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EVALUATING THE USE OF AI ON LIBRARY SERVICES AT MADHAV UNIVERSITY: A STUDY

Dr Bharti L Vaja
Associate Professor
Department Of Library & Information Science
Madhav University, Shirohi
Rajasthan
Mail. vajabharti@gmail.com

ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative technology in almost all sectors, including libraries and information centers. Academic and research libraries are increasingly adopting AI-driven tools for cataloguing, information retrieval, recommendation systems, virtual assistance, and data analytics. The present study is survey-based and conducted with reference to Madhav University. A descriptive-analytical research method has been adopted, with data collected from faculty, students, and library staff. The findings highlight that AI enhances efficiency, user experience, and decision-making but also brings challenges related to cost, ethics, and the digital divide.

Keywords
1. Artificial Intelligence 2. Library Services 3. Information Retrieval 4. Madhav University, 5. Digital Libraries

1. Introduction

Libraries worldwide are undergoing rapid transformation due to technological advancements. Among these, Artificial Intelligence (AI) stands out as a significant innovation influencing library operations and user services. Traditional libraries primarily focused on physical collections, whereas modern libraries now provide hybrid services combining print and digital resources. AI applications in libraries include cataloguing automation, intelligent search, personalized recommendations, and virtual reference services. In the Indian context, although some premier institutions like IITs and IIMs have started AI-based library services, smaller universities still face challenges. Madhav University, as a growing academic institution, provides an ideal setting to study the impact of AI on library services.

- What is AI?

a) Artificial intelligence, or AI, is technology that enables computers and machines to simulate human intelligence and problem-solving capabilities.

b) Artificial Intelligence (AI), a term coined by emeritus Stanford Professor John McCarthy in 1955, was defined by him as "the science and engineering of making intelligent machines". Much research has humans program machines to behave in a clever way, like playing chess, but, today, we emphasize machines that can learn, at least somewhat like human beings do.

- How to prepare for AI in library services:

In order to be ready for the integration of AI into library services in the future, librarians must educate both themselves and their clients about the fundamentals of AI as well as its potential drawbacks. Engaging with AI stakeholders and users is crucial to understanding their requirements, expectations, feedback, and concerns. Additionally, in order to fully understand the potential and constraints of AI tools and technologies, librarians should experiment with them. They should also assess the effects and results of AI in terms of effectiveness, relevance, variety, quality, accessibility, usability, and satisfaction. In order to modify their tactics and talents appropriately, they need also keep up with the latest developments in AI, including its new and developing applications, possibilities, problems, and innovations.

2. Objectives of the Study

1. To study the awareness and perception of library professionals and users regarding AI.
2. To examine the present status of AI-based applications in Madhav University Library.
3. To assess the benefits and challenges of AI adoption in library services.
4. To provide suggestions for effective implementation of AI in LIS.

3. Review of Literature:

The integration of Artificial Intelligence (AI) into library and information services (LIS) has emerged as a significant area of research over the past decade. A review of existing literature reveals a consensus that AI is poised to revolutionize traditional library functions, although challenges related to implementation and human factors persist.

1. AI Applications in Libraries

Early research focused on the potential of AI to automate routine tasks. Tella (2020) and Jakhar & Kaur (2020) provide comprehensive overviews of AI applications, including automated cataloging, collection development, and personalized user services. A key application highlighted across the literature is the use of AI for enhanced information retrieval. AI-powered search engines and smart OPACs (Online Public Access Catalogues) use Natural Language Processing (NLP) to better understand user queries and provide more relevant results than traditional keyword-based searches (Pawar, 2024). Another prominent application is the use of chatbots and virtual assistants for 24/7 reference services, as discussed by Ajakaye (2021). These systems handle simple, repetitive questions, freeing up human librarians for more complex tasks.

2. Benefits and Opportunities

The literature consistently identifies several key benefits of AI adoption. The primary advantage is increased efficiency and productivity through automation, as noted by Lund & Wang (2020). This allows librarians to reallocate their time to more strategic roles such as providing research support and digital literacy training. Another significant benefit is the enhancement of the user experience. AI-driven personalized recommendation systems, which analyze user data to suggest relevant resources, have been shown to increase user engagement and satisfaction (Mulimani, 2024). The shift towards data-driven collection development is also seen as a major opportunity, allowing libraries to make informed purchasing decisions based on predicted user demand (Otterlo, 2016).

3. Challenges and Concerns

Despite the clear benefits, researchers have also identified substantial challenges to AI integration. The most frequently cited barriers are cost and infrastructure. Implementing and maintaining AI systems require a significant financial investment, which can be prohibitive for many institutions with limited budgets (Pawar, 2024). Another major concern is the lack of awareness and skills among both library staff and users. A survey by Hervieux & Wheatley (2021) found that while librarians are generally positive about AI, many feel they lack the necessary training and expertise to effectively manage these technologies.

Ethical issues, while not always the primary concern in early studies, are gaining more attention. Data privacy and security are becoming increasingly critical as AI systems collect and analyze vast amounts of user data. Additionally, the potential for algorithmic bias to perpetuate and amplify existing biases in information access is a growing concern (Ajakaye, 2021).

4. The Future of LIS

The consensus is that AI will fundamentally change the role of the library and the librarian. Rather than replacing human professionals, AI will serve as a powerful tool to augment their capabilities. The future librarian will be an information architect, a data analyst, and a digital literacy educator, working in synergy with AI systems to create a more efficient and user-centric information environment (Lund & Wang, 2020).

4. Research Methodology

The study adopts a descriptive survey research design. The universe of the study includes the users and staff of Madhav University Library. The sample comprises 100 users (UG, PG, research scholars, and faculty) and 10 library staff. Stratified random sampling technique has been employed. Data collection tools include structured questionnaires, interviews, and observation checklists. The collected data has been analyzed using percentages, tables, and charts.

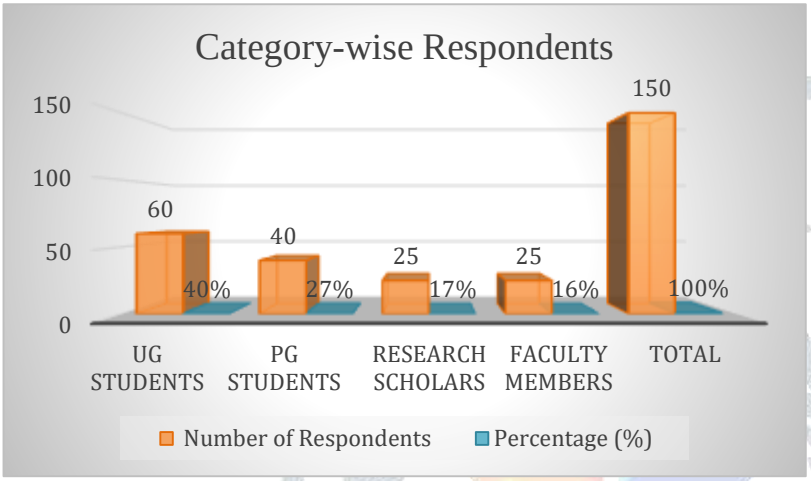
5. Data Analysis

1. Respondents Profile

Table 1: Category-wise Respondents

Category	Number of Respondents	Percentage (%)
UG Students	60	40%
PG Students	40	27%
Research Scholars	25	17%
Faculty Members	25	16%
Total	150	100%

Chart 1.



Interpretation:

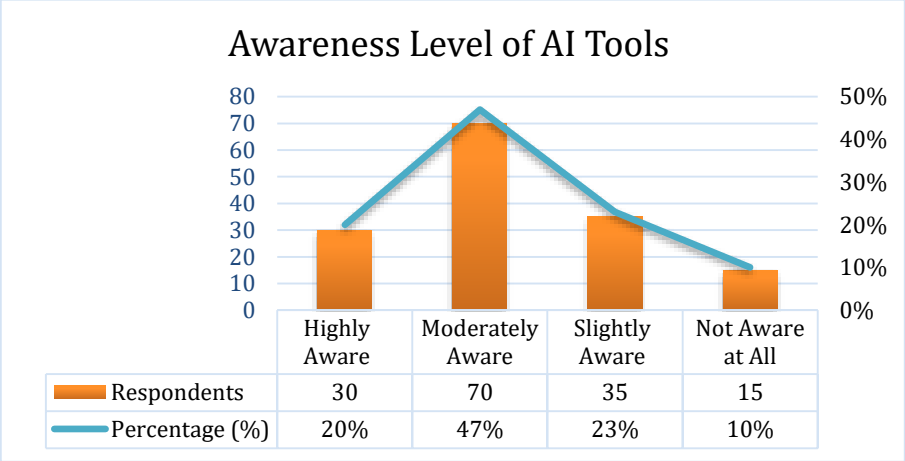
- The data in the table represents the distribution of respondents for a survey, categorized by their academic or professional status. The total number of participants in the study was 150.
- The largest group of respondents were UG (Undergraduate) students, who accounted for 40% of the total, with 60 participants. PG (Postgraduate) students were the next largest group, making up 27% of the sample, with 40 participants.
- Research Scholars and Faculty Members comprised the smallest groups. Each of these categories had 25 participants, representing 17% and 16% of the total respondents, respectively.
- Overall, the sample is a balanced representation of the academic community, with a strong focus on students, who make up the majority of the respondents.

2. Awareness of AI in Library Services

Table 2: Awareness Level of AI Tools

Awareness Level	Respondents	Percentage (%)
Highly Aware	30	20%
Moderately Aware	70	47%
Slightly Aware	35	23%
Not Aware at All	15	10%

Chart 2.



Interpretation:

Awareness Level of AI in Library and Information Services

The provided table illustrates the varying levels of awareness regarding the use of Artificial Intelligence (AI) in Library and Information Services among the 150 survey respondents.

- The majority of respondents, 47%, reported being Moderately Aware of AI's application in this field, totaling 70 individuals. This suggests a general familiarity with the topic but perhaps not in-depth knowledge.
- A combined 43% of the participants, which includes those who are Highly Aware (20%) and Slightly Aware (23%), indicates a significant spread in understanding, from expert to basic recognition. The 30 individuals who are highly aware represent a strong foundation of knowledge within the surveyed group.
- Only a small portion, 10% (15 respondents), were Not Aware at All, indicating that the concept of AI in libraries is not entirely unknown to the community.

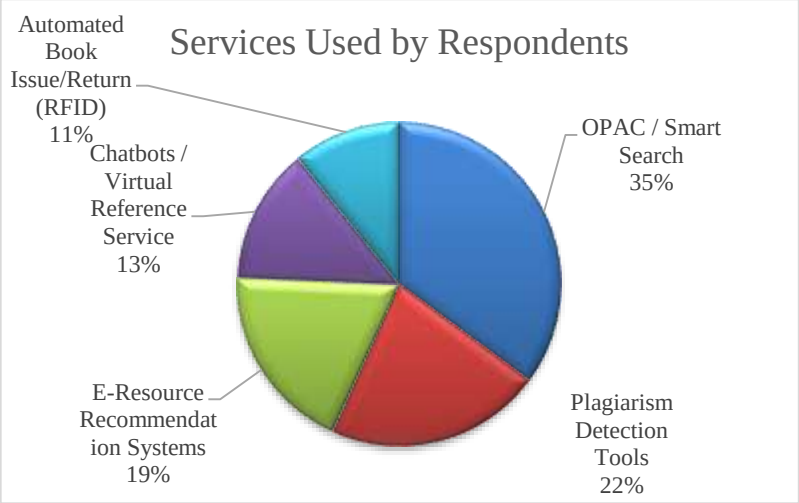
Overall, the data shows that awareness of AI in library services is widespread, with a large majority of respondents having at least some level of understanding.

3. Usage of AI-Enabled Services

Table 3: Services Used by Respondents

AI Service	Users (%)
OPAC / Smart Search	65%
Plagiarism Detection Tools	40%
E-Resource Recommendation Systems	35%
Chatbots / Virtual Reference Service	25%
Automated Book Issue/Return (RFID)	20%

Chart 3.



Interpretation:

The table presents a clear hierarchy of AI service usage among the survey respondents. It shows that users are most engaged with AI services that directly improve their core research and resource discovery tasks, while services that handle administrative or more recent technological functions have lower usage rates.

AI Service Usage Analysis

- OPAC / Smart Search is by far the most used AI service, with 65% of respondents reporting its use. This highlights its status as a fundamental and widely adopted tool for accessing and discovering library resources. The high usage rate is expected, as a modern OPAC (Online Public Access Catalog) often integrates AI to provide "smart search" capabilities, making the process of finding materials more efficient and user-friendly than traditional systems.
- Plagiarism Detection Tools are the next most popular, used by 40% of respondents. This indicates their critical importance in academic integrity and research. This usage is particularly high among students and researchers who rely on these tools to ensure the originality of their work.

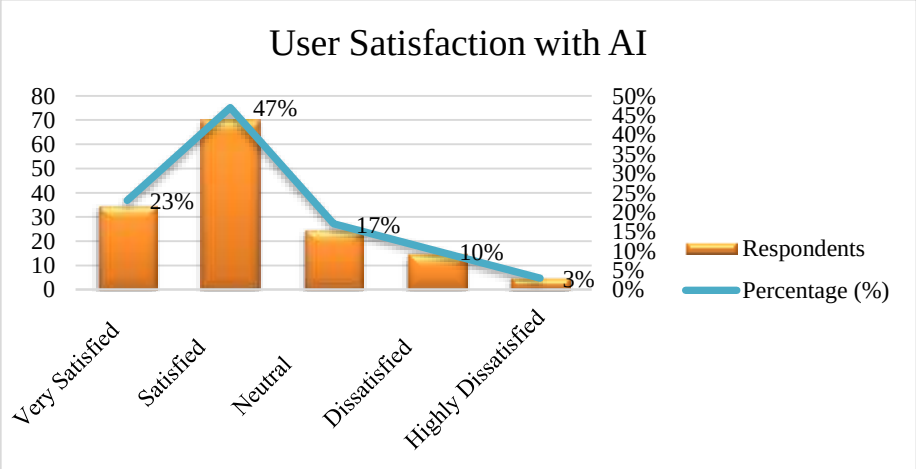
- E-Resource Recommendation Systems are used by 35% of the participants. This shows a growing adoption of personalized services. These systems, which use AI to suggest relevant resources based on a user's profile and history, are becoming more common in academic settings to enhance the research experience.
- Chatbots / Virtual Reference Services and Automated Book Issue/Return (RFID) have the lowest usage rates, at 25% and 20% respectively.
  - The lower usage of chatbots may suggest they are either a newer technology still being implemented, or that users prefer human interaction for complex queries.
  - The low rate for RFID-based automation could be due to the significant cost and infrastructure required to implement it, limiting its adoption to only a small number of institutions. This technology automates the circulation process, which, while efficient, may not be as frequently used by all users as a search tool.

4. User Satisfaction with AI

Table 4: Satisfaction Levels

Satisfaction Level	Respondents	Percentage (%)
Very Satisfied	35	23%
Satisfied	70	47%
Neutral	25	17%
Dissatisfied	15	10%
Highly Dissatisfied	5	3%

Chart 4.



Interpretation:

Based on the table, here is a detailed description of the satisfaction levels of the survey respondents.

User Satisfaction with AI Services

The data indicates a generally positive sentiment among users regarding their experience with AI services in the library. A combined 70% of the respondents expressed either satisfaction or high satisfaction.

- A significant majority of users, 47% (70 respondents), reported being Satisfied with the AI services. This group forms the largest segment of the sample, highlighting a strong acceptance and positive experience with the technology.
- A notable 23% (35 respondents) were Very Satisfied, indicating an even more positive and potentially impactful experience with these services.
- The remaining respondents were either Neutral (17%) or expressed dissatisfaction. Only a small fraction, a combined 13% of the sample, were Dissatisfied (10%) or Highly Dissatisfied (3%).

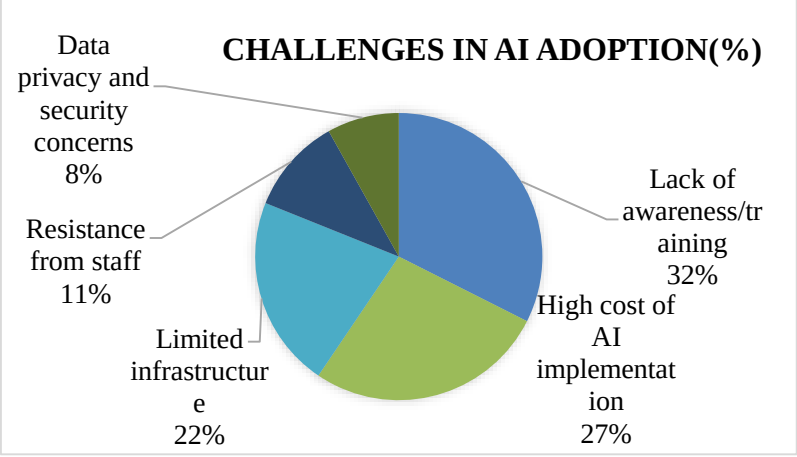
The high level of satisfaction suggests that the implemented AI services are meeting user expectations and providing valuable support. The low percentage of dissatisfied users indicates that major issues or negative experiences are not widespread.

5. Challenges in AI Adoption

Table 5: Challenges Perceived by Respondents

Challenges	Respondents (%)
Lack of awareness/training	60%
High cost of AI implementation	50%
Limited infrastructure	40%
Resistance from staff	20%
Data privacy and security concerns	15%

Chart 5.



Interpretation:

Based on the provided data, here is an analysis of the key challenges to implementing AI in library services.

Challenges to AI Adoption in Libraries

The data clearly indicates that the most significant hurdles to adopting AI in library services are related to human factors and financial constraints, rather than technical or ethical issues.

- **Lack of awareness and training** is the most prominent challenge, cited by **60%** of respondents. This suggests that a majority of the community—whether users or staff—may not fully understand the potential or functionality of AI in a library setting. This lack of knowledge can create a barrier to both acceptance and effective utilization of new technologies.
- **High cost of AI implementation** is the second major concern, with **50%** of respondents highlighting it. This is a practical and often decisive barrier, as libraries, particularly in educational institutions, often operate on limited budgets.
- **Limited infrastructure** is also a significant issue, noted by **40%** of respondents. This challenge is closely linked to cost, as building and maintaining the necessary hardware and software to support AI can be a substantial investment.

It's interesting to note that despite the common public discourse on these topics, challenges related to **resistance from staff (20%)** and **data privacy and security concerns (15%)** were the least frequently mentioned. This suggests that for this specific group of respondents, the practical issues of budget, infrastructure, and a lack of training are far more pressing than ethical concerns or fear of technology from employees.

6. Findings

Based on the data analysis you provided, here is a summary of the key findings from the survey on the impact of Artificial Intelligence in Library and Information Services.

Key Findings

- Respondent Demographics: The study's sample of 150 respondents was primarily composed of students, with undergraduate students forming the largest group (40%). This indicates that the findings are heavily weighted by the student perspective.
- Awareness of AI: A majority of respondents demonstrated a moderate to high level of awareness regarding AI in library services. 47% were moderately aware, and another 20% were highly aware. This suggests that the concept is not new to the community, but deep knowledge may be limited.
- Usage of AI Services: The use of AI services is not uniform. Services directly related to core academic tasks, such as OPAC/Smart Search (65%) and Plagiarism Detection Tools (40%), showed the highest usage rates. This highlights that users are most likely to adopt technologies that directly support their research and academic integrity needs. In contrast, newer or infrastructural technologies like chatbots and RFID-based systems had significantly lower usage rates.

- User Satisfaction: Overall satisfaction with AI services is high. A combined 70% of respondents were either satisfied (47%) or very satisfied (23%). This positive feedback suggests that the current AI tools are effective and are meeting user expectations.
- Challenges to AI Adoption: The most significant challenges to implementing AI were found to be non-technical. Lack of awareness/training (60%) and the high cost of implementation (50%) were the top two barriers identified. This indicates that financial and educational gaps are more pressing concerns than ethical issues like data privacy, which was cited by only 15% of respondents.

The survey findings reveal a positive outlook on the role of AI in library services. While there is a clear and high demand for AI-powered tools that enhance core academic functions, the adoption process faces significant hurdles related to funding and user/staff education. To ensure the successful integration of AI, library administrators should prioritize training and awareness programs while securing the necessary financial resources for implementation.

7. Suggestions

Based on the key findings from the survey, here are some actionable suggestions to address the identified challenges and further improve the impact of AI in library and information services: Suggestions for Improving AI Integration in Library and Information Services

1. **Prioritize Training and Awareness Programs:**
   - **Targeted Workshops:** The finding that **60%** of respondents cited a lack of awareness/training as a key challenge is critical. The library should conduct regular workshops and seminars for both students and faculty on how to effectively use AI-powered services like smart search, e-resource recommendation systems, and plagiarism detection tools.
   - **Staff Development:** Provide specialized training to library staff to make them proficient in managing, troubleshooting, and promoting AI services. Empowering staff will not only reduce resistance but also ensure that users receive expert guidance.
   - **Create Awareness Campaigns:** Use the library's website, social media, and physical posters to create engaging campaigns that highlight the benefits and availability of AI services.
2. **Focus on Core Services for Investment:**
   - The high usage of **OPAC/Smart Search** and **Plagiarism Detection Tools** suggests that investment should first be directed towards enhancing these already popular services. Upgrading the existing search engine with more advanced AI capabilities or integrating more comprehensive plagiarism detection software would yield immediate benefits and high user satisfaction.

3. **Invest in Scalable and Cost-Effective AI Solutions:**
   - Given that **50%** of respondents cited high costs as a challenge, the library should explore open-source AI solutions or subscription-based services that offer a lower initial investment.
   - Prioritize a phased implementation approach. Start with a pilot project for a single AI service (e.g., a chatbot for basic queries) and, based on its success and feedback, gradually expand to other services.
4. **Enhance User-Friendly Interfaces:**
   - The low usage of chatbots suggests that the user interface may not be intuitive or the service is not well-advertised. The library should design a more prominent and user-friendly interface for its chatbot, perhaps integrated directly into the library's homepage, to encourage its use for quick questions.
5. **Address Data Privacy Concerns Proactively:**
   - Although a low percentage of respondents cited **data privacy** as a primary challenge, it is a significant ethical concern. The library should have a transparent and clearly stated policy on data privacy.
   - Communicate to users how their data is being used by AI systems (e.g., to personalize recommendations) and assure them that it is handled securely and ethically.
6. **Seek Feedback Continuously:**
   - Implement a system for continuous user feedback on AI services. Use quick surveys or feedback forms on the library website to gather suggestions and identify areas for improvement. This will ensure that the AI services evolve according to the needs of the users.

8. Conclusion

Artificial Intelligence has significant potential to revolutionize library and information services. Madhav University Library, with proper planning, n become a model AI-enabled library. The study concludes that AI should be used as a supportive tool to assist librarians rather than replace them, ensuring sustainable and user-centric development of library services.

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