

REVOLUTIONIZING LIBRARY AND INFORMATION SCIENCE (LIS) LEVERAGING ARTIFICIAL INTELLIGENCE (AI), INNOVATION, AND CREATIVITY

Ladi B. Habila

Library Department, College of Education, Akwanga, Nasarawa State.

Abstract

This paper explores the transformative potential of Artificial Intelligence (AI), innovation, and creativity in revolutionizing Library and Information Science (LIS). AI is rapidly transforming the LIS landscape, presenting unprecedented opportunities for enhancing information retrieval, personalizing services, preserving digital collections, and developing new service models. By leveraging AI-driven innovations, libraries and information centres can reshape their operations, services, and scholarly engagement, ultimately staying relevant, improving efficiency, and enhancing user engagement. Key applications of AI in LIS include intelligent search and recommendation systems, automation of metadata generation and cataloguing, AI-powered Chatbot for personalized reference services, and innovative approaches to digital preservation and collection analysis. Additionally, AI fosters creative new services, such as data visualization support, trend prediction for collection development, and accessible content summaries. However, integrating AI into library ecosystems also poses challenges, including ethical considerations surrounding bias, privacy, algorithmic transparency, and the digital divide, as well as the need for staff up skilling. This study discusses the benefits, challenges, and future implications of AI in LIS, highlighting its potential to redefine the future of information management, contribute to the knowledge economy, and drive a new era of innovative and creative information services. By strategically leveraging AI while managing its risks, libraries can empower LIS professionals, enhance user experiences, and optimize resource allocation.

Keywords: Artificial Intelligence (AI), Library and Information Science (LIS), Innovations.

Introduction:

Libraries have long been custodians of knowledge, evolving from traditional repositories of books to dynamic centres of learning and information dissemination. In recent decades, technological advancements have continually transformed library services, with digitalization and internet access the sector marked shifting paradigms (Luther & McGregor, 2016). The emergence of Artificial Intelligence (AI) represents the latest frontier, offering unprecedented opportunities for innovation in Library and Information Science (LIS). AI's capacity to process vast data, learn from interactions, and adapt to user needs positions it as a catalyst for revolutionizing how libraries operate and serve their communities (Bawden & Robinson, 2012). As the digital landscape becomes increasingly complex, embracing AI becomes essential for libraries to remain relevant and effective in fostering lifelong learning and inquiry.

The integration of AI in LIS has the potential to revolutionize the way libraries and information centres operate, provide services, and meet user needs (Coyle, 2020).

According to Lankes (2016), the future of libraries depends on their ability to adapt to changing user needs and technological advancements. By leveraging AI, libraries can enhance information retrieval (Kamps et al., 2017), offer personalized services (Xie et al., 2019), preserve digital collections (Rosenthal et al., 2010), and develop new service models such as virtual reference desks and AI-powered chatbots. AI's integration into LIS has improved operational efficiency, enhanced user experiences, and transformed information retrieval. Libraries are leveraging AI to automate cataloguing, provide personalized recommendations, and offer intelligent search engines.

However, the integration of AI in LIS also presents challenges, such as algorithmic bias, data privacy concerns, and the need for technological literacy. Despite these challenges, the potential benefits of AI in LIS are substantial, and libraries that adapt to these changes can stay relevant, improve efficiency, and enhance user engagement, ultimately contributing to the knowledge economy.

Summarily, the advent of AI has revolutionized various sectors, and LIS is no exception. AI's integration into LIS has improved operational efficiency, enhanced user experiences, and transformed information retrieval. Libraries are leveraging AI to automate cataloguing, provide personalized recommendations, and offer intelligent search engines. However, the integration of AI in LIS also presents challenges, such as algorithmic bias, data privacy concerns, and the need for technological literacy.

What Artificial Intelligence (AI) Is All About

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, especially computer systems (Russell & Norvig, 2016). These processes include learning, reasoning, and self-correction, which enable machines to perform tasks that typically require human intelligence. AI encompasses a range of technologies, including machine learning Natural Language Processing (NLP), computer vision, and robotics (Goodfellow et al., 2016). Machine learning, a subset of AI, enables systems to improve from experience without being explicitly programmed, which is particularly applicable in analyzing large datasets (Goodfellow et al., 2016). NLP allows machines to understand, interpret, and generate human language, facilitating more intuitive human-computer interactions.

Artificial intelligence therefore can be described as the technology that enables robots to plan, learn, reason, solve problems, move, and to some extent be creative. Artificial Intelligence's goal is to create computers that can think, see, hear, walk, communicate, and feel, and the beauty of this technology is that it can recognize patterns at a size and pace that humans cannot. It can be defined as a replica knowledge obtained through the use of computer peripherals and programmed to become actual and valuable to mankind due to its technical application and usage. It is a technology that has provided the globe a boost in terms of human knowledge progress and applicability across all disciplines.

Artificial Intelligence (AI) in Colleges of Education Libraries

Artificial intelligence (AI) is one of the latest digital transformation (DT) technological trends that Colleges of Education libraries can use to provide users with alternative educational services (Wamba et al., 2020). AI can foster intelligent decisions for retrieving and sharing information for learning and research, thereby enhancing the overall user experience (Lankes, 2016). However, extant literature

confirms a low adoption rate of AI by Colleges of Education libraries in providing innovative alternative services, as this is often missing in their strategic plans (Arslan & Yilmaz, 2020). To address this gap, our research develops an Artificial Intelligence Library Services Innovative Conceptual Framework (AI-LSICF) to provide new insights into how AI technology can be used to deliver value-added innovative library services and achieve digital transformation.

Applications of Artificial Intelligence (AI) in Library and Information Science (LIS)

The applications of Artificial Intelligence in Library and Information Science could be viewed in the followings:

1) Enhancing Information Retrieval

Artificial Intelligence (AI) is revolutionizing information retrieval in libraries by making it more precise and efficient (Kamps et al., 2017). AI-driven cataloguing procedures automatically classify and tag resources, generating improved metadata that enhances resource discoverability (Svenonius, 2000). Natural Language Processing (NLP) algorithms help understand user queries, providing search results that are more contextually relevant (Manning et al., 2014). Additionally, AI-powered Optical Character Recognition (OCR) technology extracts and transcribes text from fragile documents, facilitating efficient digitization and improving accessibility (Holley, 2010).

2) Personalizing Services

AI-powered recommendation systems analyse user behaviour, preferences, and library resources to offer personalized suggestions, enhancing user experience and streamlining resource discovery (Xie et al., 2019). These systems integrate user feedback to continually refine recommendations, ensuring accuracy and relevance over time (Kim et al., 2020). Personalized services enable libraries to tailor their offerings to individual users' needs, increasing user engagement and satisfaction (Lankes, 2016). Examples include AI-driven chatbots that provide real-time support and virtual assistants that guide users to relevant resources, (Chiu et al., 2020).

3) Preserving Digital Collections

AI plays a crucial role in preserving digital collections by monitoring content integrity, detecting changes or alterations, and ensuring the original context is preserved (Rosenthal et al., 2010). Predictive analytics helps libraries prioritize restoration resources, safeguarding priceless and historically important objects (Becker et al., 2019). AI-assisted preservation planning and conservation efforts enable libraries to protect their valuable collections for future generations (Khan et al., 2020). Moreover, AI-powered algorithms enhance digitized images, preserving visual quality and facilitating access to rare and historical materials. (Liu et al., 2019).

4) Developing New Service Models

Libraries are leveraging AI to develop innovative service models, such as virtual reference desks and AI-powered chatbots, providing 24/7 assistance and support (Chiu et al., 2020; Radford & Radford, 2017). These services enable users to access information and guidance at any time, breaking down traditional constraints associated with library operating hours (Lankes, 2016). AI-driven virtual assistants also facilitate language translation services, making library resources more accessible to diverse user groups (Kabasawa & Kitamura, 2020).

5) Creating Enhanced User Experiences

AI is transforming the user experience in libraries by providing personalized assistance, streamlining access to resources, and offering tailored support based on individual preferences and needs (Xie et al., 2019; Kim et al., 2020). AI-powered tools, such as chatbots and virtual assistants, enhance user engagement, improve resource discovery, and foster a more interactive and immersive experience, (Chiu et al., 2020). Additionally, AI-driven educational tools offer personalized learning experiences, adapting content to individual user preferences and learning styles, (Kearns et al., 2020).

Creativity and Innovation in Library and Information Science

Creativity refers to the bringing into existence something new. It is new idea that can be used to solve a problem (Vijay, D., 2019). All the new ideas that are introduced in the library may be referred to as creativity because it is through these ideas that a problem is solved. Creativity involves applying new methods to more familiar ways of reaching users and need not involve fiercely original ideas but simply new ways to approach a well-known service with some fearlessness as just having access to technology is not enough. Creativity in libraries therefore entails ability of library staff to develop and put into use new services and products especially with the use of modern day technology, while innovation is the implementation of new ideas to produce a new service or product. Creativity and innovation are different from each other, but they are interrelated in one way or the other. Basically, creativity is about thinking of methods to improve on our old products and services and putting the ideas into practice is an innovation. Innovation is also modifying or improving the existing services or products (Vijay, D., 2019). In our rapidly changing library environment, we can expect to see more creativity and innovation. The weight and responsibilities expected to be shouldered by the 21st century librarians call for some descriptive insight into what ideal personal attribute, personality and characteristics ought to be. According to Ahmed (2023), characteristically, the library and information professionals of 21st century will assume different attributes and devise new approaches to library operations in order to fit into the 21st century global audience. Consequently upon the foregoing, one is apt to portray the 21st century library and information professional in the following light as regards his stamina, outreach, performance, outlook and veracity. Librarians by this view are expected to be innovative and creative in the quest for information service delivery. According to Asamoah (2022), great and vibrant libraries are now measured by the level of automation, Internet connectivity and accessibility to other libraries on real time basis, subscription to reputable online databases as well as quality of collection.

Benefits of Artificial Intelligence (AI) in Library and Information Science (LIS)

Automated Cataloguing and Metadata Generation: AI streamlines cataloguing processes, automatically generating metadata and reducing manual errors, (Bawden & Robinson, 2018). **Intelligent Search Engines:** AI-powered search engines improve information retrieval, using natural language processing and machine learning algorithms to provide relevant results, (Casey & Savastinuk, 2006). **Personalized Recommendation Systems:** AI-driven recommendation systems offer users tailored suggestions, enhancing their library experience, (Xiang et al., 2019). Chatbots and

Virtual Assistants: AI-powered chatbots provide immediate assistance, answering queries and improving user engagement, (Kim et al., 2020).

Challenges and Concerns

Algorithmic Bias and Data Privacy: AI systems can perpetuate biases and compromise user data, emphasizing the need for responsible AI management, (Kidd & Aslam, 2019).

Resistance to Change: Library staff may require training to adapt to AI-driven systems, highlighting the importance of technological literacy, (Reynolds, 2024 & Jiang, 2022).

High Implementation Costs: Integrating AI into library systems can be costly, requiring significant investment in infrastructure and personnel, (Arlitsch & Cushing, 2020).

The Role of Innovation and Creativity

Designing User-Centered Services: Libraries can leverage AI to design user-centered services, enhancing user experiences and engagement (Bawden & Robinson, 2018). **Fostering Collaboration:** Libraries can collaborate with AI developers, researchers, and other stakeholders to drive innovation and best practices in AI integration (Xiang et al., 2019). **Developing New Skills:** Librarians can develop new skills, such as data analysis and machine learning, to effectively integrate AI into library services (Kim et al., 2020).

Future Implications

Enhanced User Experiences: AI will continue to personalize library services, improving user engagement and satisfaction (Casey & Savastinuk, 2006).

Increased Efficiency: AI automation will streamline library operations, freeing staff to focus on high-value tasks (Arlitsch & Cushing, 2020).

New Skills for Librarians: The integration of AI will require librarians to develop new skills, including data analysis, machine learning, and AI management (Kidd & Aslam, 2019).

Summary

According to Suganth, (2022), “*Revolutionizing Library and Information Science through Artificial Intelligence (AI), Innovation, and Creativity*” refers to the transformative impact of AI technologies on the field of Library and Information Science (LIS). This revolution involves:

- i). AI-powered services: Implementing AI-driven tools and systems to enhance library services, such as information retrieval, cataloguing, and user engagement.
- ii). Innovative applications: Developing new applications of AI in LIS, like natural language processing, machine learning, and data analytics, to improve information management and dissemination.
- iii). Creative solutions: Fostering creativity in applying AI to LIS challenges, such as information literacy, digital preservation, and knowledge organization.
- iv). Enhanced user experience: Leveraging AI to provide personalized, intuitive, and efficient information services, improving user satisfaction and engagement.

v). Future-proofing libraries: Preparing libraries for the digital age by embracing AI-driven innovations and staying ahead of the curve in information management and dissemination.

Revolution in Library and Information Science is aimed at the following:

- i). Improve efficiency: Streamline library operations and services through automation and AI-driven processes.
- ii). Enhance accessibility: Make information more accessible and inclusive, leveraging AI-powered tools and services.
- iii). Foster innovation: Encourage creativity and innovation in LIS, driving new solutions and applications.
- iv). Support knowledge creation: Facilitate the creation, dissemination, and preservation of knowledge through AI-powered LIS services.

Therefore, by embracing Artificial Intelligence (AI), innovation, and creativity, libraries can transform their services, operations, and impact, ultimately revolutionizing the field of Library and Information Science.

Conclusion

The integration of Artificial Intelligence (AI) in LIS has transformed library services, offering numerous benefits and opportunities for growth. However, it also presents challenges and concerns that need to be addressed. By leveraging Artificial Intelligence (AI), innovation, and creativity, libraries can revolutionize their services, enhancing user experiences, improving efficiency, and fostering collaboration.

Recommendations

1. Librarians should develop skills in Artificial Intelligence (AI), machine learning, and data analysis to effectively integrate AI into library services.
2. Libraries should prioritize responsible Artificial Intelligence (AI) management, addressing algorithmic bias, data privacy, and transparency concerns.
3. Libraries should collaborate with Artificial Intelligence (AI) developers, researchers, and other stakeholders to drive innovation and best practices in AI integration.

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