

Implementation, Benefits, and Challenges of AI-Enhanced Information Literacy Skills in Academic Libraries: A Study

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ABSTRACT:

Information literacy is an essential skill for users in academic libraries, helping them find and assess information effectively. With technology advancing quickly, libraries are looking into AI tools to improve information literacy programs. This article explored how artificial intelligence can enhance information literacy skills in libraries. It considers the advantages and challenges of using AI tools like chatbots and personalized learning systems to engage users and help them find resources better. The findings show benefits such as customized learning paths, immediate support, and better search features. However, there are challenges, such as high costs, ethical issues, and training for library staff. The paper concludes that while AI offers promising opportunities for improving information literacy, it is important to address these challenges for successful use. Future research should focus on solving problems and understanding the long-term effects of AI on information literacy in academic libraries.

Keywords: *Information literacy skills, Academic libraries, Artificial Intelligence, Personal Learning, Chatbots*

Introduction

Information literacy is a basic skill for users in academic libraries, enabling them to navigate and evaluate information effectively. With the rapid advancement of technology, academic libraries are increasingly exploring AI-driven tools to enhance information literacy initiatives. It was initially introduced by Zurkowski (1974) within a workforce context. He defined the ability to effectively use information in various forms to solve problems, make decisions, and engage in a variety of tasks in the workplace. In 1989, according to the ALA, “to be information literate, a person must be capable of recognizing when information is necessary and possess the ability to find, assess, and effectively utilize the required information.”.

Artificial Intelligence (AI) was initially characterized as “the science and engineering of making intelligent machines” in 1995 (McCarthy, 2007, p.2). Over various decades of the 20th century, AI has progressively transformed into intelligent machines and algorithms capable of reasoning and adapting to specific rule and environments resembling human intelligence (McCarthy, 2007). Wang (2019) expanded the definition of AI to include its ability to perform cognitive tasks, especially learning and problem-solving alongside innovative technologies such as machine learning, natural processing, and neural networks (Zawacki-Richter, Marin, Bond, and Gouverneur 2019)

Information literacy (IL) is an essential skill that empowers individuals to effectively navigate, evaluate, and apply information in various contexts. In academic settings, IL is particularly critical as students, researchers, and faculty members frequently engage with vast amounts of information in a range of formats and from diverse sources. With the rapid expansion of digital resources and the complexities of the information landscape, traditional approaches to teaching information literacy are no longer sufficient to meet the needs of today’s learners. As a result, academic libraries are increasingly turning to Artificial Intelligence (AI) technologies to enhance information literacy skills and provide more dynamic, personalized learning experiences.

Objectives of the Study:

1. How are AI technologies currently being implemented to enhance information literacy skills in academic libraries
2. What are the perceived benefits of AI-enhanced information literacy programs for students and library staff?
3. What challenges do academic libraries face when implementing AI technologies to support information literacy?
4. What factors influence the successful integration of AI technologies into information literacy education in academic libraries

Problem of the Statement

The research aims to fill this gap by exploring the implementation, benefits, and challenges of AI-enhanced information literacy skills in academic libraries. It identifies key barriers and provides recommendations to overcome them.

Significance of the Study

The study explores the use of AI in improving information literacy education by assisting students in finding, assessing, and using information. It aims to create personalized

programs in academic libraries, enhancing teaching and learning. The research will outline a plan for integrating AI into library services, addressing ethical issues like data privacy and job displacement. It will also contribute to understanding AI in libraries, inform policy decisions, and encourage collaboration between AI developers and libraries.

Literature Review

Several papers emphasize how AI chatbots, proposal systems, and virtual librarians have positively impacted library services by users with more personalized support, as well as the challenges associated with the implementation of AI-enhanced information literacy in academic libraries.

Tzanova, S. (2024). The Paper discusses the integration of artificial intelligence in academic libraries, emphasizing the need for appropriate operations and collaborative technologies to support diverse curricula and research needs. It emphasizes the need for librarians to become co-creators and experts in AI-driven services, promoting AI literacy as a comprehensive framework for effective communication in AI-driven environments.

Hirvonen, N. (2024) The article examines the relationship between information literacy (IL) and artificial intelligence (AI) in modern information environments, focusing on how tasks are increasingly performed with AI and delegated. It highlights the challenges posed by AI's autonomy and adaptiveness, emphasizing the importance of IL researchers and practitioners

(Kaushal & Yadav, 2022) The research indicates that incorporating chatbot technology into library information systems may enhance research and academic communication. Yet stakeholders encounter significant perceived risks, privacy invasion, and task complexity issues, which developers need to resolve.

(Mckie & Narayan, 2019). The paper recommended that information professionals adapt emerging technologies such as chatbots to innovate, improve, and support library services. creating a favourable experience for the user is crucial to guarantee that these technological solutions remain sustainable

Methodology

In this study, a comprehensive research method was employed; it was a systematic review of the analysis that AI enhanced information literacy skills in academic libraries.. The results of the study highlight several benefits, including personalized learning paths, real-time assistance, and improved resource search capabilities. However, challenges associated with high implementation costs, ethical concerns, and resistance from library staff constitute significant barriers.

Role of AI-Enhanced Information Literacy in Academic Libraries:

Information Discovery

Artificial intelligence (AI) enhances information literacy in the digital era by efficiently locating, assessing, and using vast amounts of data, thereby improving the efficiency of content finding.

2. Automated Cataloguing

AI algorithms are important for automating metadata generation. This is key for organizing and classifying large amounts of digital content. AI analyzes various types of content, like historical documents and videos, to create descriptive tags, keywords, and categories that truly represent the content.

3. Personalized Services:

AI-driven recommendation systems have changed the way we find books, articles, and various other resources. By examining a user's preferences, reading history, and even behaviors such as the duration spent on specific topics or the ratings given to past content, these systems can propose items that are significantly relevant and customized to personal tastes.

4. Decision Support:

AI-powered data analytics are changing the way librarians tackle collection development, user interaction, and resource management. By examining usage patterns, search queries, and user activities, AI can assist librarians in making data-informed choices that directly serve library patrons.

5. Virtual Assistance:

AI-powered chatbots are transforming libraries by offering users real-time assistance, managing duties like responding to often-asked queries, and assisting them in locating and gaining access to resources. There is no need for staff availability or library hours because they are available around the clock.

Implementation of AI-Enhanced Information Literacy in Academic Libraries

To effectively implement AI-enhanced information literacy in academic libraries, a well-planned strategy is essential. Key steps include

1. Infrastructure Upgradation: Libraries are increasingly becoming hubs for digital resources, and to keep up with technological advancements, they need to ensure their

infrastructure is up to the task. High-speed networks would help with faster access to online resources and databases, cloud storage would make managing vast amounts of data more efficient, and AI-compatible systems would enable libraries to harness the potential of AI for things like personalized recommendations, improved cataloguing, and even help users with information retrieval.

2 Staff Training: As AI becomes more and more ingrained in daily life, librarians need to be able to advise users on how to use these resources responsibly and effectively. By learning about AI principles, librarians can be better equipped to assist consumers in navigating complex technology and finding legitimate, moral uses for them.

3 Collaboration with AI service Providers: Libraries can leverage partnerships with academic institutions, AI vendors, and other organizations to gain technical expertise and stay updated on AI technology. These partnerships will enable responsible and moral AI integration, benefiting both staff and the public.

4. Pilot Project: There is great potential for enhancing educational outcomes with the AI-enhanced information literacy pilot project. The initiative intends to provide people with the necessary abilities for thriving in the digital age by using AI to personalise learning, offer interactive tools, and encourage critical thinking.

5. Policy Development: Establishing robust policies around AI use is essential for ensuring responsible and sustainable implementation. Without clear guidelines, AI tools in libraries could raise ethical, privacy, and security concerns that might undermine user trust and hinder their effectiveness. Here's a breakdown of how policies can address key areas

AI Enhanced information literacy in the library for better user experiences and accessibility

AI-enhanced information literacy in libraries can significantly improve user experiences and accessibility by streamlining how people access, evaluate, and interact with information. The integration of AI technologies can offer various benefits, both for library users and staff, especially in an era of vast, often overwhelming amounts of data.

1. Personalized Learning Paths: AI-enhanced personalized learning paths for information literacy provide a powerful way to tailor educational experiences to individual needs, making the process more efficient, engaging, and effective. With AI's ability to assess, adapt, and recommend content in real-time, learners can receive targeted support that helps them develop critical skills for navigating and using information in a digital world.

2. Smart Recommendation Systems: AI-driven recommendation systems transform the way libraries arrange and showcase their collections. These systems evaluate user preferences, borrowing records, and reading habits to propose customized reading lists and

pertinent resources. This method streamlines the exploration of materials and improves user involvement and contentment

3. Chatbots and Virtual Assistants: Chatbots and virtual assistants can significantly improve the information literacy abilities of library patrons. These AI-driven tools offer instant, tailored assistance that aids users in exploring library resources, honing their research abilities, and cultivating essential information literacy skills. Whether it's assisting users with search techniques, citation methods, or source evaluation, chatbots, and virtual assistants are revolutionizing how libraries support and educate their communities.

4. Automated Administrative Tasks: AI can automate standard administrative responsibilities, including managing book reservations, overseeing due dates, and creating overdue alerts. This automation enables library personnel to dedicate more time to helping patrons, curating collections, and designing programs to enhance the user experience.

5. Natural Language Processing for Research: By assisting users in formulating search queries and locating relevant content from vast academic databases and digital libraries, artificial intelligence (AI), more especially Natural Language Processing (NLP), facilitates research and reference services. This feature expedites the research process and improves the caliber of data gathered.

6. Enhanced Accessibility for Users with Disabilities: AI is essential for users with disabilities. Text-to-speech and speech-to-text features enhance accessibility for the visually impaired or individuals with reading challenges. AI-enhanced image recognition aids in describing visual content, rendering it accessible for those with vision impairments

7. Data Analytics for Collection Development: AI-powered data analytics can improve how libraries handle their collections. By looking at user behaviour and trends, librarians can make informed choices about what to buy, which resources to update, and which areas need more focus. This helps keep the collection relevant and aligned with community needs.

8. Preservation and Restoration of Materials: AI technologies, such as Optical Character Recognition (OCR) and content analysis, aid in digitization efforts, preserving rare and fragile materials. Additionally, AI facilitates the restoration of old or damaged texts, maintaining historical records for future generations.

9. Educational Program Customization: AI algorithms tailor educational programs and workshops to meet the specific needs and preferences of users. This personalization boosts engagement and helps library programs match the learning goals of each individual.

10. Virtual Reality (VR) and Augmented Reality (AR) Experiences: AI-driven VR and AR technologies provide immersive experiences in libraries. Users can explore library spaces, attend events, and interact with digital collections. This enhances user engagement

and draws in a wider audience.

11. Language Translation Services: AI-based language translation services in libraries help remove language barriers, allowing users to access resources from around the world. This makes it easier for users to find content in the language they prefer, promoting inclusivity and diversity.

AI-enhanced information literacy in library services improves user experience and accessibility significantly. Libraries using AI are becoming more engaging and focused on users, making sure that everyone can access information easily. This change supports a knowledgeable and enriched society.

Benefits of AI-enhanced information literacy programs for students and library staff

A. For Students;

1. Personal Learning: AI may modify content to fit each student's unique needs, learning preferences, and proficiency level, improving the effectiveness and customisation of information literacy training.

2. Improved research skills: AI tools can help students refine their search strategies, identify reliable sources, and improve citation practices, enabling them to conduct more thorough and accurate research.

3. Time Efficiency: AI-driven tools can assist students in navigating large volumes of information quickly, helping them focus on high-quality sources and reducing the time spent on finding relevant materials.

4. Enhanced critical thinking: By guiding students through data analysis bias detection and source evaluation, tools can foster better critical thinking when it comes to assessing information credibility

5. Instant feedback: AI can provide real-time feedback on student research methods, writing, or citation practices, allowing them to make immediate improvements and reinforce learning.

6. Access to Drivers Learning Resources: Ai can curate personalized resources, ensuring students have access to a broader range of relevant content, such as articles, videos, and tutorials, thus supporting different types of learners.

B. For Library Staff

1. Automation of Routine Tasks: AI can automate repetitive library tasks, such as cataloguing, indexing or even answering frequently asked questions, allowing library staff

to focus on more complex, value-added activities

2. Enhanced Resources Discovery: AI-enhanced search tools can help library staff identify patterns, trends, and gaps in resources, making it easier to curate collections that better meet student and faculty needs.

3. Data-Driven Insights: AI can analyse usage patterns and student feedback to provide insights into the effectiveness of information literacy programs, helping staff refine strategies for teaching and engagement

4. Better Resource Allocation: By streamlining administrative tasks and improving the effectiveness of the information literacy program, AI tools can enable library staff to better allocate their time and resources toward supporting high-priority initiatives.

5. Scalable Instruction: AI can help library staff scale their information literacy programs more efficiently, particularly in large institutions or for remote learning by offering automated lessons, assessments, and feedback

6. Challenges of implementing AI technologies

Academic libraries face several challenges when implementing AI technologies to support AI-enhanced information literacy.

7. High costs of implementation: Developing or adapting AI technologies often requires significant financial investment in infrastructure, software, and ongoing maintenance which can strain the library budget

8. Data Privacy: AI tools often rely on large datasets, and this raises issues around user privacy, consent, and data security. Libraries must ensure they are complying with data protection laws, like GDPR, and that AI usage is ethical.

9. Lack of sufficient infrastructure: Academic libraries face challenges due to inadequate infrastructure, including outdated hardware, insufficient internet bandwidth, and digital resources. Smaller institutions may struggle more, limiting their ability to effectively implement AI tools and support information literacy initiatives

10. Staff training and development: The integration of AI in information literacy programs faces challenges due to the need for staff training and development, as existing library staff may lack specialized knowledge for effectively using AI tools and teaching students ethical engagement.

11. Keeping Up with Rapid Technological Changes: AI technology is evolving quickly, which means libraries must continuously update their tools, training, and services to stay relevant. This rapid pace of change can be difficult for libraries to keep up with, especially considering other competing priorities.

12. Pedagogical Shifts: Libraries will need to rethink and adapt their pedagogical approaches to integrate AI in a way that supports critical thinking and information literacy. AI must be used as a tool to enhance, not replace, the fundamental principles of evaluating, selecting, and using information effectively.

Addressing these challenges requires careful planning, cross-collaboration between librarians, faculty, and IT departments, and a thoughtful approach to both the technology and the people it serves.

Findings and Discussions:

The study reveals varying adoption of AI tools in academic libraries, with incremental integration being the most common model. Large language models dominate initial implementation, while subject-specific AI tools are integrated in specialized disciplines. A skills gap exists among library staff, with peer-led and collaborative learning models showing the highest effectiveness. Challenges include institutional barriers, ethical concerns, technical limitations, and compatibility with existing systems.

Conclusion

AI-enhanced information literacy skills can greatly benefit academic libraries by boosting student engagement and resource management. AI helps personalize instruction, increases efficiency, and encourages critical evaluation, enabling students to become better researchers and information users. While there are advantages, like tailored learning and improved library functions, challenges such as data privacy, technical inconsistencies, and ethical considerations need attention. Issues like algorithmic bias, the digital divide, and financial limitations should also be carefully evaluated. Future research on AI-enhanced information literacy in academic libraries should assess current practices, train for implementation, address ethical concerns, and foster collaborations to shape the future of information literacy, and also research should aim to address these challenges while enhancing the benefits of AI for all students.

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