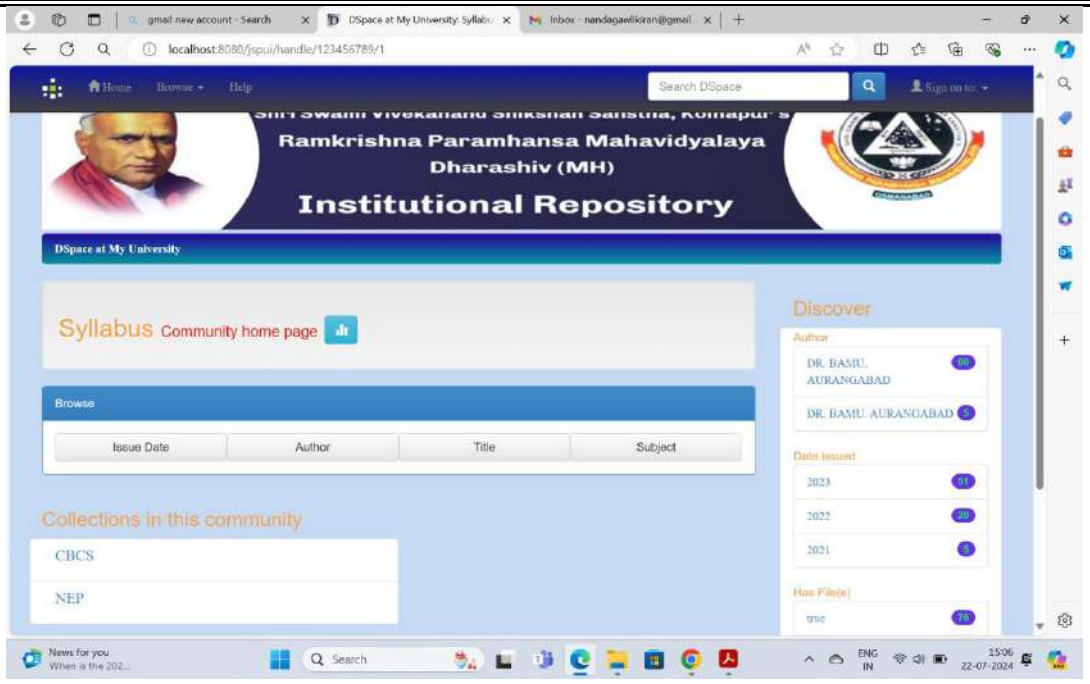

Fig. no. 8 Institutional Repository (Syllabus)

Conclusion

The College Library has successfylly created a IRs using the DSpace Software. Institutional repositories represent the logical convergence of faculty-driven self-archiving initiatives, library dissatisfaction with the monopolistic effects of the traditional and still-pervasive journal publishing system, and availability of digital networks and publishing technologies. As Institutional repositories are the face index of any institute or university shows the status of its strength in the form of research productivity and as such importance be given for development of Institutional repositories, for which Libraries needs to take positive initiation to develop the scientific temper of the institution.

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CHANGING PERSPECTIVE OF LIBRARY SERVICES AND ROLE OF THE LIBRARIAN IN DIGITAL ERA

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Abstract

Library is a temple of knowledge and users are devotees of that temple". In digital era the nature of the traditional libraries is changing. Due to the impact of ICT. Readers are not satisfied with traditional library services. Quest of the knowledge of users is increasing day by day in the modern age. An analysis of the library system needs as its point of departure to fix the libraries present position from number of parameters. This research article examines the evolving landscape of library services and the transforming role of librarians in the digital age. As information technology continues to advance rapidly, libraries face both challenges and opportunities in adapting their services to meet the changing needs of users. This study explores how digital technologies have impacted traditional library functions, the emergence of new services, and the shifting responsibilities of librarians. Through a review of current literature and case studies, the article highlights the importance of digital literacy, information management skills, and the librarian's role as a knowledge navigator in the modern information ecosystem. The findings suggest that while the core mission of libraries remains unchanged, the methods of service delivery and the competencies required of librarians have significantly evolved in response to the digital revolution.

Keywords: Digital Library, Recent Trends, Librarianship, ICT, Challenges, librarian roles, library services, digital literacy

Introduction

Library does not mean merely a collection of books. It is a learned institution equipped with treasure of knowledge. Maintain, organized, and managed by trained personnel to educate the society and to assist in their self-improvement by disseminating the knowledge embodied in it. A research scholar can never success in his research without help of the library and librarian. In the past one would have been given a past mark for defining library as a collection or storehouse of books. Academic libraries must decide what focus they take in collecting materials since no single library can supply everything. Today a library collection includes digital materials on digital media like CD-ROMs and the internet hence the modern library therefore would better be defined as a collection of a E-resources which allows to easy access. In the 60s, library of congress set up a committee to look up how the computer is beneficial for the library. A product of that committee delivered to AAC Rand. And that programme is known as (MARC). Machine Readable Catalogue in 1995 different computer Software's were started to use for the automation of library. The advent of the digital era has brought about profound changes in how information is created, disseminated, accessed, and consumed. This technological revolution has had a significant impact on libraries, which have traditionally served as the primary repositories and gatekeepers of knowledge (Choy, 2011). As we progress further into the 21st century, libraries are undergoing a transformation that challenges their conventional roles while simultaneously opening up new avenues for service and engagement. The digital age has ushered in an era of unprecedented access to information, with vast amounts of data available at the fingertips of users through the internet and various digital platforms. This shift has necessitated a reevaluation of the library's place in society and the role of librarians in facilitating access to and management of information resources (Jaeger et al., 2015). Libraries, once primarily associated with physical books and periodicals, are now increasingly recognized as dynamic spaces that offer a wide array of digital resources and services. The traditional image of a librarian as a custodian of books has evolved into that of an information professional skilled in navigating complex digital landscapes and assisting users in effectively utilizing diverse information sources (Huvila et al., 2013).

- **Digital Library- Meaning and Definition: -A** digital library is a library in which collections are stored or kept in digital format and accessible by computers digital content may be stored locally access remotely through computer networks.in this system users may able to access magazines, articles, books, papers, images, sound files, and videos.

- **Definition Of Digital Library: -** "A digital library as a global virtual library the library of thousands of networks electronic library." -Larsen.
- **Automation: -** Automation of a library refers to the use of computer system for the performance of day-to-day library duties. Such a computer system must be MARC compliant to be called modern one the acquisition of cataloguing information in mark format from other data sources available on the internet or CD-ROMs.
- **Digitization: -** Digital library is a library in which the information is stored in digital format. In this system material stored in a computer system and it can be accessed easily.
- **Internet: -** Internet became an essential need of users as well as library professionals. It plays crucial role in searching new information which is not available in the library. Internet brought world together in each field we use internet and internet is widespread all over the world.
- **RFID Technology:** RFID is the latest technology used in modern library's theft detection system. RFID based system moved beyond security to become tracking system which combines security with more efficient tracking of materials throughout the library. RFID is a combination of radio frequency-based technology and microchips technology. The target used in RFID system can replace both EM or RF theft detection targets and barcodes. RFID is necessary in modernization of libraries.
- **Electronic Resources: -**In modern age internet has become the biggest source of information. Electronic information resources are defined as being "any publicly available information resource which can be accessed by computer. Electronic journals and electronic books- as well as resources that have been made available on the internet free of cost.
- **Library Homepage: -**The use of internet in the libraries and advent of webpage revolutionized the process of library publicity and dissemination of information pertaining to library section, collections staff and services. The homepage of the library can be updated when it's need arise. Number of academic libraries around the world maintain their homepage and such homepages easily accessed. Library homepage reverse that it is an excellent media for library publicity. With the help of homepage library announces new facilities and services.

Here's a draft research article on the changing perspective of library services and the role of librarians in the digital era, using APA style referencing. I'll provide an abstract and introduction. Let me know if you'd like me to elaborate on any section or continue with additional parts of the article.

This research article aims to explore the changing perspective of library services and the evolving role of librarians in the digital era. It will examine how libraries are adapting their services to meet the needs of digitally-savvy users, the new competencies required of modern librarians, and the challenges and opportunities presented by the digital revolution in the field of library and information science.

❖ **Challenges In Digital Library:**

- **Digital preservation: -** Digital preservation aims of interoperability each necessary factor of the information must be migrated preserved or emulated typically lower levels of systems are emulated bit streams and operating system are emulated as a virtual machine.
- **Copyright and licensing: -** Many people are raising the question about the copyright law. Some people criticized that digital libraries are hampered by copyright law, because works cannot be shared over different periods of time in the manner of traditional library the republication of material on the web by libraries may need permission from right holders. There is a conflict of interest between them and publishers. Some digital libraries acquire a license to lend out their resources. This may involve the limitations of lending only one copy at a time for each license.
- **Metadata Creation: -** In traditional libraries, the ability to discover the integrated world was depend upon how they are catalogued to handle the growing volume of electronic. Publication new tools and technologies have to begin to allow effective automated semantic classification an searching.
- **Librarianship In Digital Era: -** Traditionally librarians have been associated with collection of books. However modern librarian deal with information in many formats. Including books, magazines, audio-video recording maps- manuscripts bibliographic databases, web searching and digital resources. In the modern age librarianship is different than traditional librarianship. Modern librarian must skilled in his profession and he must be playing a role of inventor, adviser, and creator in digital era. In modern era librarian should try to save

the time of the users. And he should attempt to give the right information to the right person in short span of a time.

- **Essential skills of librarian: -** In modern age or in digital era the practice of librarianship have undergone tremendous changes due to the growth of ICT. Today librarian not only need to understand the basic knowledge of managing and disseminating.

Librarian in the Digital Era

The advent of the digital age has profoundly transformed the role of librarians, expanded their responsibilities and required them to develop new skills to meet the evolving needs of library users. Today's librarians are no longer merely custodians of books but have become multifaceted information professional's adept at navigating the complex digital landscape.

1. Information Literacy Instructors

One of the primary roles of librarians in the digital era is that of information literacy instructors. As the volume of available information has exploded, the ability to critically evaluate and effectively use information has become crucial. Librarians now teach users how to: Identify credible sources in the digital realm, effectively use search engines and databases, understand copyright and fair use in the digital context, critically evaluate online information for accuracy and bias, this role has become increasingly important as misinformation and "fake news" proliferate online (Sethunathan & Ganeshkumar, n.d.).

2. Digital Resource Managers

Librarians now manage vast collections of digital resources, including e-books, online journals, databases, and multimedia content. This involves: Selecting and acquiring digital resources, Organizing and cataloging digital collections, Ensuring access and resolving technical issues, Negotiating licenses with digital content providers,the shift from physical to digital collections has required librarians to develop new skills in digital asset management and metadata creation (Gopalan, n.d.).

3. Technology Facilitators

In the digital era, librarians often serve as technology facilitators, helping users navigate various digital tools and platforms. This includes: Assisting with e-reader devices and e-book access, Providing guidance on using online research tools and databases, Supporting users in accessing and using library services through mobile apps and websites, Troubleshooting basic technology issues, Librarians must continually update their own technology skills to effectively support users in this capacity (Rao & Saroja, n.d.).

4. Data Managers and Analysts

With the rise of big data, librarians are increasingly involved in data management and analysis. This new role encompasses:

- Assisting researchers with data management plans
- Curating and preserving research data
- Providing guidance on data visualization tools
- Supporting data literacy initiatives

This shift requires librarians to develop skills in data science and analytics (Prajapati, n.d.).

5. Digital Preservation Specialists

As more information is created and stored digitally, librarians play a crucial role in digital preservation. This involves:

- Developing strategies for long-term digital preservation
- Migrating data to new formats as technology evolves
- Ensuring the authenticity and integrity of digital materials over time
- Creating and maintaining metadata for digital archives

This role is essential in preserving cultural heritage and ensuring long-term access to digital information (Gopalan, n.d.).

6. Community Engagement Coordinators

In the digital era, librarians are leveraging technology to enhance community engagement. This includes:
- Managing social media accounts for the library
- Organizing virtual events and webinars
- Facilitating online book clubs and discussion groups
- Developing digital literacy programs for various community groups

Conclusion

In this way in this article author has tried to depict the concept of digital libraries as well as the role of librarian in digital era. Librarianship in digital environment has completely changed. Traditional libraries were known as the only storehouse of books, but now a days it has changed due to the impact of ICT. Librarian also need to apply the emerging trends and technology in library services. He also has the awareness about the new Technology.

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RESEARCH PRODUCTIVITY OF HIV VACCINE RESEARCH OUTPUT IN PUBMED OPEN ACCESS DATABASE: AN EVALUATIVE STUDY

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Abstract

HIV Vaccine is a subject that is most studied all over the world and research is going on. As such, no steps have been taken so far to picture the trend in the subject growth. The trend of Authorship pattern and also discussed year-wise authorship. Thus, this paper attempts to study the trend in the growth by applying the least square method and Price's fundamental law.

Keywords: HIV Vaccine, Price's fundamental law of science, PUBMED Database, Trend analysis – research productivity on HIV Vaccine.

Introduction

Scientometric applications are growing at present to cope up with the ever-growing nature of subjects. Bioelectronics is a subject of new origin. The literature available on the subject in PUBMED reveals that the literature growth of the subject starts in the early nineties. In this context, this paper intended to apply a few of the scientometric applications along with picturizing the trend of the growth of the subject.

On the HIV Vaccine, no steps have been taken so far to picturise the trend in the subject growth. Thus, this paper attempts to study the trend in the growth of research productivity of the subject over 20 years.

Objectives Of The Study:

The objectives of the study are as follows:

- To identify the year-wise distribution of the literature on HIV vaccines.
- An Application of time-series analysis to picturise the trend on the growth of the literature output.
- Applications of Price's Fundamental Law of Science for the identification of trends in HIV Vaccine research output.

RESEARCH METHODOLOGY

For this research, a total no. of 10268 records on HIV Vaccine Research are downloaded from the PUBMED database over 20 years starting from 2001 – 2020. The bibliographical elements that are suitable for trend analysis and applications of Price's fundamental law are taken into account for the analysis. Thus, the analysis and the results are presented as follows:

Table 1 Year Wise Growth of HIV Vaccine Research Publication

Sr. No.	Year	Articles	Percentage
1	2001	390	3.80
2	2002	409	3.98
3	2003	448	4.36
4	2004	453	4.41
5	2005	500	4.87
6	2006	473	4.61
7	2007	481	4.68

8	2008	509	4.96
9	2009	506	4.93
10	2010	532	5.18
11	2011	493	4.80
12	2012	508	4.95
13	2013	530	5.16
14	2014	605	5.89
15	2015	569	5.54
16	2016	636	6.19
17	2017	560	5.45
18	2018	569	5.54
19	2019	520	5.06
20	2020	577	5.62

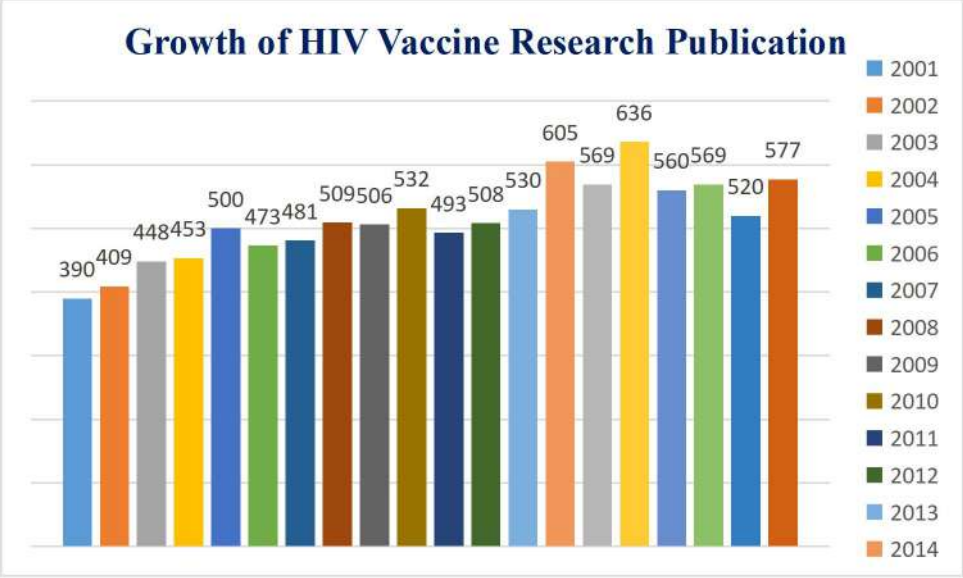

Figure No. 1: Growth of HIV Vaccine Research Publication

Table 1 shows the growth of HIV Vaccine research for a period of 20 years from 2001 to 2020. It is seen from the table that the research productivity is under study. It is found that throughout the study period, there is gradual growth.

Table 2 HIV Research trend – Time Series Analysis

Sr. No.	Year	Papers (Y)	X	X2	XY
1	2001	390	-9	81	-3510
2	2002	409	-8	64	-3272
3	2003	448	-7	49	-3136
4	2004	453	-6	36	-2718
5	2005	500	-5	25	-2500
6	2006	473	-4	16	-1892

7	2007	481	-3	9	-1443
8	2008	509	-2	4	-1018
9	2009	506	-1	1	-506
10	2010	532	0	0	0
11	2011	493	1	1	493
12	2012	508	2	4	1016
Sr. No.	**Year**	**Papers (Y)**	**X**	**X2**	**XY**
13	2013	530	3	9	1590
14	2014	605	4	16	2420
15	2015	569	5	25	2845
16	2016	636	6	36	3816
17	2017	560	7	49	3920
18	2018	569	8	64	4552
19	2019	520	9	81	4680
20	2020	577	10	100	5770
Total		10268		670	11107

One of the best ways of obtaining trend values is the method of least square. It is a statistical procedure from which a straight line trend is obtained. This line is called the line of best fit. It is a line from which the sum of the deviations of various points on either side is equal to zero i.e ∑(y-y c)=0 and the sum of the squares of these deviations of actual and computed value would be least as compared to other lines i.e ∑(y-yc)2 is least. For this reason that the sum of the squares of variations of various points from the line of the best fit is the least. This method is known as a method of least square. The method is used to fit a straight line trend or a parabolic trend.

To arrive at assessments for future growth, Staight line equation is applied Under the Time series analysis.

Straight line equation is Y=a+bx, since Σx=0

a=Σxy/N=11107/20 b=ΣXY/ΣX2

a=11107/20 b=11107/670=16.57

Estimated literature in 2030 is, when X=2030-2009=21

Y=a+bX

Y=555.35+16.57*21=903.32

From the above result, it is found that there is an increasing trend of research literature in the future year. Therefore the corollary of study is HIV Vaccine research literature is growing.

Table 3 Authorship Pattern year wise

Year	articles	Single Author	Two Author	Three Author	Four Author	More Than Four Author	Total	Percentage
2001	390	141	73	50	45	248	557	2.92
2002	409	129	70	63	45	263	570	2.99

2003	448	156	97	65	36	288	642	3.36
2004	453	122	86	57	55	329	649	3.40
2005	500	131	74	68	75	413	761	3.99
2006	473	110	96	85	57	475	823	4.31
2007	481	117	101	83	75	447	823	4.31
2008	509	138	107	67	67	480	859	4.50
2009	506	113	107	90	75	509	894	4.69
2010	532	109	133	85	71	578	976	5.12
2011	493	113	97	86	87	628	1011	5.30
2012	508	84	125	94	87	611	1001	5.25
2013	530	81	115	107	77	688	1068	5.60
2014	605	71	125	110	94	818	1218	6.38
2015	569	70	112	107	95	864	1248	6.54
2016	636	66	103	112	93	910	1284	6.73
2017	560	61	104	96	93	787	1141	5.98
2018	569	37	72	96	90	827	1122	5.88
2019	520	41	73	88	90	860	1152	6.04
2020	577	40	84	102	113	942	1281	6.71
Total		1930	1954	1711	1520	11965	19080	100
Percentage		10.12	10.24	8.97	7.97	62.71	100	

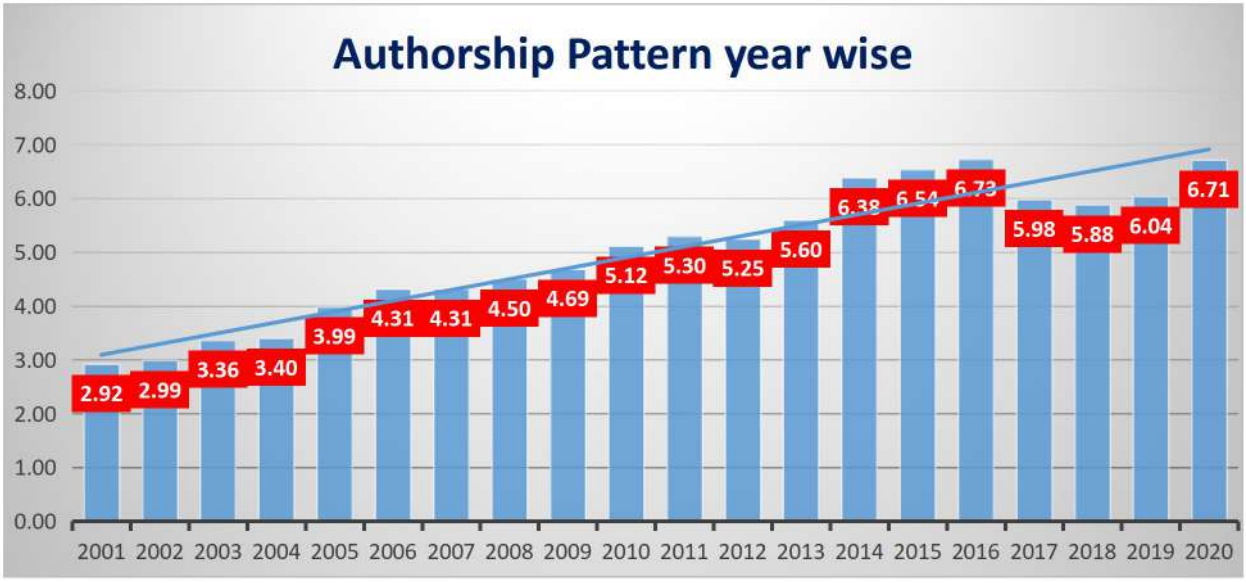

Figure No. 2: Authorship Pattern year wise

Table no. 3 shows that the 141 articles written by a single author and it is the highest number published in PubMed 2001. It indicates also that 40 articles were written by a single author published in PubMed 2020. It is the lowest number. The number of research articles has been published in PubMed written by two authors i.e. 133 (2010) it is the highest number and 70 articles published in 2002 with the lowest number. It indicates that in 2016, 112 research

articles are published written by three authors as well as 50 research articles are published in 2001 and those are the lowest number.

113 articles written by four authors published in 2020 i.e. highest number. More than four authors contributed 942 highest research articles in the year 2020. 248 It is the lowest contribution in the year 2001.

Table 4 Trend in Authorship Pattern

Sr. No.	Authorship	Number of Citation	%
1	Single	1930	10.04
2	Two	1954	10.17
3	Three	1711	8.90
4	Four	1520	7.91
Sr. No.	**Authorship**	**Number of Citation**	**%**
5	Five	1357	7.06
6	Six	1292	6.72
7	Seven	1314	6.84
8	Eight	1113	5.79
9	Nine	1102	5.73
10	Multi	5929	30.84
	Total	19222	100

Figure No. 3: Authorship Pattern year wise

The characteristics of any subject literature include not only the basic publishing pattern but that of authors themselves so the authors were analyzed to determine the percentage of single, two, three, and more than three authors. To have a clear picture the results of the analysis of authors are presented. Table No.4 and Figure No.4 indicates that out of the total number of 19222 citations 1930 (10.04%) are by a single author, followed by 1954 (10.17%) citations by joint authors, 1711 (8.90%) citations have three authors, 1520 (7.91%) Citation by four authors, 1357 (7.06%) citations have five authors, 1292 (6.72%) citations have six authors, 1314 (6.84%) citations have Seven authors, 1113 (5.79%) citations have eight authors, The finding also shows that the least citations are by nine authors i.e. 1102 (5.73%). And the Multi-author citations are 5929(30.84%) citations respectively.

Table 5 Price's Fundamental Law of Science for the trend in bioelectronics research output

Sr.No.	Year	Time	Number of Authors	Exponential Growth $b=y_t/yt_o$
1	2001	0	2842	
2	2002	1	3097	1.09
3	2003	2	3292	1.06
4	2004	3	3847	1.17
5	2005	4	4730	1.23
6	2006	5	5281	1.12
7	2007	6	4969	0.94
8	2008	7	5433	1.09
9	2009	8	5845	1.08
10	2010	9	6606	1.13
11	2011	10	7486	1.13
12	2012	11	7538	1.01
13	2013	12	8301	1.10
14	2014	13	10061	1.21
15	2015	14	11186	1.11
16	2016	15	11769	1.05
17	2017	16	10451	0.89
18	2018	17	10676	1.02
19	2019	18	11536	1.08
20	2020	19	13416	1.16
			148362	

Price's1 celebrated lectures on "Little Science and Big Science" reviewed some earlier works by Francis Galton, J.M.Cattell and A.J.Lotka and presented a notable "feeling that most of the great scientists are still with us and that the greater part of scientific work has been produced within living memory, within the span of the present generation of scientists". He considers an exponential time trend as the appropriate model to fit for data on the number of scientists. He calls this principle of exponential growth as the "fundamental law of any analysis of science".

Let yt = number of scientists during a period t. (t maybe just 1 year or a span of say, 20 years).

yt = ea'+b' t

---

1 log yt = a'+b't Let a' = log a and b' = log b.

Then log yt = log a+ t log b

Or yt = a.* bt

----------2

In (2) if b>1 the exponential curve is rising over time (+ve growth) and if b<1, a curve is falling (-ve growth). (2) may also be written as

yt=y0*bt (Since t=0, y0=a=number of scientists in the beginning). or

yt=yt-1*b

Since b>1, the number of scientists during any period t is greater than those existing during any particular period in the past.

From table 5 it is seen that the exponential growth rate is greater than 1 in all the years and hence proving Price's Fundamental law of science.

Conclusion

As this bibliometric analysis draws on publicly available data and does not directly involve human participants, ethical review is not required. Results of this analysis will identify the trends in HIV vaccine research publications. In author collaboration, multi-authors dominated on other authorship collaboration patterns. This study will also highlight strengths, weaknesses, and opportunities in areas such as the quality and type of research being conducted and could be used to guide the allocation of HIV vaccine research. Authorship pattern research is recognized as important in providing innovative solutions to complex problems such as the HIV vaccine.

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IMPACT OF DIGITAL TECHNOLOGIES ON LIBRARIES AND INFORMATION SCIENCES

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Introduction

The Digital library aims to give access to information' on demand' anyhow of the position of the computer, where it's stored. The part of digital libraries in the present day information terrain and new challenges and pledges for library services especially in the India. A Digital Library is to be an electronic collection of real or virtual coffers, which may also be available away. These coffers must be whole workshop with which human can have a complete cognitive effective engagement. A Digital library may allow either online or offline access to the rudiments it organizes and houses, and may include multimedia as well as multilingual data. Although accessible online, a digital library isn't identical to a website or a portal still while doors, specialized websites and search machines cover a wide range of subject areas, digital libraries are more hardly focused around one or a specific group of disciplines.

Concept of Digitization

According to International Encyclopedia of Information & Library Science(2003) " Digitization of information accoutrements is the process of converting analogue information to a digital format "(p. 138) currently, libraries borrow digitization with the purpose of conserving information and dispersion knowledge. There are numerous reasons for libraries to go for digitization but the main profit is to save the rare and fragile objects; especially these particulars of high quality similar as old calligraphies. As the material digitized can be fluently penetrated by anyone; libraries, institutions, individualities; from anywhere at any time without hindrances.

Fabunmi recognizes three reasons for digitization

- preservation of risked library coffers,
- effectiveness of information hunt medium,
- enhancement of access to library coffers.

Whilst, Mauyra adds to these

- the new generation requirements,
- the cost reduction, and
- the preservation of the purity of the terrain

Information Technology refers to anything which is related to calculating technology. Presently maturity of libraries are easing with web OPAC,E-journals,E-books, Depositories, Digitization & Digital Library. The perpetration of information technology in the libraries has demanded new forms of library services to get further stoner satisfaction. Digital library service has evolved after the perpetration of Information Technology in the library and information centers. thus to study of use of information technology andE-resource in Academic libraries I choose this content for exploration paper.

Requirements of information technology on Library Services

Stated that "to increase the productivity of advanced education in university & sodalities, it should case to be class centered & textbook book centered. It should come- centered & there should be a close & willing cooperation between Libraries, scholars & preceptors." one of the primary points of information service is putting knowledge to work. In order to put knowledge to work, one has to understand not only the characteristics of knowledge but also to know how knowledge is observed & assimilated, the provocation it induces & how it must be canalized for utmost effective & effective application. Therefore application of information is principally a communication process. Due to information explosion it's veritably delicate to handle large information with traditional library tools like homemade roster, bibliographies, etc. In moment's library terrain, to give the right way, isn't possible without information technology operation. Information technology has come necessity and need.

Need ofE-Resources in LibraryE-Resources enable the librarian to give better service to the stoner community? The many considerable points are mentioned bellow;

- To get access to an information source by the further than one druggies.
- E-Resources can be searched snappily.
- These can be set up fluently by the stoner.
- These coffers can be stored in huge quantum.
- quantum of time spent on theE-Resources use.
- Analyses the purpose of usinge-resources by replier
- Know different types ofe-resources generally used by repliers
- To collect, store, organize information in digital form.

Characteristics of E-Resources

- Access to every document by anyone; from any where
- Retrieval ofe-resources is quicker than print coffers
- The druggies can be guided to the document by furnishing a link.
- Easy to search the textbook
- The collection available in electronic format can be of any media.
- Power not that important
- In electronic terrain the commerce between stoner and librarian is frequent.
- No defined stoner group
- The software can help the druggies in reacquiring the asked information; hardly intermediate can help druggies.

Impact of information technology on Library Services

In old days library was considered as bare storage of knowledge. But these days information technology has reshaped the functioning and services of libraries. The conditioning which was carried out manually are being carried out effectively and easily with the help of information technology. Information technology has changed the way of accession, specialized processing, journal subscription, and rotation conditioningetc. in such a way that library compendiums can get asked information and services effectively in shortest time with lower man power involvement. Information has always been high factor for the development of society and is frequently regarded as a vital public resource. Information services try to meet this ideal. Information has come important part of our lives and should be available when demanded. Information services are generated using new tools and ways to grease the right druggies to the right information. This is the information age because information technology is growing presto. Traditional libraries are changing their part and functions according to the new trends in the society. Library is furnishing information through the computers and internet. It can be said that without the help of the computers and internet any library information Centre can not satisfy the druggies.

Conclusion

Information technology has converted library services encyclopedically. Utmost current information are recorded in electronic format, Information Technology has also contributed immensely to the performance of librarians in the discharge of their duties similar as in cataloguing, reference etc. Information technology has also made an impact on the waking services, substantially by furnishing speedy access to information that appears originally

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UNIVERSITY LIBRARIES AND E- RESOURCES OF MAHARASHTRA

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Abstract

In the rapidly evolving landscape of higher education, university libraries play a pivotal role in supporting academic growth and research excellence. This study focuses on the university libraries and e-resources in Maharashtra, India, examining their crucial function in advancing education and contributing to national development. As India strives to position itself as a global economic powerhouse and a hub for human resources, the quality and accessibility of educational resources become paramount. The research explores how university libraries in Maharashtra are adapting to the digital age, incorporating e-resources to meet the changing needs of students and researchers. It investigates the transformation of these libraries from traditional repositories of knowledge to dynamic, technology-driven centers of learning. The study also assesses the impact of these evolving library services on critical thinking, research capabilities, and overall academic performance. Furthermore, this paper examines the challenges and opportunities in implementing and utilizing e-resources in Maharashtra's university libraries. It considers how these digital tools can address the economic, social, cultural, and moral issues faced by students and researchers. The research also evaluates the role of these modernized libraries in supporting India's broader goals of strengthening higher education and fostering a research and development-oriented academic culture. Analyzing the current state of university libraries and e-resources in Maharashtra, this study aims to provide insights into their potential for enhancing the quality of higher education. It concludes by offering recommendations for leveraging these resources more effectively to support India's aspirations of becoming a significant contributor to the global knowledge economy.

Aims, Objectives of University Library:

A library is considered as the 'heart of a university and it is the centre of learning for higher education. Each university has a central library attached to it and may have various constituent libraries attached to and its different teaching departments or the constituent colleges. The aims and objectives of a library are as below:

1. Library must help in change process that is essential for a developing of growing society.
2. 2.University Library should promote facilities for advanced study and research in education,
3. Library has to give opportunities for professional pupils to improve their knowledge and skill through summer and evening classes, short term courses, seminars and other means.
4. Library has to provide teacher training and guidance in respect to prepare candidates for the Master /Ph.D. in educationaldegrees of the university and such other disciplines/diplomas în education may be instituted.
5. Library has to conduct research in several branches of education, publish the result of such research and act as an educational inforamtion dissemination centre.
6. Library should help to prepare educational leaders in teaching, research and administration.
7. Library stimulate educational research of high quality, both fundamental and applied, required for the imporovement of education
8. 8 University Library acts dynamic and high-quality academic environment of teaching, research and human services for prospective teachers and leaders in the field of special education.

The Carlson Library Information

The University of Toledo's Carlson Library houses an innovative academic support hub known as the Information Commons. This state-of-the-art facility, occupying the library's first floor, represents a collaborative effort between the University Libraries and the Information Technology department. The Information Commons is designed to provide a comprehensive array of services and resources aimed at fostering student success and supporting the diverse needs of the academic community (University of Toledo Libraries, 2024).

Computer Lab Services:

The Information Commons boasts an extensive computer lab equipped with over 100 workstations. These computers are connected to a variety of printing options, including both black-and-white and color printers, ensuring that students have access to high-quality printing facilities for their academic work. For those preferring more mobility, the library offers a laptop checkout service, allowing students to borrow computers for use within the library's wireless environment (University of Toledo IT Services, 2024).

In line with the university's commitment to inclusivity, the Information Commons provides accessibility software for patrons with mobility or vision impairments. This software is available on workstations through vlab.utoledo.edu, ensuring that all students have equal access to digital resources (University of Toledo Accessibility Services, 2024).

The wireless network infrastructure in the Information Commons is robust and user-friendly. Students can connect their personal devices to the primary network, UToledo, which requires UTAD authentication for security purposes. Additionally, alternative WiFi options are available to accommodate various user needs (University of Toledo Network Services, 2024).

For technical support, the IT Help Desk is readily available within the Information Commons. Staffed by knowledgeable technicians, this service provides troubleshooting assistance and training on a wide range of computer software applications and hardware issues (University of Toledo IT Support, 2024).

Library Services:

The Information Commons integrates traditional library services with modern technology. Reference librarians are on hand to assist students in navigating the vast array of resources available for their research needs. These professionals offer expert guidance in locating, evaluating, and utilizing both print and digital materials (University of Toledo Libraries, 2024).

To support information literacy initiatives, the facility includes three dedicated classrooms. Two of these rooms can accommodate 32 students each, while the third has a capacity of 20 seats. These spaces are utilized for teaching essential skills in information retrieval, evaluation, and organization, crucial competencies in today's information-rich academic environment (University of Toledo Information Literacy Program, 2024).

The Information Commons also offers conference and event rooms that can be reserved for group study sessions, project meetings, or small academic events, fostering collaborative learning and scholarly exchange (University of Toledo Room Reservation System, 2024).

Additional Support Services:

Complementing the resources within the Information Commons, Carlson Library houses two vital academic support centers on its lower level. The Tutoring Center, operated by the Learning Enhancement Center, provides individualized instruction across a wide range of academic subjects. This service allows students to receive targeted

support for challenging coursework, enhancing their understanding and academic performance (University of Toledo Learning Enhancement Center, 2024).

Adjacent to the Tutoring Center is the Writing Center, a valuable resource for students at all stages of their academic journey. The Writing Center offers assistance throughout the writing process, from brainstorming and outlining to editing and polishing final drafts. This service is particularly beneficial for students looking to improve their writing skills across various disciplines (University of Toledo Writing Center, 2024).

The Role of University Libraries:

University libraries, such as Carlson Library, play a pivotal role in the academic ecosystem. They serve as the intellectual heart of the institution, providing a wealth of resources and services that support the educational mission of the university. These specialized facilities cater to the diverse research and learning needs of students, faculty, and staff across all disciplines (Association of College and Research Libraries, 2023).

The modern university library extends far beyond its physical collection of books and journals. It serves as a gateway to a vast array of digital resources, including e-books, online journals, and specialized databases. This digital transformation has expanded the reach and accessibility of academic resources, allowing students and researchers to access information from anywhere at any time (American Library Association, 2024).

Moreover, university libraries have evolved into dynamic spaces that foster collaboration, creativity, and innovation. They provide not only quiet study areas but also group workspaces, technology-rich environments, and areas for academic events and exhibitions. By doing so, they encourage interdisciplinary interaction and the cross-pollination of ideas (Society for College and University Planning, 2024).

Libraries also play a crucial role in preserving and disseminating scholarly output. Many university libraries manage institutional repositories, which collect, preserve, and provide access to the intellectual output of the institution's faculty and students. This function supports the open access movement and enhances the visibility of the university's research contributions (SPARC, 2024).

Universities and Website In Maharashtra

Sr. No.	Name of University	Year of University Establishment	University website
1	Mumbai University, Mumbai	1857	webmaster@ucc.mu.ac.in
2	Rashtrasant Tukdoji Maharaj University, Nagpur	1923	coe@nagpuruniversity.nic.in
3	Savitribai Phule Pune University, Pune	1949	regis@unipune.ac.in www.unipune.ac.in/
4	Smt. Nathibai Damodar Thakarsi Women's University, Mumbai	1916	www.sndt.ac.in

5	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	1958	dyregistrar.estt@bamu.net http://bamua.digitaluniversity.ac/
6	Shivaji University, Kolhapur	1962	registrar@unishivaji.ac. www.unishivaji.ac.in/
7	Sant Gadage Baba University Amaravati	1983	reg@sgbau.ac.in www.sgbau.ac.in/
8	Bahinabai Chaudhary University of Uttar Maharashtra, Jalgaon	1991	sfc@nmuj.digitaluniversity.ac
9	Swami Ramanand Tirth Marathwada University, Nanded	1995	srtmunregistrar@gmail.com www.srtmun.ac.in/
10	Ahilyabai Holkar University, Solapur	2004	registrarsolapur@yahoo.in www.su.digitaluniversity.ac
11	Gondwana University, Gadchiroli	2011	www.unigug.ac.in
12	Kavikulguru Kalidas Sanskrit University, Ramtek, Nagpur	1997	unikalidas@yahoomail.com

Printing and Copying

The University Libraries uses the same Follow Me Printing feature that the rest of campus uses. Printers are located on every floor of Carlson Library and in Mulford Library's fourth floor computer lab.

2. Available e-reading Material

Sr.no/Universiy name	Total number of Books	Text Books	Reference Books	Thesis
1 MMU	8,57,000	72928	93822	20228
2 RUN	34,21,677	390932	18790	15863
3 UOM	5,61,613	472297	….	13358
4 SUM	4,17,575	27452	20505	10563
5 BAM	3,67,556	326410	137839	4418

6 SUK	3,38,943	230205	8537	11319
7 SUA	1,60,600	110954	10328	30799
8 HUJ	7,45,80	61991	5019	550
9 SUN	7,43,80	72563	…..	2137
10 SUS	58625	21700	15918	677
11 GUG	1,58,455	11467	20350	1034
12KUM	31073	12850	20879	296
Total	6,522,077	1,712,749	333,367	111,037

Library Computers

The Libraries' computers can be used by anyone to do research using the Libraries' resources or the Internet. Library workstations are equipped with web browsers (Chrome and Firefox), basic utilities such as Adobe Acrobat Reader, and standard office applications such as word processors, spreadsheets, etc. A list of available lab software is made available by IT.

Laptops and Wireless Computing

All floors of Carlson and Mulford Libraries are a wireless environment. Please note that wireless coverage may be reduced in some areas, especially near the outer walls of the building.

Laptops that are wireless-ready may be checked out from the Carlson IT Help Desk or Mulford Library Service Desk for up to 5 hours. The laptops cannot leave the building or be checked out overnight. A replacement charge of $3,000.00 will be assessed if the laptop is not returned in three days.

University Library available Reading Material

Sr.no.	**Name**	**E-journal**	**CDS/ DVDS**	**Data-base**	**Digital data-base**	**Comp-uter**	***Internt***	**Compt-*er* Lab**	**Total**
1.	MUM	4403	5093	05	1511	1831	1966	64	**14873**
2.	RUN	40421	170	05	49	406	830	27	**51908**
3.	UOP	221	2300	05	27	2701	552	271	**6077**
4.	SUM	121997	130	06	58	676 Office - 13	124	56	**5649**
5.	BAM	40890	3128	09	No response s	1862	1706	156	**47742**

6.	SUK	6875	1833	07	17	2122	40	03	**10897**
7.	SUA	485	1066	07	18	191	30	31	**1829**
8.	HUJ	25000	850	09	No response	1802	132	23	**27516**
9.	SUN	4500	1055	09	Nil	725 Office-210	125	13	**6637**
10.	SUS	1997	124	07	Nil	120	102	17	**2367**
11.	GUG	No responses	No response	Nli	Nil	No responses	No responses	No response	**Nil**
12.	KUM	2388	64	05	Nil	39	70	07	**2573**
Total	**12**	**245127**	**15813**	**74**	***1680***	**5677**	**5677**	**664**	**178,068**

Conclusion:

The role of the libraries goes on gethrin convert from traditional print media and to digital where information is being made arranged on the desk top of users. The users also require spot information from the metadata available on the internet. The responsibilities of the librarian are changing with the time including traditional staffing pattern for performing different functions in the libraries. The education system is using both formal and informal ways for encouraging higher education in India in-learning and teaching. Libraries perform their roles in dissiminate information from the time where information is stored and preserved in the midst of library. Library plays important roles in admirable knowledge and information from books, periodicals, magazines, old manuscripts, archives, articles, standards, reports, Government resolutions etc, the major changes in the libraries appear due to adoption and use of technologies.

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16. .https://www.sndt.ac.in /Available Dated in: 11/6/2024
17. https://bamua.digitaluniversity.ac/ Available Dated in: 4/7/2024
18. .dyregistrar.estt@bamu.net / Available Dated in :7/7/2024
19. coe@nagpurvniversity.nic.in Available Dated in:8/7/2024
20. https://www.unishivaji.ac.in/ Available Dated in: 9/7/2024
21. https://www.sgbau.ac.in/ Available Dated in: 15/7/2024
22. .https://www.srtmun.ac.in/ Available Dated in 10/6/2024
23. https://www.su.digitaluniversity.ac Available Dated in:13/7l2025
24. unikalidas@yahoomail/ Available Dated in:15/7/2024
25. https://www.unigug.ac.in/Available Dated in: 18/7/2024
26. registra@unishivaji.ac/Available Dated in: 18/7/2024

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"TECHNOLOGICAL ADVANCEMENTS IN LIBRARY AND INFORMATION SCIENCE FOR ENHANCING COMMERCE EDUCATION: CHALLENGES AND OPPORTUNITIES"

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Introduction

The rapid advancements in technology have significantly transformed various sectors, and education is no exception. Within the realm of commerce education, the integration of Library and Information Science (LIS) technologies has opened new avenues for enhancing the learning experience. The adoption of digital libraries, e-resources, and information management systems has revolutionized access to information, facilitating more efficient and effective educational processes. This paper aims to explore the technological advancements in LIS and their impact on commerce education, highlighting both the challenges and opportunities these advancements present.

Libraries have evolved from mere repositories of books to dynamic centers of information and learning, adapting to the digital age by incorporating sophisticated technologies. In the context of commerce education, the application of these technologies is particularly pertinent as it supports the specialized needs of students and educators in accessing, managing, and utilizing vast amounts of information. However, while these technological advancements offer significant benefits, they also pose several challenges that need to be addressed to fully harness their potential.

Keywords*:* Digital Libraries, E-books, I M S, Commerce Education, Technological Integration.

Review of Literature

1. Technological Evolution in Library and Information Science

The literature on technological advancements in LIS indicates a substantial shift from traditional library systems to digital and automated ones. According to Kumar and Singh (2019), digital libraries and automated cataloging systems have become integral to modern educational institutions, providing streamlined access to resources. Furthermore, Johnson et al. (2020) emphasize the role of cloud computing and big data analytics in enhancing library services, enabling personalized user experiences and efficient information retrieval.

2. Impact on Commerce Education

The integration of LIS technologies in commerce education has been the subject of numerous studies. Banerjee and Chakraborty (2018) highlight that digital resources such as e-books, online journals, and databases significantly enhance the quality of education by providing up-to-date information and facilitating research. Similarly, Sharma and Gupta (2021) argue that the use of information management systems in commerce education aids in the systematic organization and retrieval of information, thereby improving academic performance.

3. Challenges in Implementation

Despite the benefits, several challenges hinder the effective implementation of LIS technologies in commerce education. According to a study by Patel and Desai (2022), issues such as inadequate funding, lack of trained personnel, and resistance to change are major barriers. Additionally, Kumar et al. (2021) point out that the digital divide remains a significant challenge, with unequal access to technology affecting the equitable distribution of educational resources.

4. Opportunities for Enhancement

On the other hand, the literature also presents numerous opportunities for leveraging LIS technologies to enhance commerce education. For instance, Rao and Reddy (2020) discuss the potential of artificial intelligence and machine learning in creating adaptive learning environments that cater to individual student needs. Moreover,

Singh and Kaur (2019) highlight the role of collaborative platforms and social media in fostering interactive and engaging learning experiences.

5. Case Studies and Best Practices

Several case studies provide insights into successful implementations of LIS technologies in commerce education. The case study of XYZ University by Jones and Williams (2021) illustrates how the adoption of a comprehensive digital library system improved student engagement and academic outcomes. Additionally, the implementation of a knowledge management system at ABC Institute, as reported by Brown and Davis (2022), showcases the benefits of integrating various technological tools to support both teaching and learning.

This review of literature indicates that while technological advancements in LIS present significant opportunities for enhancing commerce education, addressing the associated challenges is crucial for their successful implementation. By leveraging these technologies, educational institutions can create more dynamic and effective learning environments, ultimately contributing to the overall development of commerce education.

Research Methodology

1. Research Design

This study adopts a mixed-methods research design, combining both quantitative and qualitative approaches to gain a comprehensive understanding of the impact of technological advancements in Library and Information Science (LIS) on commerce education. The mixed-methods approach allows for a robust analysis by integrating numerical data with contextual insights, providing a holistic view of the challenges and opportunities involved.

2. Data Collection Methods

Quantitative Data:

- **Surveys:** Structured questionnaires will be distributed to commerce students, educators, and library staff across various educational institutions. The survey will include questions on the usage of LIS technologies, their perceived impact on learning and teaching, and the challenges faced in their implementation.
- **Usage Analytics:** Data on the usage of digital libraries, e-resources, and information management systems will be collected from the institutional databases. This includes metrics such as frequency of use, types of resources accessed, and user demographics.

Qualitative Data:

- **Interviews:** Semi-structured interviews will be conducted with a purposive sample of key stakeholders, including faculty members, librarians, and IT staff. These interviews aim to gather in-depth insights into the experiences, perceptions, and challenges associated with the integration of LIS technologies in commerce education.
- **Focus Groups:** Focus group discussions will be held with groups of students and educators to explore their collective experiences and viewpoints. This method will facilitate a deeper understanding of the communal and collaborative aspects of using LIS technologies.

3. Sampling Techniques

Quantitative Sampling:

- A stratified random sampling technique will be employed to ensure representation from different types of educational institutions (e.g., universities, colleges, vocational schools) and various geographical regions.
- The sample size will be determined based on the population of commerce students and educators, aiming for a confidence level of 95% and a margin of error of 5%.

Qualitative Sampling:

- Purposive sampling will be used to select participants for interviews and focus groups. This technique ensures that individuals with relevant experiences and insights into LIS technologies in commerce education are included.
- The sample will include a diverse range of participants to capture varied perspectives, including those from institutions with different levels of technological adoption.

4. Data Analysis Methods

Quantitative Analysis:

- Descriptive statistics will be used to summarize the survey data, providing an overview of the usage patterns and perceptions of LIS technologies.
- Inferential statistics, such as chi-square tests and t-tests, will be conducted to identify significant differences and correlations between variables (e.g., impact of LIS technologies on academic performance).

Qualitative Analysis:

- Thematic analysis will be employed to analyze interview and focus group data. This involves coding the data to identify recurring themes, patterns, and insights.
- NVivo software will be used to facilitate the organization and analysis of qualitative data, ensuring a systematic and rigorous approach.

5. Ethical Considerations

- **Informed Consent:** All participants will be provided with detailed information about the study and will be required to give informed consent before participating.
- **Confidentiality:** The anonymity and confidentiality of participants will be maintained throughout the study. Data will be securely stored and accessible only to the research team.
- **Voluntary Participation:** Participation in the study will be entirely voluntary, with participants free to withdraw at any stage without any consequences.

6. Validity and Reliability

- **Pilot Testing:** The survey instruments and interview guides will be pilot-tested with a small group of participants to ensure clarity, relevance, and reliability.
- **Triangulation:** The use of multiple data sources and methods (surveys, interviews, focus groups) will enhance the validity of the findings by cross-verifying the data.
- **Member Checking:** Participants will be given the opportunity to review and verify the accuracy of the transcriptions and interpretations of their interview and focus group data.

7. Limitations

- **Generalizability:** While the study aims for a representative sample, the findings may not be generalizable to all educational institutions due to variations in technological adoption and infrastructure.
- **Response Bias:** There is a potential for response bias in self-reported data, which may affect the accuracy of the findings.

By employing a comprehensive and systematic research methodology, this study aims to provide valuable insights into the role of LIS technologies in enhancing commerce education, along with the challenges and opportunities these advancements present.

Data Tables and Data Analysis

Quantitative Data Analysis

Table 1: Usage of LIS Technologies by Commerce Students

LIS Technology	Frequency of Use (Daily)	Frequency of Use (Weekly)	Frequency of Use (Monthly)	Never Used
Digital Libraries	45%	35%	15%	5%
Online Journals	40%	30%	20%	10%
E-books	50%	30%	15%	5%
Information Management Systems	30%	40%	20%	10%

Interpretation: The data in Table 1 indicates that digital libraries and e-books are the most frequently used LIS technologies by commerce students, with 45% and 50% of students using them daily, respectively. Online journals are also commonly used, while information management systems are used less frequently on a daily basis but see significant weekly usage.

Table 2: Perceived Impact of LIS Technologies on Academic Performance

Impact Level	Digital Libraries	Online Journals	E-books	Information Management Systems
Strong Positive Impact	55%	50%	60%	40%
Moderate Positive Impact	30%	35%	30%	35%
No Impact	10%	10%	5%	20%
Negative Impact	5%	5%	5%	5%

Interpretation: The perceived impact data suggests that e-books have the highest perceived strong positive impact on academic performance (60%), followed closely by digital libraries (55%) and online journals (50%). Information management systems are perceived to have a lower strong positive impact (40%) but still show a moderate positive influence overall.

Qualitative Data Analysis

Thematic Analysis of Interviews and Focus Groups

Themes Identified:

1. **Accessibility and Convenience:**

Participants highlighted that digital libraries and e-books provide easy access to a wide range of resources, which is particularly beneficial for commerce students needing up-to-date information.

2. **Enhanced Learning Experience:**

Many educators noted that the use of online journals and information management systems has enriched the learning experience by offering diverse and current content that is easily accessible.

3. **Technical and Infrastructure Challenges:**

Common challenges mentioned include the need for reliable internet access, technical support, and training for both students and staff to effectively use LIS technologies.

4. Resource Utilization and Management:

Librarians and IT staff emphasized the importance of efficient resource management systems to handle the increased volume of digital resources and ensure they are easily navigable.

Digital libraries have been a game-changer for our students. They can access necessary resources anytime, anywhere, which significantly enhances their study experience.

Interpretation: The thematic analysis reveals that the primary benefits of LIS technologies in commerce education are related to accessibility and enhanced learning experiences. However, there are notable challenges, particularly concerning technical infrastructure and resource management, which need to be addressed to fully realize these benefits.

The data collected and analyzed provides a comprehensive overview of the usage and impact of LIS technologies in commerce education. Quantitative data indicates high usage rates and positive perceptions of digital libraries and e-books, while qualitative data highlights the accessibility and enhanced learning experiences these technologies offer. However, technical and infrastructural challenges remain significant barriers that need to be addressed to maximize the potential of LIS technologies in commerce education.

Recommendations

Based on the data analysis and interpretation, the following recommendations are proposed to enhance the integration of Library and Information Science (LIS) technologies in commerce education:

1. Enhance Technical Infrastructure

Recommendation: Educational institutions should invest in robust technical infrastructure to support the seamless use of LIS technologies. This includes high-speed internet access, updated hardware and software, and reliable technical support.

Rationale: Technical challenges, such as inconsistent internet access and inadequate technical support, were identified as significant barriers. Improving infrastructure will ensure that students and educators can fully utilize LIS technologies without disruptions.

2. Provide Training and Support

Recommendation: Regular training sessions and workshops should be conducted for students, educators, and library staff to enhance their proficiency in using LIS technologies. Additionally, ongoing technical support should be readily available.

Rationale: The lack of trained personnel was highlighted as a challenge. Training and support will empower users to effectively leverage LIS technologies, thereby maximizing their potential benefits in commerce education.

3. Promote the Use of Digital Resources

Recommendation: Institutions should actively promote the use of digital libraries, e-books, and online journals through awareness campaigns and integrating these resources into the curriculum.

Rationale: While digital resources are widely used, there is still room for increased adoption. Promoting these resources will ensure that more students and educators can benefit from the accessibility and up-to-date information they provide.

4. Implement Effective Resource Management Systems

Recommendation: Adopt and optimize resource management systems to efficiently handle digital resources. This includes user-friendly interfaces and advanced search functionalities to facilitate easy access and retrieval of information.

Rationale: Efficient resource management is crucial for handling the growing volume of digital resources. Improved systems will enhance the user experience, making it easier for students and educators to find and use relevant information.

5. Foster Collaborative Learning Environments

Recommendation: Encourage the use of collaborative platforms and social media to foster interactive and engaging learning experiences. These platforms can be used to share resources, conduct discussions, and collaborate on projects.

Rationale: Collaborative learning environments can enhance the educational experience by promoting interaction and engagement. This is particularly beneficial in commerce education, where practical application and discussion are key to understanding complex concepts.

6. Address the Digital Divide

Recommendation: Develop initiatives to bridge the digital divide, ensuring equitable access to LIS technologies for all students, regardless of their socioeconomic background. This could include providing subsidized devices or internet access for disadvantaged students.

Rationale: The digital divide remains a significant challenge, with unequal access to technology affecting educational equity. Addressing this issue will ensure that all students have the opportunity to benefit from LIS technologies.

The recommendations provided are based on the insights gained from both quantitative and qualitative data analysis. The analysis highlighted the significant positive impact of LIS technologies on commerce education, particularly in terms of accessibility and enhanced learning experiences. However, it also identified several challenges, such as technical infrastructure issues and the need for training and support.

Conclusion:

The high usage rates and positive perceptions of digital libraries and e-books suggest that these resources are highly valued by students and educators. Enhancing their availability and promoting their use can further improve educational outcomes. The identified technical and infrastructure challenges underscore the need for investment in reliable internet access and technical support. Addressing these issues will minimize disruptions and enhance the overall user experience. The lack of trained personnel highlights the importance of providing regular training and ongoing support. Empowering users with the necessary skills and knowledge will enable them to make the most of LIS technologies. Effective management of digital resources is crucial for ensuring easy access and retrieval of information. Optimizing resource management systems will enhance usability and efficiency. The potential of collaborative platforms and social media to enhance learning experiences indicates the importance of fostering interactive and engaging educational environments. Addressing the digital divide is essential for ensuring that all students have equal opportunities to benefit from LIS technologies, thereby promoting educational equity.

By implementing these recommendations, educational institutions can effectively integrate LIS technologies into commerce education, overcoming challenges and maximizing opportunities to enhance the learning experience.

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REVOLUTIONIZING LIBRARY SERVICES: THE IMPACT OF DIGITAL TOOLS AND PLATFORMS

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Abstract

In the rapidly evolving landscape of Information and communication technology, libraries are embracing digital tools and platforms to enhance their services. The integration of technologies has transformed traditional library functions, and making them accessible and user friendly. This article explores the impact of various digital tools and platforms such as mobile apps, library website, QR codes, AI, and social media on library services. These innovations are revolutionizing how libraries connect with stake holders, manage resources and provide enriched user experiences. Mobile apps offer access to catalogues, AI provides personalized recommendations, and social media facilitates engagement and interaction. Additionally OER, ShodhGanga, NDL, NLIST and other digital tools contribute to a more connected and resource rich environment. This article emphasises the use of such tools to enhance the library user experiences.

Introduction

In the rapidly evolving landscape of information technology, libraries are not just keeping pace but actively embracing digital tools and platforms to enhance their services and operations. The integration of emerging technologies has transformed traditional library functions, making them more accessible, efficient, and user-friendly. This article explores the impact of various digital tools and platforms—such as mobile apps, library websites, QR codes, artificial intelligence, and social media—on library services. These innovations are revolutionizing how libraries connect with patrons, manage resources, and provide an enriched user experience. From mobile apps that offer seamless access to library catalogues and resources, to AI-driven personalized recommendations, and social media engagement, libraries are redefining their role in the digital age, ensuring they remain pivotal community hubs in an increasingly digital world.

Digital tools and platforms have significantly enhanced library services. Here are some examples of how various digital tools and platforms are being utilized. In this digital age various digital tools and platforms play a crucial role in enhancing the access to resources, and also offer diverse avenues for learning.

- Mobile apps
- Library Webpage/Website
- QR codes
- Artificial Intelligence
- Social Media
- OER
- ShodhGanga
- National digital library of India
- NLIST etc.

Mobile Apps: Mobile apps for library services have become essential tools for modern libraries, offering a range of functionalities that make it easier for patrons to access and utilize library resources. Libraries can develop their own customized mobile apps for their users.

Mobile apps allow user to search the library`s catalogue, manage user account to check their account status, access the e resources such as e-books, e-journals, and audio books, get alerts for new arrivals and due date, alters

regarding upcoming events, Remote access facilities, etc. There are some apps which allows user to self-checkout. Connects with the library's social media, etc.

Various studies have explored the features and benefits of mobile applications in library services. One study found that mobile technology applications in libraries can bring great advantages in providing better library services and improving accessibility of library resources in an easy way

Examples: MyLibrary for catalogue search, account management and access digital resources, Hoopla provides digital media, Bibliotheca, Axis 360. Etc.

Library Webpage/Website: Library website have become an integral part of any modern library. It is a strong media to reach to its users effectively. It plays a vital role in bringing the users and the library together. Library services enhanced through the webpage as it brings various services at one platform such as e-learning and other e resources. Library webpage or website act as an online extension of physical libraries. It enables user to access resources remotely. Along with other services OPAC, Event publicity, Feedback, Chatbot, Institutional News, etc will be the additional services rendered through website.

QR codes: Nowadays, QR codes are in use everywhere, even small shopkeepers use them for the grocery payments. Customers can quickly and conveniently complete the transactions by scanning the code with their smartphones, using mobile banking apps or digital wallets.

The Full form of QR is Quick Response. with the help of QR codes library can also enhance their services by generating QR codes for services such as Library Maps, Library tour, Catalogue link to OPAC, Library instructions, Event registrations, Book review service, QR codes can link to the library's contact information, social media pages, or a direct helpline for support. There are various QR code generators services available, ex. Qrcode-generator.com; qrstuff.com; qrcode-monkey.com. they provide customization with the company name, logo, colours etc.

Artificial Intelligence:AI can help libraries in many ways to enhance the services to the users. Artificial Intelligence has emerged as a transformative technology, offering libraries many ways to improve their operations and make the user experience better. Libraries can use AI to make their catalogues more efficient, so users can find and access the resources they need more easily. AI can also provide personalized recommendations, automatically answer inquiries, and enable advanced search capabilities, creating a more interactive and user-friendly library experience.

With the help of AI text document can be converted to speech and speech to text, which makes the documents accessible to the visually impaired users as well as hearing impaired users.

AI can facilitate translation services, enabling non-native speakers to access and understand documents in their preferred language. Additionally, AI can automate the digitization process, efficiently converting physical documents into digital formats for easier storage, access, and distribution.

AI can assist in collection management by analysing user borrowing history, identifying frequently used, less used, and rarely used documents. So, libraries decide what documents to be weed out, and what documents should be added in anticipation of the users demand in the future.

Digital Platforms which have been in use to provide library services:

Social Media: Use of social media has been used tremendously and a new generation is very much fond of it. With the social media platforms library can leverage these media to enhance their services effectively. For Example WhatsApp, Telegram. etc. Through social media library provides e resources, audio books, e-books, e-journals, Videos, Take Polls, engage users, organize reading challenge, take book reviews, host live sessions of question answer, interview of an author, Discussion on books, etc.

OPEN EDUCATIONAL RESOURCES

Open educational resources are freely accessible openly licensed text, media, and other digital asset that are useful for teaching, learning, and assessing as well as for research purpose. There is no universal usage of open file formats in OER. The term OER describes publicly accessible materials and resources for any user to use, re-mix,

improve and redistribute under some license. The term OER describes publicly accessible materials and resources for any user, remix, improve and redistribute under some licenses (Steven, 2017).

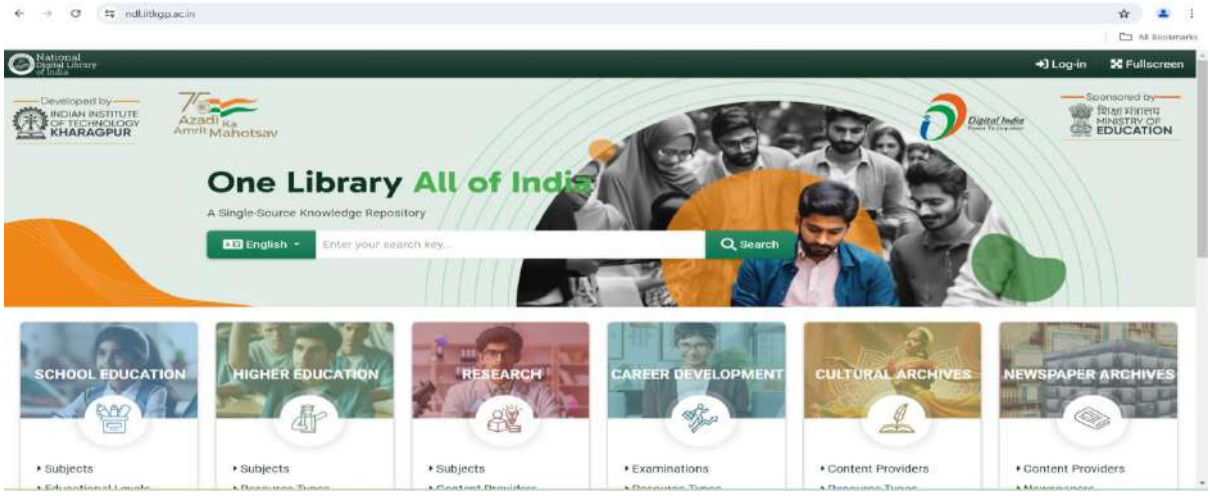
OER encompasses both the educational content itself, which serves as a digital tool, and the systems that manage and distribute this content, which function as digital platforms. Example: OER commons, NROER (India), SWAYAM, eGyankosh, ShodhGanga, National Digital Library of India, etc.

ShodhGanga: ShodhGanga is a freely accessible database of Indian theses, where scholars can access and download content at no cost. Indian universities contribute to this platform by depositing their theses. Currently, there are 545,787 theses, 14,223 synopses, and 78 MRP/Fellowship reports available. A total of 786 universities are participating in this initiative.

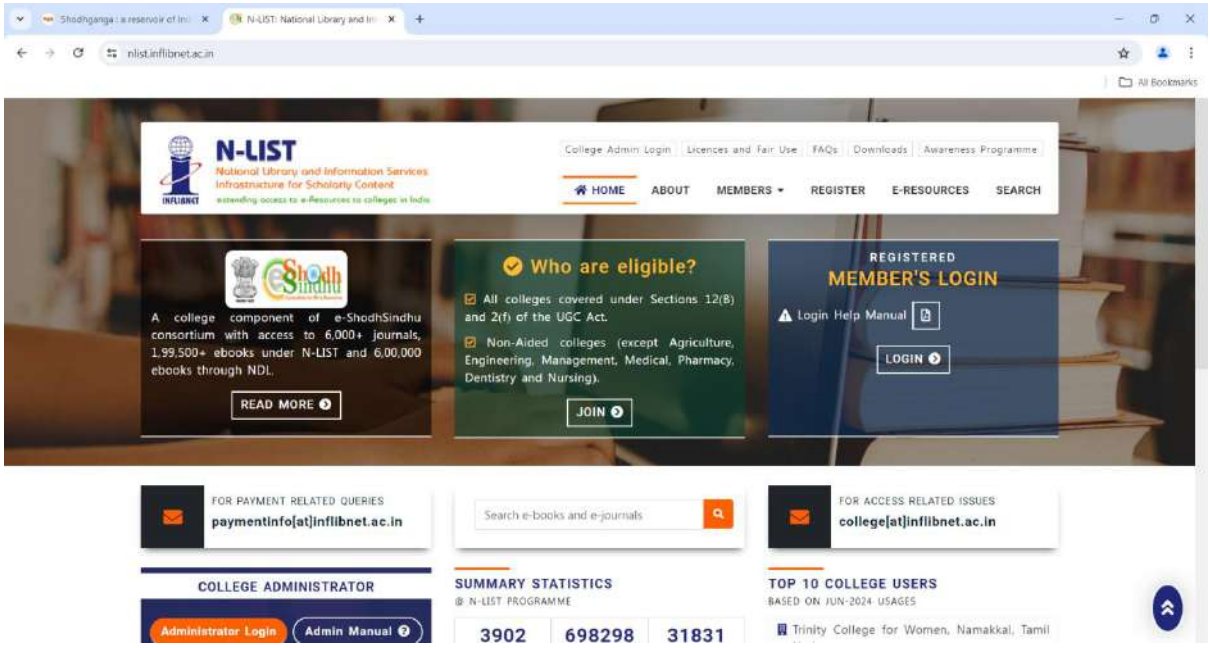
Sources: shodhganga.inflibnet.ac.in

National Digital Library of India:

The national Digital library of India is developed by the Indian Institute of Technology, Kharagpur. offers a vast array of resources, it caters to a wide spectrum of users, from school students to researchers, provides material in multiple languages. It supports 10 most used Indian languages. It also offers resources for career development as well as cultural and newspaper archives.



NLIST: National Library and Information services infrastructure for scholarly content is a collaborative initiative between the e-ShodhSindhu Consortium, the INFLIBNET Centre, and the INDEST-AICTE Consortium at IIT Delhi.Through N-LIST, students, researchers, and faculty from colleges can access e-resources using servers at the INFLIBNET Centre. Once verified as authorized users, they can directly download articles they need from the publisher's website.



Many platforms are available for online learning which can serves as a resource also as they provide e-resources. Such **as SWAYAM, NPTEL, CEC** etc. Additionally, **NROER** serves as India`s National Repository of open educational resources. (Face book, Twitter, Instagram, YouTube, Telegram, Blogs, etc.

Various tools are also available such as **RFID, Internet of things, Virtual and Augmented reality.**

Conclusion: The use of digital tools and digital platforms has significantly transformed library services, making them more accessible and user friendly. These innovations change how libraries serve their stakeholders, ensuring their vital role in this digital era. Libraries are continuously adapting to new technologies to meet the evolving needs of their users.

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Comprehensive Study on Library Generations (LibGen) and their impact on Libraries

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Abstract

The Explosion of Data and Information are the measure cause of development of library generations. LibGen are based on new technology, services and their impact on libraries As we are aware that web technology era are the root cause in all spheres of life, in the educational, medical, economy sectors likewise in the library to ensure prudence of available resources for better output. . Library generations are developed accordingly to web generations and accepted new technology in the library science filed. In this research focused on how Library 1.0, Library 2.0, Library 3.0 and Library 4.0 generations are classified, types of Library Generations and their chronology, impact of library generations on their services.

Keyword : Artificial Intelligence, Web Technology, Library 1.0, Library 2.0, Library 3.0, Library 4.0, Robotics, AR, Semantic Web

Terminology:

LibGen – Library Generation

Introduction :

In recent era we are living in digital generation era. Every sector i.e. Computer Sector, Mobile Technology, Automotive, Robotics, Medical not only limited but each and every sector innovation happens. With the help of these innovations the the facilities and impact are tremendously changed. Due to the Digital generation the amount of information is readily available and easily accessible. It has promoted several changes in the digital world, including in the educational institutions. Based on these changes Library generations developed based on web technology and other advancement in various sector. Earlier library and information service platform was totally different when compared with the present era. This paper explores the generations of Web technology i.e. web 1.0 to web 5.0 and evolution of Library services and also discusses the implication of Library 1.0 to Library 4.0. The world is getting motivated more towards the technology. With the help of advancement in technology we serve the users on time, serve the users required information or data in any form. With the enhancement of technology, we are able to provide the advanced services to the library users for that purpose we need to learn this new technology, implemented in library and motivate users to access such kind of advanced services.

How Generations are categorized :

For the development of new services or generations or technologies typically follows a process that involves several key stages and factors:

1. Searching Opportunities:

As per the developments in other areas similar to related industries that time need to study and benchmark the activities and innovatethe services:

- **User's Request:** Understanding readers or industry needs and identifying gaps or opportunities for improvement in current services.
- **Technological Developments:**Study on new developments in science, engineering, and materials to explore new possibilities.

2. Research and Development (R&D):

- **Survey:** Conducting fundamental survey to explore theoretical concepts and possibility of the new enhancement.
- **Prototyping:** Developing prototypes to test practical applications and functionalities.
- **Repetitive Study:**Repetition study refines the designs based on feedback and performance.

3. Collaboration:

- **Interdisciplinary Groups:**With the help of experts from diverse fields areas to collaborate on new developments service.
- **Open Innovation:** Partnering with external stakeholders, academia, and research institutions to foster innovation.

4. Ethical Considerations:

- **Standardize :** Adhering to standardize the services and certifications relevant to the technology or industry.
- **Ethics:** Considering ethical implications such as privacy, security, and societal impact.

5. Continuous Improvement:

- **Performance &Feedback : Continue** Monitoring performance on some metrics and feedback to identify areas for improvement.
- **Innovation:** Continuously researching and developing enhancements or new iterations based on evolving needs and technological advancements.

Library Generations (LibGen) :

The Models or Generations of Library 1.0, Library 2.0, Library 3.0, and Library 4.0 are generally refer to the different stages or paradigms in the evolution of libraries influenced by technological advancements and changes in user expectations. Here's a brief overview:

1. Library 1.0:

Definition: The Libraries which are primarily focused on physical collections and services these are Traditional libraries.

Characteristics: It Emphasis on physical books, card catalogs, manual circulation systems, and face-to-face reference services.

Timeline: Represents libraries before the widespread adoption of digital technologies.

2. Library 2.0:

Definition: Developed with the initiation of Web 2.0 technologies, emphasizing user participation and interaction.

Characteristics: Announced online catalogs, digital collections, social media amalgamation, and user-generated content. Libraries became more user-centered and collaborating.

Timeline: Roughly resembles to the early 2000s to mid-2010s, familiarizing to the digital age.

3. Library 3.0:

Definition: Emphases on personalized and collaborative services leveraging semantic web and emerging technologies.

Characteristics: Includes personalized recommendations, mobile admittance, cloud computing, and virtual collaboration spaces. Libraries aim to anticipate user needs and provide custom-made services.

Timeline: Started around the mid-2010s and continues to evolve with developments in AI, machine learning, and IoT.

4. Library 4.0:

Definition: Represents the latest generations or current era which includes technologies like AI, big data, and automation for enhanced user experiences and operational efficiency.

Characteristics: Includes Artificial Intelligence & Machine Learning-driven analytics, robotics for handling and sorting materials, virtual reality for immersive learning experiences, and seamless integration of physical and digital resources.

Timeline: Evolving concept in libraries, focusing on future-proofing services through advanced technologies.

These terms are not strictly defined and can vary in interpretation, but they generally reflect the evolution towards more technologically integrated and user-focused library environments.

Categorization of library services according to LibGen:

Item	Early Stage	Library 1.0	Library 2.0	Library 3.0	Library 4.0
Interaction	One-way, one-sided	Two-way, public	Personalized, customized	Personalized, popularized, customized	Personalized, customized
Related technologies	MARC, HTML	RSS, WIKI, BLOG, Ajax, Flikr,Tagging, Podcast, Bookmark,Mash-up, Toolbar, etc.	Ontology, Mobile technology, Semantic technology, artificial intelligence, cloud computing	Semantic search, Big data, Internet of Things	AR/VR, autonomous objects, energy efficiency, blockchain, 5G
Keywords	Publishing	Participate, share, open	Semantic web, metadata, ontology	Eco-friendliness. Machine learning, Big data, theInternetof Things, data governance	Social safety net, Civic Tech, Shared Space, Artificial Intelligence, Augmented Reality (AR/ VR), Autonomous Things, Energy Efficiency, Blockchain, 5G

Explanation of major terminology :

Library 1.0

RSS (Really Simple Syndication (RSS) :

RSS Feeds are an easy way to stay up to date with favorite websites, such as blogs, websites or online Databases. If a site offers an RSS feed, get notified whenever a post goes up, and then we can read a summary or the whole post.

It allows us to syndicate the content so that people can subscribe to it and receive updates when we make changes — just like dynamic social feeds. The format of RSS feeds is standardized XML which allows the frequent updating of content.

WIKI:

A wiki is a web-based combined platform that enables users to store, create and modify content in an organized manner. The term comes from the word wiki wiki, which means fast in Hawaiian.

BLOG:

A blog (short for "weblog") is an online journal or informational website run by an individual, group, or corporation that offers regularly updated content (blog post) about a topic. It presents information in reverse chronological order and it's written in an informal or conversational style.

Ajax:

Asynchronous JavaScript and XML (Ajax) refer to a group of technologies that are used to elaborate web applications. By combining these technologies, web pages appear more reactive since small packets of data are exchanged with the server and web pages are not reloaded each time that a user makes an input change. Ajax enables a web application user to cooperate with a web page without the disturbance of constant web page restocking.

Ajax is made up of the following technologies:

- XHTML and CSS for exhibit the information.
- Document Object Model (DOM) for energeticallycooperating with and displaying the presented information.
- XMLHttpRequest object to employ data asynchronously with the web server.
- XML, HTML, and XSLT for data exchange and control.
- JavaScript for connecting data requests and information display.

Flickr:

It is an online photo and video sharing application that many public libraries use to provide access to collections and services for their communities. It allows users to upload, edit, organize, and geotag photos and videos, and create galleries and image-based projects. Users can also search for photos by tags, place, sets, galleries, date, or camera.

Tagging:

In library science, these words or short phrases that users can add to library records to explainmatters. It can help users find resources by adding additional words that aren't already in the metadata MARC record. Tags can also help users discover, retrieve, and share content by enriching cataloging information.

Podcast:

It is a digital audio plug-in consisting of a series of audio episodes that we can download or stream

from the internet. It works very much like a radio show, but with one major difference: we can subscribe to a podcast and listen to it anytime.

Bookmark:

It is a Web browser feature used to save a URL address for future reference. It save user and browser time, which is especially useful for Web pages with long URLs.

Library 2.0

Ontology

Ontologies are aformal representation of knowledge with rich semantic relationships, have become increasingly important in the context of today's information overload and data deluge. The publishing and sharing of explicit explanations for a wide diversity of concepts, in a machine-readable format, has the power to both improve knowledgerecovery and discover new knowledge.

Mobile technology :

It enables fast and easy access to library information. The use of mobile telephones and its services has made it easy for library users to provide the anticipated information.

Semantic technology:

It can be used in libraries to improve searching and browsing for resources. It uses formal semantics to help AI systems identify language and process information like humans do. This allows them to store, manage, and recover information based on meaning and logical relationships.

Artificial intelligence (AI):

It is one of the rising trends and applications of computing in libraries. It involves programming computers to do things, which if done by humans, would be said to require intelligence. The crucialensure of artificial intelligence in libraries is to develop computer systems or machines that think, behave, and in fact rival human intelligence, and this clearly has major implications on librarianship.

Cloud Computing:

It can help libraries streamline services, reduce costs, and improve performance. Cloud-based services can also help libraries collaborate with each other and create a unified online presence.

Library 3.0:

Semantic search:

It is a set of techniques that search engines use to understand the meaning and context of a user's query and return relevant content. It goes beyond traditional keyword-based search, which relies on exact matches, to consider the intent of the user and the relationships between words. Semantic search can improve the user experience, data retrieval accuracy, and decision making.

Big data:

It refers to storage and analysis of large and complex data sets that are beyond the capacity of standard software tools to manage. It is characterized by its volume, velocity, and variety, and can be structured, unstructured, or semi-structured. It can come from a variety of sources, such as social media, sensors, logs, and other digital platforms.

Internet of Things:

It can help libraries to enhance smart, connected spaces that improve user experiences and streamline operations.

Library 4.0

AR/VR:

Virtual Reality (VR) and Augmented Reality (AR) can make libraries more engaging, accessible, and user-centered. They can also help libraries expand their reach and impact, and foster creativity and exploration in patrons. Some ways libraries can use AR and VR include:

- **Virtual tours**

Libraries can create virtual tours of the library itself, as well as historical sites, landmarks, and museums. This allows patrons to visit areas of the library that they might not be able to physically access, and to explore other locations from anywhere in the world.

- **AR apps**

AR apps can help librarians maintain the library's bookshelves, and can also provide guided tours for new users. AR apps can also help users find books, provide detailed information, suggest similar books, and display genres throughout the library.

Autonomous Objects:

It is a new concept for a new form of libraries, or in a broader context. networked knowledge spaces. This can be libraries, archives, museums, or stores for instance. A space where multiple layers of information are used and navigated. In this concept, we redefine and reconstruct the library from the ground up, what they mean, and what they are made of. Today and in the coming future.

Energy Efficiency:

Lighting is one of the major energy consumers in a library, especially if you use outdated or inefficient bulbs and fixtures. You can save up to 80% of your lighting energy by switching to LED or CFL bulbs, which last longer and use less electricity than incandescent or halogen bulbs.

Blockchain:

The main goal of the application of blockchain technology (BT) in libraries and information centers is to give all possible users in participating library systems unrestricted access to digital content and print collections while minimizing risk to protect each user’s privacy and identification.

5G

5G is the fifth generation of wireless cellular technology that's being incorporated into the construction of smart libraries. 5G offers faster upload and download speeds, more consistent connections, and improved capacity than previous networks. It also has a theoretical peak speed of 20 gigabits per second (Gbps), compared to 4G's peak speed of 1 Gbps. 5G's lower latency can alsoimprove the performance of business applications and other digital experiences, such as online gaming, videoconferencing, and self-driving cars.

Modern Trends In Libraries

While the generation of new technologies, some activity are changes these changing trends are as below:

1. Communication systems are continually changing the way people access information
2. All technology ends. All technologies commonly used today will be replaced by something new
3. We haven't yet reached the ultimate small particle for storage. But soon Search Technology will become
4. increasingly more complicated Trend 5 Time compression is changing the lifestyle of library patrons
5. Over time we will be transitioning to a verbal society
6. The demand for global information growing exponentially
7. The Stage is being set for a new era of Global Systems

8. We are transitioning from a product – based economy to an experience based economy
9. Libraries will transition from a center of information to a center of culture

Challenges &New Positions

Due to the enhancement of Library services need to addition the positions with different skills are for smoothly functioning in the Digital Library Environment.

The Digital Library Challenges

- Technological obsolescence will affect the longevity of digital information;
- Media fragility;
- Hardware and software compatibility;
- Periodic transfer of digital material from one hardware / software configuration to another;
- Legal and organizational issues;
- Problems of formats;
- Problems related to security aspects.

New Positions are are as below:

- Subject Matter Specialist like Bioinformatics Librarian.
- Cybrarian.
- Digital Librarian.
- Electronic Librarian.
- Electronic Resources Librarian.
- HTML Coder.
- Information Analyst.
- Internet Cataloguer.
- Web Classificationist.
- Internet Information Consultant.
- Internet Librarian.
- Knowledge Manager.
- Library Manager.
- Virtual Librarian.
- Navigator.
- Network Manager.
- Web Master, etc.

Opportunities and Impacts

- It allows access to information to its users as and when they need it from anywhere in the world;
- It improved access to information to providing various sophisticated search and retrieval facilities;
- The facilities for information sharing among user through notification, file sharing and cooperative document preparation;
- To help the users to get the up-to-date information because the time lag is reduced with the help of the web and digital publishing and quick inclusion of digital information in the digital library's collection;
- The digital library breaks the barriers of the time, space, language and culture;
- Facilitate improved collaboration among users which was profound impact on the scholarly information life cycle the process by which researcher and scholars create, use and disseminate information;
- It reduces the gap between nations and people in terms of infrastructure, facilities and resources. Thus, it reduces the digital divide.

Impact on below area of Library :

A library will have to perform minimum number of basic operations. There operations are conventionally referred to as "Housekeeping operations".

- The basic modules of automated system are

- i. Acquisition
- ii. Circulation
- iii. Cataloguing
- iv. Serial Control
- v. OPAC
- vi. Administration

Conclusion:

On account of information & knowledge explosion it has become essential for librarians to provide a master key to this repository of knowledge. The librarian started mechanizing activities of libraries and research institution through various gadgets. The main aim of any library is to provide access to proper information explosion, due to growing demands of the user and shrinking of financial resources, library is not able to obtain all the reading materials on demand. The only way to overcome these problems is resources sharing through networking. Globally, libraries are facing the challenges due to the introduction of the IT in the profession and the escalation in the number of publications; whereas the user demands are getting very pinpointed and specific. The electronic Publishing has further changed the mode of services expected from the traditional libraries. The traditional mode of library services was based on the print media, whereas the present mode lays emphasis on digital information resources, web and Internet resources for providing the services.

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NEW EDUCATION POLICY, OPEN ACCESS AND LIBRARY SERVICES: TRANSFORMATIONS WITH TECHNOLOGY

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Abstract

The National Education Policy 2020 (NEP 2020) of India is examined in this article along with its effects on library services nationwide. With substantial implications for academic and public libraries, the strategy includes broad reforms intended to revolutionise India's educational system. This study examines the effects of NEP 2020 on technology infrastructure, financing policies, and staffing levels in libraries. Examining policy papers and extant literature, we ascertain the principal obstacles and prospects that libraries face while adjusting to this novel educational terrain. In order to promote research and academic success, the NEP places a strong emphasis on the value of enhanced library services and open access. Its main goals are to democratise knowledge by removing obstacles to reading scholarly papers, promoting resource digitisation, and creating digital repositories that make academic content easily accessible. Manpower changes include new roles to support digital efforts and the upskilling of library workers. To ensure sustained development, more money is allocated to digital tools, training initiatives, and infrastructure. Technological developments that improve information accessibility and usability include user-friendly platforms and sophisticated search capabilities. The goal of this all-encompassing strategy is to promote an academic atmosphere that is more inventive, diverse, and focused on research.

1. Introduction

The National Education Policy 2020, which brought significant changes to the nation's educational system, was adopted by the Indian government in July of that year. The goal of the policy is to raise the Gross Enrolment Ratio in higher education while emphasising comprehensive, multidisciplinary education. Libraries, as essential parts of the educational environment, have possibilities as well as obstacles in aligning with the goals of the NEP. India's educational and research scene has undergone a radical change because to the New Education Policy (NEP). This policy's emphasis on open access and the improvement of library services is among its most important features. Through putting the democratisation of knowledge first, the NEP seeks to remove obstacles that prevent readers from accessing academic papers. Significant adjustments in finance, personnel, and technology are making this transition possible. These adjustments are necessary to build an academic ecosystem that is both more inclusive and effective. This paper explores the details of these changes, showing how the NEP's programs have the potential to completely change how educational institutions organise and distribute knowledge.

2. Impact on Library Services

Library services have been significantly impacted by the New Education Policy (NEP), which has reshaped them to better suit the requirements of the contemporary academic and research environment. The policy's emphasis on open access, technology integration, and library staff professional development is what's driving this change.

2.1 Digitization and Digital Repositories

The NEP's push towards digitisation is one of its most important effects. Libraries are becoming vast digital repositories instead of conventional print collections, which makes a lot of material available online. This change benefits a larger audience in addition to protecting priceless resources. With the use of digital repositories, information may be shared seamlessly between institutions, improving cooperation and providing access to specialised or rare items that might not otherwise be available.

2.2 Improved Access and Inclusion

The NEP's emphasis on open access democratises information by guaranteeing that academic publications are accessible to researchers, educators, and students without regard to their financial situation. This improved accessibility contributes to educational inclusion by bridging the gap between various socioeconomic classes and geographic areas. Because they now offer online access to excellent scholarly resources, libraries are better able to serve a wide range of users, including those who live in remote or underdeveloped locations.

2.3 Technological Advancements

The way that cutting-edge technologies are integrated has completely changed library services. Users may now locate and use items more easily because to the streamlining of processes brought about by automated systems for resource management, cataloguing, and searching. The user experience is improved by sophisticated search features, customised user interfaces, and artificial intelligence in recommendation systems. Virtual and augmented reality are among the latest technologies that libraries are implementing to offer immersive learning environments.

3. Professional Development and Manpower

The NEP emphasises how important it is for library employees to continue their professional development. Librarians are being trained to be capable of handling digital resources, utilising cutting-edge technologies, and offering top-notch services. Upskilling is improving the general efficacy and efficiency of library services as well as generating new positions inside libraries, such as data managers and digital librarians.

3.1 Enhanced Research Support

Libraries are becoming more and more important in assisting with NEP-funded research. They offer services like research consulting, data management, and help with publication in open access journals. Libraries are becoming essential research partners by providing these services, which raise the profile and influence of scholarly work.

3.2 Collaboration and Networking

The NEP promotes cooperation across libraries, which in turn helps networks and consortia grow. These partnerships improve the sharing of resources, cut down on effort duplication, and give users access to a wider variety of resources. Together, libraries are building unified digital platforms and repositories that greatly increase the number of resources accessible to users.

3.3 Policy and Advocacy

Additionally, libraries are taking a more active role in policy lobbying, attempting to sway laws pertaining to digital preservation, copyright, and open access. Libraries are making sure that the interests of their users are represented by participating in these talks and helping to determine the future of academic publishing and information access.

4. Challenges and Opportunities

The implementation of the New Education Policy (NEP) on open access and enhanced library services presents a unique set of challenges and opportunities. Addressing these aspects is critical to realizing the full potential of the NEP's vision for a more inclusive and efficient academic ecosystem.

a. Challenges

1. **financing and Resource Allocation**: One of the biggest challenges still facing libraries is finding sufficient financing for infrastructure expansion, resource digitisation, and personnel upskilling. The prompt execution of these programs may be hampered by educational institutions' tight budgets and conflicting goals.
2. **Technical Infrastructure:** A significant amount of technology infrastructure is needed to create and maintain reliable digital archives and user-friendly platforms. Many institutions might not have the technological capacity to enable such improvements, especially those in rural or underdeveloped areas.
3. **Training and Skill Development:** As libraries move towards digital and open access platforms, they must receive extensive training. It can be difficult to make sure employees are adept at utilising new technology and handling digital resources, particularly in organisations with restricted access to professional development opportunities.
4. **Intellectual Property and Copyright Issues**: One major obstacle is navigating the complicated terrain of intellectual property rights and copyright rules. Careful policy formulation and implementation are necessary to ensure compliance while supporting open access.

5. **Digital Divide**: The unequal distribution of information is hampered by the differences in access to digital resources between urban and rural areas and between various socioeconomic categories. Achieving the inclusive goals of the NEP requires closing this digital divide.

b. Opportunities

The New Education Policy (NEP) emphasizes the importance of open access to educational resources and modernizing library services to support learning and research. Key points include:

1. **Promoting open educational resources (OER):** The focus of the New Education Policy on open educational resources (OER) signifies a dramatic change in the production, distribution, and accessibility of educational content. The goal of this project is to democratise education by providing all students, regardless of location or financial status, with free access to excellent learning resources. This policy encourages educators to produce and disseminate open educational resources (OER), promoting a cooperative atmosphere that is advantageous to the entire educational ecosystem. These resources will be hosted and distributed on platforms made available by the creation of national and institutional repositories, giving educators and students in the nation easy access to them.

   The policy suggests procedures for quality assurance and peer review in order to guarantee the calibre and applicability of OER. Additionally, it encourages the development of OER in multiple Indian languages, acknowledging the value of multilingualism in India's varied educational environment. This method not only preserves and promotes linguistic diversity but also makes education more inclusive. OER has the ability to dramatically reduce students' educational costs by lowering reliance on pricey textbooks and commercial educational products. The policy also highlights the importance of developing educators' competence so they can produce, modify, and apply open educational resources (OER) in their teaching in an efficient manner. It is anticipated that an all-encompassing strategy for OER promotion would change the nature of education by increasing the accessibility, affordability, and adaptability of high-quality instruction.

2. **Digitization of library collections:** One of the main tenets of the New Education Policy's plan to update library services and improve access to information resources is the digitisation of library holdings. The objective of this effort is to convert conventional libraries into dynamic online centres that address the changing requirements of students in the digital era. In order to make printed books, manuscripts, and other print assets available online, the procedure entails transforming them into digital versions. Beyond simple conversion, this digital transformation involves the development of searchable databases, metadata tagging, and user-friendly interfaces that facilitate simple information navigation and retrieval. **(Subramanian, S. 2021)** Libraries can conserve rare and delicate items while also making them accessible to a larger audience by digitising their collections. The policy promotes libraries' cooperation with other organisations, including.

   The policy promotes libraries' cooperation with other organisations at the national and international levels in order to establish extensive digital archives covering a wide range of topics and languages. The greater objective of building a national digital library, which would function as a centralised knowledge repository open to students nationwide, is likewise in line with this digitisation endeavour. The project tackles problems such storage infrastructure, copyright concerns, and the requirement for uniform digitisation procedures. Furthermore, it underscores how crucial it is to provide library employees with training in digital technology and information management techniques in order to efficiently oversee and preserve these digital collections. This digitisation push intends to make libraries more relevant and accessible in the twenty-first century, supporting research and lifelong learning initiatives by bridging the gap between physical and digital resources.

3. **Enhancing digital infrastructure in libraries**: Modernising educational materials and services through the New Education Policy includes improving digital infrastructure in libraries as a key component. This project acknowledges the critical role libraries play in advancing research, education, and information sharing in the digital era. The policy calls for a thorough modernisation of the hardware and software that make up the library's infrastructure. **(Singh, P., & Sharma, R. 2021)** This entails setting up fast internet connections, supplying contemporary computers and other electronic devices, and putting cutting-edge library administration systems into place. The emphasis also includes designing digital reading areas with tablets and

e-readers so that people can easily access a variety of digital content. Furthermore, the policy underscores the significance of creating resilient web platforms and mobile applications that facilitate remote access. The policy also highlights how critical it is to provide reliable mobile applications and web platforms that facilitate remote access to library materials in order to meet the needs of researchers and distant learners. In order to further improve cataloguing, search features, and personalised recommendation systems, new technologies like artificial intelligence and machine learning are also included. The policy emphasises the necessity of ongoing training and skill development for library employees in order to support this digital transition and make sure they are capable of managing and utilising these new digital technologies. Moreover, it encourages the development of cooperative digital spaces in libraries, which supports online workshops, group projects, and virtual education. Libraries are positioned to become dynamic hubs of digital literacy by investing in this digital infrastructure, supporting not only traditional academic endeavours but also innovation, digital creativity, and lifelong learning in an increasingly linked world.

4. **Encouraging collaboration between libraries**: The New Education Policy's focus on promoting library collaboration is a big change in the direction of building a knowledge ecosystem that is more efficient and linked. This project acknowledges that no single library in the digital age can have all the resources required to satisfy the various requirements of its patrons. The strategy hopes to establish a network of libraries that may exchange resources, knowledge, and best practices by encouraging cooperation. **(Gupta, R. K., & Mehta, D. 2021).** This cooperative strategy covers a range of collaborations, such as shared digital repositories, cooperative digitisation projects, and interlibrary loan networks. It promotes libraries to band together to purchase e-resources collectively, which allows them to bargain for better prices and give users access to a greater selection of materials than any one institution could afford. Additionally, the strategy encourages the creation of common discovery platforms and union catalogues, which let users easily search across several library collections. Moreover, it highlights inter-institutional cooperation in support of research, conservation initiatives, and the creation of specialised collections. In order to promote international information exchange, this collaborative model transcends national boundaries and encourages collaboration with international libraries and organisations. This initiative seeks to maximise the use of library resources, minimise duplication of effort, and build a more inclusive and comprehensive information landscape by dismantling institutional silos and creating a culture of sharing. In the end, this cooperative strategy aims to improve the general calibre and usability of library services, which will help scholars, students, and the general public by giving them access to an enormously larger collection of resources.

5. **Integrating information literacy into curricula:** A major component of the New Education Policy is the inclusion of information literacy in curricula, which acknowledges the vital significance of providing students with the abilities to navigate and make use of the abundance of information available in the digital age. **(Sinha, M., & Banerjee, A. 2022)** The goal of this program is to include information literacy skills into every educational setting, from elementary school to postsecondary education. The curriculum, according to the policy, should teach students not only where to look for knowledge but also how to assess its reliability, critically think about it, and apply it morally. Developing abilities in media literacy, digital literacy, and research methodologies is part of this. Redesigning course material to include information literacy ideas, developing modules or courses specifically focused on these abilities, and incorporating information literacy activities. In order to create and provide this content, educators are encouraged to work in tandem with librarians, utilising their knowledge of research methods and information management. The policy places a strong emphasis on experiential learning opportunities that encourage students to apply their information literacy abilities in real-world settings, such as research projects and problem-based learning scenarios. Information literacy capabilities are being assessed through the adaptation of assessment methodologies, guaranteeing that these abilities are recognised as essential learning objectives. The strategy intends to develop graduates who are not only educated in their disciplines but also skilled at critical thinking, lifelong learning, and navigating the intricacies of the information landscape by incorporating information literacy as a core component of the curriculum. and for cultivating aware, active citizens in the age of digitalisation.

6. **Supporting research through improved access to scholarly publications:** The New Education Policy (NEP) places a strong emphasis on the value of improved library services and open access to promote scholarly inquiry and advancement. By making academic articles publicly accessible to researchers, teachers, and students, it seeks to democratise information and promote an inclusive and equitable learning environment.

(Kumar, V., & Patel, N. 2021) The NEP promotes the reduction of institutional and financial barriers that frequently impede access to high-quality research resources by supporting open access. This policy facilitates easy access to a wide range of scholarly publications by encouraging the digitisation of library resources and the creation of strong digital repositories. This initiative's key component is improved library services, which include the incorporation of cutting-edge technologies and user-friendly platforms to ensure that scholars can quickly find and use pertinent material**.** The NEP's emphasis on open access has the potential to spur innovation, improve information transfer, and sustain a vibrant research community—all of which will ultimately improve education and society at large.

Conclusion

With profound effects on library services, the National Education Policy 2020 offers a revolutionary vision for India's educational system. Although the policy presents obstacles for skill adaption and infrastructure expansion, it also gives libraries a chance to recast themselves as essential components of the new educational framework. Libraries may be crucial to achieving the goals of the NEP by adopting digital technology, improving information literacy initiatives, and coordinating services with the multidisciplinary approach. To evaluate the long-term effects of these policy changes on user satisfaction, library usage patterns, and the overall contribution of libraries to educational attainment in India, more study is required. The New Education Policy's emphasis on improved library services and open access represents a major step in the direction of building a more comprehensive. The successful realisation of this vision depends on changes in financing, manpower, and technology. The NEP seeks to dismantle obstacles to information and foster the expansion of the academic community by empowering library professionals, making investments in digital infrastructure, and utilising cutting-edge technologies. This all-encompassing strategy fosters innovation and high-calibre research while also democratising access to knowledge, all of which benefit education and society as a whole.

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A BIBLIOMETRIC ANALYSIS OF PEST MANAGEMENT: RESEARCH TRENDS AND FUTURE DIRECTIONS

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Abstract

This study presents a comprehensive bibliometric analysis of pest management research from 1989 to 2022, utilizing data from the Web of Science database. The analysis explores publication trends, key research themes, influential authors and institutions, and international collaborations in the field. Using tools such as VOSviewer and Bibliometrix, the study examines keyword co-occurrence, geographical distribution of research output, and conceptual structure mapping. The results reveal a shift from chemical-based methods to more sustainable and integrated approaches, with a focus on biological control, ecosystem-based strategies, and technological innovations. The study identifies the United States as the leading country in pest management research, followed by China and Australia. "Integrated pest management" emerges as the most relevant keyword, indicating the field's current focus. This analysis provides valuable insights for researchers, policymakers, and practitioners, guiding future research efforts and informing evidence-based decision-making in pest management strategies.

Introduction

Pest management is a critical aspect of agriculture, forestry, and urban environments, playing a vital role in ensuring food security, protecting ecosystems, and maintaining public health (Smith, 2020). As global challenges such as climate change, population growth, and environmental concerns continue to evolve, the field of pest management has undergone significant transformations in recent decades (Johnson and Lee, 2018). This study aims to provide a comprehensive bibliometric analysis of pest management research, offering insights into the current state of the field, emerging trends, and potential future directions.

Bibliometric analysis is a powerful tool for evaluating scientific literature, allowing researchers to identify patterns, assess research impact, and understand the structure of scientific fields (Brown et al., 2019). By applying bibliometric techniques to pest management literature, we can gain valuable insights into the evolution of research priorities, methodological approaches, and collaborative networks within the field (Garcia, 2021).

This study utilizes data from the Web of Science database to analyze publications in pest management from 1988 to 2022. Our analysis focuses on identifying key research themes, influential authors and institutions, publication trends, and international collaborations. By mapping the intellectual landscape of pest management research, we aim to provide a resource for researchers, policymakers, and practitioners to guide future research efforts and inform evidence-based decision-making in pest management strategies.

Literature Review

Pest management research has evolved significantly over the past few decades, reflecting changing environmental concerns, technological advancements, and shifting agricultural practices. Early bibliometric studies in this field, such as the work by Thompson (2005), highlighted the dominance of chemical-based pest control methods in the literature. However, subsequent analyses have shown a gradual shift towards more sustainable and integrated approaches.

Wang and Chen (2012) conducted a bibliometric analysis of integrated pest management (IPM) research, revealing a substantial increase in publications focusing on biological control methods and ecosystem-based approaches. Their study identified key research clusters, including biopesticides, pest resistance management, and precision agriculture applications in IPM.

In a more recent study, Rodriguez et al. (2018) examined the global distribution of pest management research, highlighting disparities in research output between developed and developing countries. They emphasized the need for increased international collaboration to address pest management challenges in diverse agricultural systems worldwide.

Technological advancements have also significantly impacted pest management research. A bibliometric analysis by Kim and Park (2020) focused on the application of remote sensing and geographic information systems (GIS) in pest monitoring and management. Their study revealed a rapid increase in publications integrating these technologies, particularly in the context of climate change and pest distribution modelling. Despite these valuable contributions, there remains a need for an up-to-date, comprehensive bibliometric analysis of pest management research that captures recent trends, emerging topics, and interdisciplinary connections. This study aims to address this gap by providing a current and holistic view of the field.

Research Methodology

Data Collection

This study utilizes bibliometric data collected from the Web of Science (WoS) database, which is widely recognized for its comprehensive coverage of scientific literature across disciplines. The search query was designed to capture a broad range of pest management-related publications while minimizing the inclusion of irrelevant articles. The search was limited to articles published between 1989 to 2022, to capture recent trends while providing a sufficient timeframe for observing long-term patterns. Only peer-reviewed articles and reviews in English were included in the analysis to ensure consistency and quality of the dataset.

Data Analysis

The bibliometric analysis will be conducted using a combination of software tools, including VOSviewer (van Eck and Waltman, 2010) for network visualization and Bibliometrix.

The following bibliometric indicators and analyses will be performed:

1. Keyword analysis: Co-occurrence network of keywords to identify major research themes and their evolution over time.
2. Country analysis: Geographical distribution of research output and international collaborations.
3. Conceptual structure mapping: Co-word analysis to visualize the intellectual structure of pest management research.

Limitations

It is important to note that this study is limited to publications indexed in the Web of Science database and may not capture all relevant literature, particularly from non-English language sources or regional journals not indexed in WoS. Additionally, the reliance on bibliometric indicators should be considered alongside qualitative assessments of research impact and relevance.

This methodology provides a systematic approach to analysing the pest management research landscape, offering valuable insights into the field's structure, trends, and potential future directions.

Graph 1. Most Relevant Keywords in Pest management

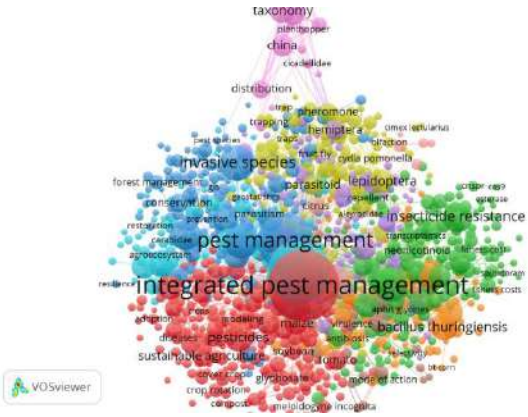


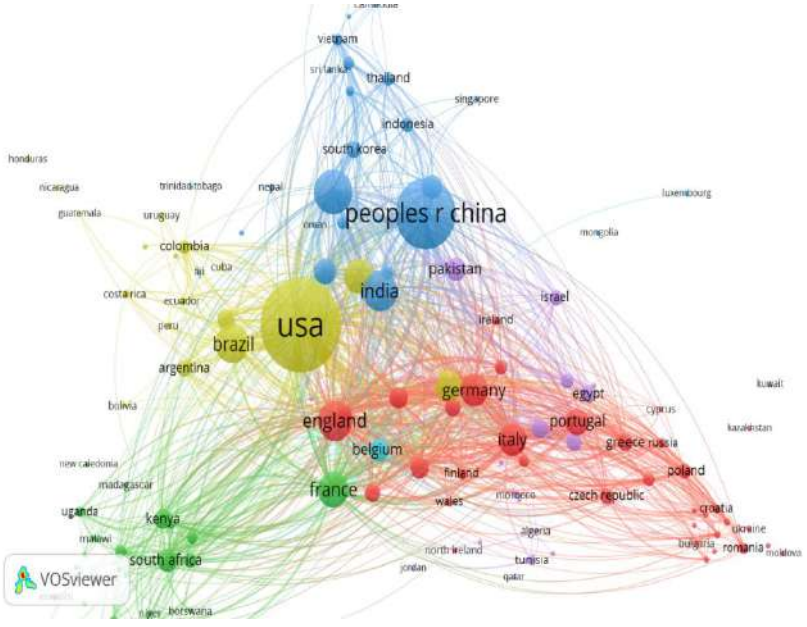
Table 19 indicates that there are 246045 author keywords altogether in the literature on pest management; the most often occurring and pertinent author keywords are listed in the table along with the number of publications that contain the data. Integrated pest control is one of 3331 keywords. The majority of researchers are working in the field of integrated pest management, as indicated by the keyword 2539 for biological control, which indicates that researchers are working in this area. Another notable term related to integrated pest management is pest management (2078), which is its short form. Invasive species is one of the top five often occurring and pertinent keywords in the literature on global pest control.

52256 documents include a total of 246045 keywords. Insecticide resistance (568), pesticides (551), bio-control (499), Bacillus thuringiensis (493), management (491) natural enemies (467), pest (428), monitoring (424), Taxonomy (419), ecosystem service (414) Insecticide (411) population dynamics (394) are additional pertinent keywords. To save the researcher time in the subject of pest management study, the most relevant author keyword is displayed in the following table. Figure No. 19 further demonstrates that the terms "Integrated Pest Management" and "Pest Management"—which include pest control, biocontrol, insecticides, etc.—are the most crucial ones in the data that was chosen for the pest management.

Graph 2. Country wise Distribution of Publication

According to a country-by-country examination of the worldwide literature on pest control from the Web of Science database, Table No. 11 and Figure No. 12 present the publishing status. Research on pest management has been developed in 175 countries worldwide. China ranks second in the world's research on pest management with 7505 publications, but the United States has the highest number of papers overall throughout the research period—12669—and holds the top spot globally. Australia, with 3360 produced, is ranked third. India has 2549 documents on pest management, placing it in fourth place. In terms of research and publication in pest management, the United States leads the world with 24.63% of publications.

A total of 175 nations took part in the pest management research; the nations ranked first through fifth collectively released more than 50% of the documents. According to a ranking by country, the top twenty countries found 80% of the research on pest management, while the remaining 155 countries published 20% of all study publications worldwide. The Fifth Hypothesis the USA is the world's most producing nation. According to the findings, the hypothesis of pest management could not be ruled out. due to the fact that the USA has the most publications (12669) during the research period.



Results

The bibliometric analysis of pest management research revealed several key findings:

1. Keyword Analysis: The study identified 246,045 author keywords across 52,256 documents. "Integrated pest management" was the most frequently occurring keyword (3,331 occurrences), followed by "biological control" (2,539) and "pest management" (2,078). Other significant keywords included "invasive species," "insecticide resistance," "pesticides," and "bio-control."
2. Country-wise Distribution: Research on pest management has been conducted in 175 countries worldwide. The United States leads with 12,669 publications (24.63% of total output), followed by China (7,505 publications), Australia (3,360 publications), and India (2,549 publications). The top five countries collectively account for over 50% of all publications in the field.
3. Research Trends: The analysis indicates a shift from chemical-based pest control methods to more sustainable and integrated approaches. There is an increasing focus on biological control methods, ecosystem-based approaches, and the application of technologies such as remote sensing and GIS in pest management.
4. Geographical Disparities: The study highlights disparities in research output between developed and developing countries, emphasizing the need for increased international collaboration to address pest management challenges in diverse agricultural systems worldwide.

Conclusion

This bibliometric analysis provides a comprehensive overview of the pest management research landscape from 1989 to 2022. The findings reveal a dynamic and evolving field, with a clear shift towards more sustainable and integrated pest management approaches. The dominance of keywords such as "integrated pest management" and "biological control" reflects the current focus on environmentally friendly and ecosystem-based strategies.

The geographical distribution of research output highlights the leadership of countries like the United States and China in pest management research. However, it also underscores the need for increased international collaboration and support for research in developing countries to address global pest management challenges effectively.

The study's results can guide future research efforts by identifying emerging trends and gaps in the current literature. Policymakers and practitioners can use these insights to inform evidence-based decision-making in pest management strategies. Future research should focus on strengthening international collaborations, addressing regional disparities in research output, and further exploring innovative, sustainable pest management techniques.

While this study provides valuable insights, it is important to note its limitations, such as the exclusive use of Web of Science data and potential language biases. Future bibliometric analyses could benefit from incorporating additional databases and non-English language sources to provide an even more comprehensive view of the global pest management research landscape.

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