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A Study on Digitisation and Integration of AI-Based Technologies in Academic Libraries of Madhya Pradesh

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Abstract

This article provides a data-driven analysis of digitisation and modernisation in academic libraries of Madhya Pradesh. Libraries use digitisation as a method to manage all of their work and to protect resources by replacing manual processes with computers. This study has data from both government and private universities and colleges. A structured closed ended questionnaire with some open ended questions was distributed based on the cluster random sampling approach in order to gather first hand data. In this study, data has been collected from 60% government and 40% private organisation. which include 56% universities and 44% colleges. Academic libraries of Madhya Pradesh are going to a transformative shift towards digitisation. Although data indicates that the digitisation of Madhya Pradesh academic libraries is either completed or in progress, a large number of libraries still work manually. For which government intervention and awareness among readers are necessary. In the academic libraries, digitisation and adoption of modern technology are also aligning with the National Education Policy (NEP) 2020 vision. In NEP libraries are envisioned as dynamic, vibrant hubs of learning and knowledge, moving beyond their traditional role as mere book repositories.

Keywords: Digitisation, Artificial Intelligence, Academic Libraries, Madhya Pradesh Libraries

Introduction

Academic libraries in Madhya Pradesh are redefining their role—from passive storage spaces to active engines of innovation and intellectual growth. Data taken from various university and college libraries of M.P. shows that in M.P. libraries, manual work is being rapidly converted into digital form. This transition is not only making the work easier, but it is also enabling the provision of 24/7 service.

Digitisation initiatives include the integration of e-journals, digital theses, online databases, automated cataloguing systems and remote-access portals that empower students, faculty and researchers to explore knowledge seamlessly and efficiently. Universities and colleges—are transitioning from traditional paper-based repositories into technologically advanced ecosystems of learning.

Along with digitisation it is also necessary to use AI-based tools and technology; this will not only give the desired and accurate information to the reader in less time but also encourage them to visit institutions like libraries. This transformation not only modernises the library infrastructure but also promotes the global connectivity, interdisciplinary research and equitable access to academic resources. By embracing digital tools and aligning with national education missions like NEP 2020.

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Literature Review

Early Studies on Digitisation

Early research on digitisation primarily focused on the transition from print to electronic media and the associated challenges in academic libraries. Fabunmi et al. (2006) highlighted digitisation as a means to enhance accessibility and preservation, noting human and technical barriers that affected planning and implementation. Udem et al. (2015) emphasised its importance in university libraries for safeguarding resources and improving information retrieval, stressing the need for strategic institutional integration. Similarly, Nneji (2018) found that digitisation at the University of Port Harcourt was driven by preservation and access goals but hindered by infrastructural and technical limitations. Collectively, these early studies reflected the formative phase of digitisation focused mainly on infrastructure, access and preservation rather than advanced technological integration.

Regional Studies Within India

Regional studies within India offered localised insights into the digitisation and modernisation of libraries, emphasising institutional and infrastructural disparities. Balasubramanian et al. (2012) analysed public libraries in Tamil Nadu and found that computerisation of core functions—such as acquisition, cataloguing and circulation—enhanced efficiency but varied across districts due to uneven technological adoption. Similarly, Singh and Sunita (2019) examined private university libraries in M.P. and noted that while awareness of digitisation's importance was growing, financial limitations and lack of institutional support hindered effective implementation. Collectively, these studies revealed that digitisation efforts across Indian states were inconsistent and largely dependent on administrative priorities and funding, yet they marked an important transition towards embracing technology as a foundation for future AI-driven innovations in libraries.

Emerging Studies on AI Integration in Libraries

Emerging research has transitioned from traditional digitisation towards Artificial Intelligence (AI)-driven transformation in library services, emphasising automation, personalisation and efficiency. Panda and Chakravarty (2021) showcased how conversational AI tools like chatbots revolutionised virtual user assistance by offering 24×7 support, reducing staff workload and improving service responsiveness. Huang (2024) surveyed academic librarians and found AI applications widely used for automation, recommendation systems and analytics, though limited funding, expertise and ethical issues hindered broader adoption. Similarly, Zondi et al. (2024) highlighted AI's potential to enhance efficiency in cataloguing and resource discovery, particularly in developing countries facing infrastructural and financial challenges. Demir (2025) provided a global perspective, analysing how AI and robotics could transform library management and education while stressing ethical governance and professional readiness. Collectively, these studies reflected a major paradigm shift—positioning libraries as intelligent, adaptive ecosystems where AI not only optimises operations but also redefines user engagement and institutional sustainability.

The reviewed literature revealed that while earlier studies emphasised digitisation infrastructure and processes, recent works explored AI integration in libraries. However, limited research examined the combined implementation and perception of both digitisation and AI in Indian academic libraries, especially in M.P. Most studies treated these areas separately, lacking empirical evidence on their joint impact. Therefore, this study aimed to bridge this gap by analysing the extent, perception and practical integration of AI technologies alongside digitisation initiatives in the state's academic libraries.

Objectives of the Study

- To trace the digitisation process in M.P. academic libraries.
- To determine whether academic libraries have started implementing AI and modern technologies.

- To explore some of the difficulties encountered by academic libraries of M.P. during digitisation.
- To know which library management software is being used the most in the process of digitisation in academic libraries.
- To know how fast academic libraries of M.P. are moving towards digitisation and modernisation.
- To offer suggestions for M.P. academic libraries' digitisation and modernisation.

Methodology

This study uses a quantitative research design to gather data about academic libraries, current state of digitisation and preparedness for AI based technology in M.P.

- *Research Design*
  - Type: Descriptive and analytical.
  - Approach: Cross-sectional survey.
- *Sampling Technique*
  - *Method*: Cluster probability sampling.
  - *Selection Process:* Cluster was formed from academic institution (universities and college)
- *Target Population:* Librarian, deputy librarian and assistant librarian from the government and private universities and colleges.

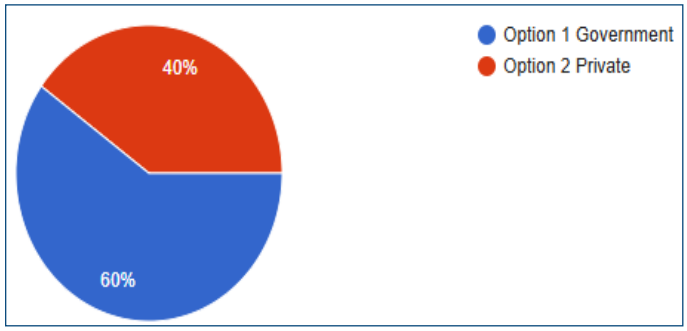

Fig. 1: The Proportion of Participant's Institutions

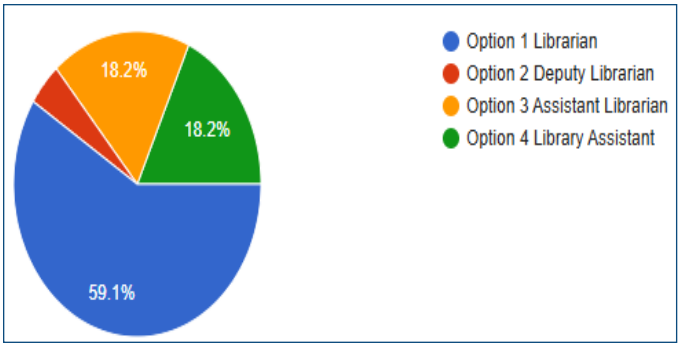

Fig. 2: Participant Composition by Professional Designation

Digitisation in Libraries: A Modern Transformation

"Digitisation is the systematic process of converting analogy and physical resources—such as paper documents, manuscripts, photographs and audio-visual media—into machine-readable digital formats. This technological transformation is revolutionising library services by improving long-term preservation, enhancing accessibility and enabling efficient knowledge management for diverse user communities."

Key Features of Library Digitisation

- *Analogue to Digital Conversion:* Utilising technology such as optical character recognition (OCR) to scan printed items and provide text search ability.
- *Digital Storage & Access:* Materials are stored in digital repositories, allowing 24/7 access from anywhere with an internet connection.
- *Creating Metadata:* Providing detailed information (title, author, subject) to improve the organisation and search ability.
- *Rare Item Preservation*: Preventing the physical deterioration of precious or culturally significant items.

- *Improved Search & Retrieval:* Readers can enhance the quality of their study through performing keyword searches across entire collections.

Why It Matters?

Digitisation goes beyond mere scanning—it represents a transformation of libraries into dynamic, inclusive and future-ready knowledge ecosystems. The five key reasons driving the need for digitisation are illustrated in Fig. 3.

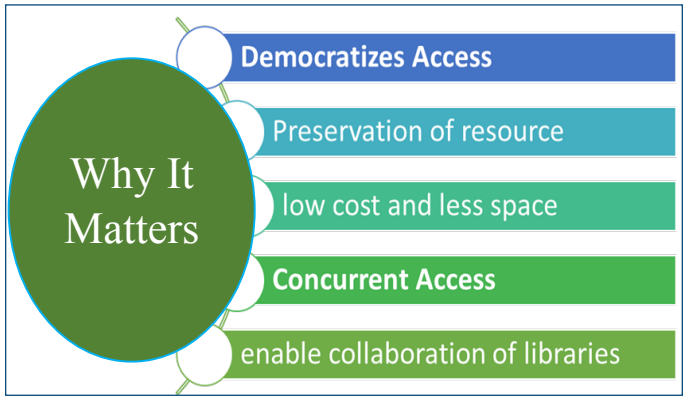

Fig. 3: Why Digitisation Required?

AI-Based Technologies Used in Libraries

Libraries globally are adopting AI to improve services, optimise workflows and tailor user experiences. Below is an overview of the main AI technologies revolutionising library systems:

Core Applications of AI in Libraries

- Multilingual Resource Availability
- Data-Driven Decision Making
- Smart Cataloguing Systems
- Conversational Search Interfaces
- Customised Resource Suggestions
- 24/7 Virtual Library Support
- Academic Integrity Tools
- Cultural Heritage Preservation
- Smart Access & Inventory Management

Emerging Innovations in Library AI

- *Automated Metadata Generation:* Generative AI augments digital materials with searchable descriptions, improving discoverability and academic functionality.
- *Immersive Learning Experiences:* Libraries are exploring the use of virtual reality spaces and robotic assistants for activities such as shelf scanning and guided tours.
- *Responsible AI Implementation:* Ethical guidelines are influencing how libraries incorporate AI, focusing on transparency, user consent and fairness in algorithms.

Digitisation Initiatives Have Been Implemented in M.P. Academic Libraries

Digitisation efforts at the M.P. academic libraries are proceeding at a swift pace. Computerisation is being used to replace the manual labour in the state's academic libraries. Though not as quickly as it should be. M.P. libraries are currently concentrating entirely on digitisation their collection and making it widely available to patrons. Along with that, library software is used to complete all management related tasks for the library. Here's an overview of how this transformation is unfolding:

- *Digital Catalogues:* Libraries are transitioning from traditional manual records to digital cataloguing systems, allowing for quicker searches and access to resources.
- *Digital Access Platforms:* Certain institutions are incorporating electronic resources, including e-books, journals and databases, via platforms like INFLIBNET and NDLI.
- *Login - Logout:* Many libraries in M.P. are utilising login/logout machines to keep a complete record of user entries. This system ensures that only users with

authorised access can utilise the library services. The login/logout machines are more efficient than traditional registration methods. This innovation also supports one of S.R. Ranganathan's five laws, specifically the law of saving the time of readers.

- *OPAC System:* OPAC system works like the Google search engine. Library users can search for any keyword related to books and get complete information about the book. They can also find out whether it is available in the library or not.
- *Library Website:* Many libraries have their own website where patrons can access their digital materials as well as subscription resources like IEEE and DELNET for research purposes.
- *Library Management Software (LMS):* The most crucial aspect of digitising a library is digitising routine processes like circulation, cataloguing and issue return, which are all impossible without the best library management software. Soul and e-granthalya and Koha are three of the most popular management software programs used by M.P. academic libraries for this purpose.

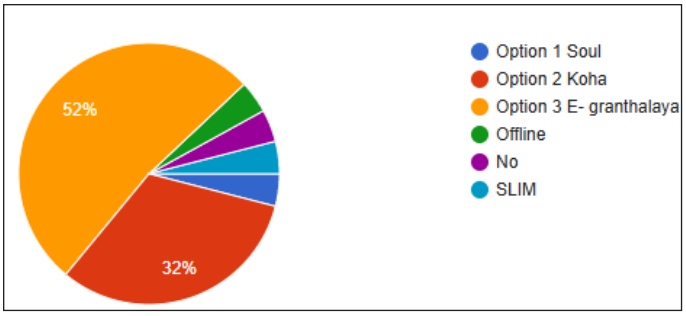

Fig. 4: Participant Software Choices for Library Automation

Implementation of AI-Based Tools in M.P. Academic Libraries

At present all the focus of the M.P. academic library is only on digitisation. But the survey has revealed that to some extent AI-based technology, which has become common in today's time, has also started being used in the library.

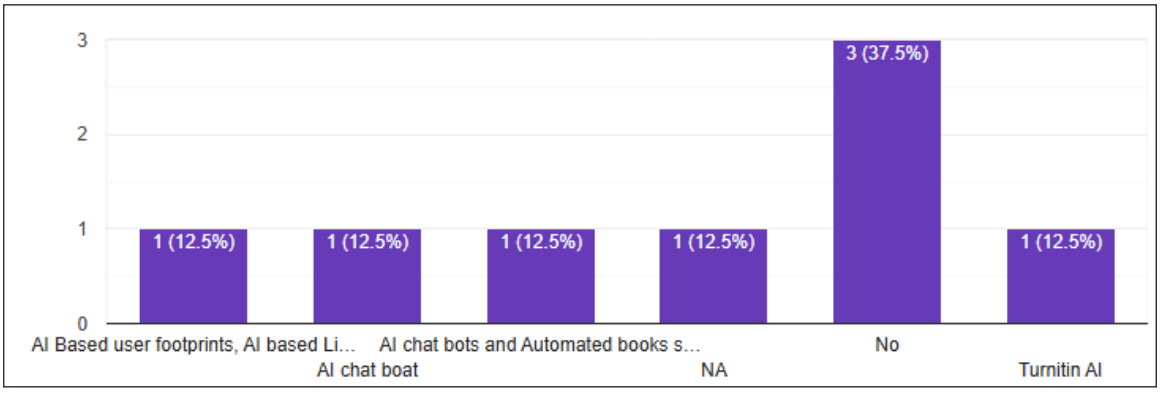

Fig. 5: AI Based Technology Being Used by Academic Libraries of Madhya Pradesh

Although AI technology has entered the M.P. academic libraries, but the data shows that the number of libraries that have adopted AI-based technology is very low, which is extremely low as per the current trends. In the survey, when asked the question whether '*AI is used in your library'*, over 56% of respondents' answers were 'No', which shows that a large portion of the academic libraries in the state are ignoring powerful technology like AI. We must comprehend the potential of AI and move swiftly in that direction.

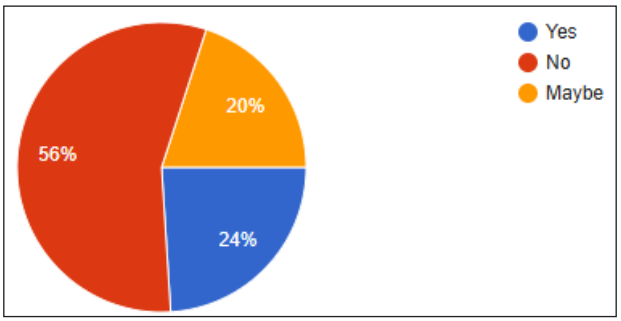

Fig. 6: Usage of AI in the Libraries of the Respondents

Suggestion

After analysing the data, it is found that it is very important to take necessary steps for the development of libraries in M.P. For this, some suggestions have been given below:

- *Library Law:* Library law acts as a backbone for library services, well-resourced, ethically run and capable of fulfilling their mission as vital committee and education hubs. The M.P. library legislation has not been put into effect yet. The act`s enactment is crucial for the growth of the state's libraries.
- *Government Initiative:* It is very important for the government to take initiative for the development of the library. It is necessary for the government to pay attention to the schemes related to the libraries.
- *Creative Hub:* In today's time, Libraries need to be used not only as reading places but also as creative places where readers can think creatively and give them a concrete form.
- *Encourage Readers to Visit the Library:* The majority of library employees believe that students will visit the library on their own if they wish to study. It is wrong to adhere to this philosophy in the modern era.

Users can quickly obtain information that meets their demands with a single click due to the readily available internet and information. They do not need to visit the library as frequently in the scenario. As a result, it is the responsibility of library employees to inform patrons of the library's advantages and draw them in.

Expansion in Variety of Resources The book bank system is a crucial support mechanism for students, ensuring that financial constraints do not hinder their access to fundamental education resources. However, the library's main objective should not be to satisfy the book bank system and academic needs only. This is incorrect because students nowadays not only study for college courses but also prepare for competitive exams and want to learn new concepts. For this reason, the libraries must provide other reading materials, such as literature and competitive materials, because the library's job is to prepare its patrons for life, not just for assessments.

Conclusion

According to the data analysis, even though many academic libraries in M.P. have completed digitisation work and some libraries have started to utilise contemporary technology, academic libraries are still lagging far behind in the use of AI and have a long way to go.

Digitisation related data reveals that many academic libraries still continue to handle manual issues, returns and record maintenance, which is undoubtedly out of sync with the modern era. Digitisation needs to be done rapidly in all academic libraries in the state so that we can move towards the best modern technologies. For this, government intervention and reader awareness are also crucial.

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