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Harnessing AI Technologies: Innovations in Literacy Libraries for Diverse Learners

Zalika Icasia Ajwa[1], Aroha Patel[2], Anne Moseley[3]
University of Guadalajara[1,3], Pandawan Incorporation[2]
Mexico[1,3], New Zealand[2]
e-mail: nazwa071219@gmail.com[1], aroha33@pandawan.ac.nz[2], annemoseley76@gmail.com[3]

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Abstract

Technological advancements have a place in every industry, including libraries. Artificial intelligence (AI) is one technology that libraries may make use of. The authors of this study provide a detailed explanation of how libraries have evolved in the wake of disruption and note many applications of AI that could be applied in library settings. Applications of AI include helping librarians do their jobs more easily and giving users quick, effective service. But the best use of AI necessitates thoughtful thought. Literacy libraries must change to meet the requirements of various learners in this more linked and complicated society. The integration of AI technology is suggested in this article as a creative way to enhance literacy library services for students with various requirements. We investigate the potential of AI in maximizing accessibility, personalizing learning, and early detection of learning issues using conceptual analysis and observational literature. With an emphasis on equity and inclusivity, we also emphasize the opportunities and difficulties associated with implementing AI technology. A responsive, adaptable, and inclusive learning environment can be created for students of different backgrounds and skill levels by using AI into library literacy.

Keywords: *Artificial Intelligence, Library, Disruption Era 4.0, Technology, Library Literacy*

1. Introduction

With the rapid advancement of information technology, every aspect related to human labor is frequently replaced by automatically operating technology [1]. This indicates that we are currently living in a disintegrating era, or what is sometimes referred to as the Industrial Revolution 4.0 [2]. The use of technology in education is just one of its many examples, In practical application, technology can be used as either a software or hardware tool [3].

The use of a software in a pushcart can be used to extract information about the book data included in the pushcart or as a pushcart user's list using the relevant application [4]. On the other hand, the use of hardware at a school can make use of devices like computers, laptops, printers, scanners, and other similar devices [5]. In a press conference, software and hardware are typically used to facilitate press conference participants in handling press

materials, creating press conference transcripts, organizing press conference data, entering press conference and book publishing data, as well as related administrative tasks [6].

Artificial Intelligence (AI) is the knowledge and process of creating a machine that can do tasks using a computer [7]. In this context, AI refers to a technological advancement that enables computer systems, robotic arms, software, and programs to "learn" in a way that is comparable to that of human beings [8]. AI is applicable in various fields, including research and development [9]. The implementation of AI in libraries can answer frequent problems is influenced by the users.

One of the challenges faced by students is finding the books they want quickly and effectively [10]. In this case, AI can provide meaningful solutions, with an automatic catalog system that uses AI, book scanning may be done more effectively [11]. This system can provide more accurate and pertinent research results based on analysis performed on the data present in the study.

This paper attempts to provide in-depth insight into the potential of AI technology to improve the learning experience and help expand educational opportunities for all individuals, regardless of their background or circumstances, by examining a variety of emerging applications of AI in the context of literacy libraries [12]. It is therefore anticipated that this research will be able to make a significant contribution to the formulation of tactics and best practices for applying AI technology to the establishment of competitive and inclusive literacy libraries [13].

AI is becoming more and more prevalent, and this has greatly benefited many facets of human existence, including education. Advances in AI technology hold great potential for enhancing inclusive and productive learning experiences for a varied range of learners, particularly in the context of library literacy [14]. AI technology application in literacy library contexts has great potential to address the challenges faced by diverse learners in an era where access to information is increasingly important, especially for those representing diverse cultural, linguistic, and ability backgrounds [15].

Literacy libraries serve as inclusive, dynamic learning environments for learner communities in addition to being book repositories. In this situation, utilizing AI technology offers creative ways to improve the services that libraries provide. AI has the power to revolutionize how we use literacy resources, from better search engines to tailored book suggestions [16]. Even though AI technology presents a lot of potential, it's crucial to take into account the difficulties and moral issues that come with using it. This essay will examine the benefits of AI for literacy libraries while also taking into account any potential negative effects on equity, privacy, and society [17].

This research aims to provide broad knowledge for readers, especially librarians in implementing AI in library services. The function of this study is to add knowledge in the use of various kinds of AI into library services [18]. In this study, the research method used is literature study, by analyzing library materials from several sources. In order to foster thoughtful discussions about how we may properly harness the power of this technology to better education and equal access to knowledge for all learners, this article intends to do more than just examine AI technological breakthroughs in literacy libraries [19].

2. Research Method

The method used in this study is literature review. The first and most important step in every research project is the literature review, which covers all research types, both qualitative and quantitative [20]. This study focuses on data analysis that is derived from previous research, books, or relevant sources without going directly to the source to conduct the study [21].

This literature review has many uses in the field of research, including helping researchers understand the scope of the problem that will be studied, other researchers methods for breaking down the problem, current research trends, and new methods that other researchers are using to solve the problem [22]. Additionally, this study makes it possible for them to identify and validate each research question that is raised once the study is conducted.

In this study, researchers analyzed various types of benefits of AI that can be implemented in libraries [23]. Data analysis carried out in this research is to make a summary of the results of research or relevant literature sources and proven by facts in the field. The results of the data analysis will be described descriptively [24].

2.1 Literature Review

The field of libraries is one that is constantly expanding. The first libraries to be developed were traditional libraries, which still used a manual data processing method and only offered a small selection of "physical" books and library resources [25]. This library is thought to be physically and geographically restricted.

Traditional libraries are another name for conventional libraries, then came the emergence of a hybrid library, whose services had no time or location restrictions. The hybrid library offers both digital and physical access to books, journals, and other resources. Users can therefore access existing information both digitally and non-digitally with flexibility. The rise of libraries, another element that bridges the gaps between the services offered by traditional and digital libraries is this hybrid. Along with the development of information technology, libraries are becoming increasingly familiar automation in data processing and storage. This cannot be separated from the role technology of course.

AI is a system that can analyze external data in real time and automatically adjust the user behavior based on the analysis results. This allows AI to generate "intelligent" that are consistent with circumstances that change quickly without human intervention. One of the advantages of AI is that it is a machine that can work just like a human. Because AI involves simulating human intelligence in running the program causes AI to be increasingly explored and developed by scientists and information technology practitioners.

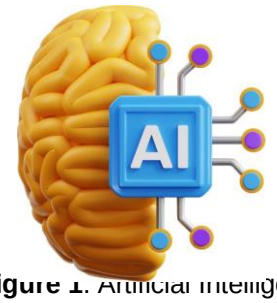

Figure 1. Artificial Intelligence

Categorize artificial intelligence techniques into two subsets:

- Intelligence techniques utilizing hardware.
- Intelligence techniques utilizing software.

As in addition, intelligence techniques using software, an example is a facial recognition system that identifies people by a set of faces. As for the fields of AI that others such as expert systems, learning systems, fuzzy logic, genetic algorithms, neural networks, intelligent agent, visual perception dexterity, propulsion, navigation, natural language, recognition conversation, multisensory interface, and virtual reality. Robotic systems, which carry out tasks autonomously, are an illustration of intelligence strategies utilizing hardware. Below are areas of AI that have been grouped:

Applications of cognitive Knowledge	Application Interface	Natural Interface Applications

Expert System	Visual Perception Stimulation	Natural Language
Learning System	Agility	Introduction Conversation
Fuzzy Logic	Propulsion	Interface Multisensor
Genetic Algorithm	Navigation	Virtual Reality
Neural Network	-	-
Smart Agent	-	-

Table 1. Grouping of Artificial Intelligence Fields

AI is widely used and modified by businesses and organizations in a variety of disciplines. AI is used not only in technology but also in non-technical domains such as industry, education, health, and medicine. Additionally, research has demonstrated the value of AI in a number of other domains, including manufacturing, law, education, health, and literacy. The above statement confirms that AI is a technology that can be applied in various fields, including libraries.

AI has broad applications across multiple domains. It has been discovered that AI is used in the medical field. One example is the diagnosis of skin conditions through the use of a computer program called Forward Chaining. It could facilitate the dermatologist's work. Additionally, Blackboard is a popular AI tool used by lecturers in the field of education for publishing notes, homework, quizzes, and tests. It appears from the observations that there is a dearth of research on AI in libraries. This could occur as a result of the lack of knowledge among specialists regarding the domains in which AI can be useful. Consequently, research into the advantages AI can offer the library industry is essential.

Even though up to 25% of employment could be replaced by AI. Artificial intelligence can potentially lead to massive productivity gains and new job opportunities in the US and Europe. AI can there by enhance outcomes.

According to a bank analysis by Goldman Sachs investments, the global annual productivity of products and services improved by 7%. Based on the information provided, it can be inferred that AI has the potential to make human labor easier across a range of industries. But the use of AI does not want to take the position of the task and one's obligations inside their line of work. AI is made up of innovations and concepts generated by experts in their domains, therefore, human power will always be important and will propel the effective use of AI in a variety of fields, including libraries.

2.3 Hypothesis

H_1: For storing information that is not in the form of a printed book, there exist bookless libraries in addition to digital libraries. A traditional library that offers a room or location but does not have printed books is called a bookless library. Through the usage of electronic gadgets for reading. Several benefits of bookless libraries include increased storage capacity for library collections, enhanced image quality, retrieval of information, preservation, and long-term conservation.

H_2: Artificial Intelligence will also be used in the disruptive period to create library 4.0 by integrating two-way communication with the internet. Artificial Intelligence can be used in real-time chat applications or in semantic web-based website systems. In the meantime, advancements in the information technology field Artificial Intelligence is not limited to website design, it may also be used to communicate with robots via monitors that resemble humans.

3. Findings

3.1 Problem

Along with the development of information technology, libraries are getting to know automation in the process of data processing and storage. It is inseparable from the role technology of course. In the 1980s when computer prices were still high, some large libraries decided to automate their library operations. At In the 1990s, almost all library operations began to be automated, and data communication between Libraries are becoming more electronic.

Questions surrounding the use of artificial intelligence, robotics, and other technologies have become the subject of discussion among librarians regarding whether they should be implemented in library operations. In the application of artificial intelligence, cooperation and collaboration can be carried out between libraries and related institutions according to their respective fields. However, some believe that the inclusion of information technology in library administration has produced mixed results. This is due to the widespread perception that advances in automation and artificial intelligence will threaten the jobs of information professionals such as librarians. Fears regarding the use of artificial intelligence arise because many believe that machines can perform tasks that humans can no longer do, leaving humans with no role in their work.

Nevertheless, attempting to integrate artificial intelligence in libraries may present certain difficulties. Among the things that can be difficult are:

- A lack of funding for the upkeep of robotics and artificial intelligence infrastructure.
- The effects of job losses and widespread unemployment as a result of artificial intelligence has taken over all of the functions of librarians, and there is also a dearth of technological know-how, experience, and competence needed to operate robotics and artificial intelligence.

3.2 Research Implementation

The library is currently experiencing a disruptive period known as "revolution 4.0". The library services with the highest start using platforms and apps to combine information technology Internet-integrated search available in the library. These days, viewers Digital libraries are becoming more well known to the public.

A library of this kind is also known as Because they are internet-based, users of walled libraries have unlimited access to information, regardless of location or time constraints. Hardware, software, and a computer network were required for the digital library realization as its primary infrastructure.

Figure 2. Digital Library

Additionally, highlighted a number of chances for AI use in libraries, such as:

- The Virtual Tour of the Library lets users: visit libraries digitally.

- The library speech-to-text collection makes it simple for users to find information through chats conducted on PCs or cellphones.
- Chatbots, also referred to as "ask librarians", provide information via chat.
- Book Shelving Machine: This device assists librarians with the process of loaning out, returning, and extending books.
- A robot for book shelving that makes it easier to get and put back a group of books on a shelf.
- Small Bookstacks Shelving Moving on: This book storage rack is movable based on customer requirements.
- OPAC Assistant Service, A feature that serves to serve the search and availability of existing book collections in the library.
- Tour Guide Assistant, can serve users to meet information that is being needed.
- Library System Analytics, used to simplify Librarians procure book collections.

Artificial intelligence can help manage data more quickly, reduce errors, and help librarians provide better, faster solutions, according to a number of chances that can be put into practice, more productive. Furthermore, technology can help librarians provide customers additional services including faster and more accurate searches and a wide range of interactive apps.

The study of modeling, characterizing, and applying intelligence to a range of computer technologies that can be utilized to express human needs and desires is connected to the idea of artificial intelligence. There is promise for artificial intelligence. excellent for fulfilling patron needs and enhancing library services. Possible challenges that will be faced can be overcome well increasing the allocation of funds for libraries to review existing infrastructure, have other duties and responsibilities for librarians so that they do not suffer losses work.

Several fields that can be done by a librarian namely website management, information literacy and teaching, social media management, data science, technology assessment, and so on. Lack of Knowledge of technology can also be overcome by improving skills in information technology so that artificial intelligence and robotics can be run optimally.

Information technology specialists might survey various groups inside the library to make sure the artificial intelligence chosen complies with the requirements and willingness expressed by librarians. This survey can determine what is needed. and the level of modification necessary for the chosen artificial intelligence to operate well. Librarians also need to take into account the expenses associated with developing and using artificial intelligence.

4. Conclusion

The concept of artificial intelligence is related to the study of modeling, describing, and the application of intelligence to a set of computer technologies that can be used to articulate human needs and desires. Artificial intelligence has great potential to improve library services and meet the needs of users. Even though there are obstacles to overcome, libraries can use the appropriate artificial intelligence to offer their patrons better and more effective services. In following the era of disruption Voice Recognition can be used to apply certain AI utilization potential.

> OPAC, Neural Network, Virtual Tour Library, Tour Guide Assistant, Intelligent Agent, Expert System, Compact Bookstacks, Shelving, Moving On, and so on. In the realm of technological advancement, technology plays a crucial role across various disciplines, including libraries. Artificial intelligence stands out as a particularly potent tool that libraries can leverage extensively.

The author of this publication looks into many potential to use artificial intelligence in libraries and gives a thorough account of how libraries have evolved in the disruption period.

The utilization of artificial intelligence yields numerous advantages, such as simplifying the tasks of librarians and offering prompt and effective services to users.

But in order to guarantee the best possible use of artificial intelligence, a number of things must be carefully taken into account, including:

1. Funding for infrastructure up keep.
2. Expanding users and librarians understanding of artificial intelligence technology.
3. Customizing AI capabilities to meet user requirements.

This all-encompassing strategy will guarantee the successful integration of AI in libraries, enhancing services and the user experience as a whole.

As a result, this study offers insightful information about how libraries might benefit from the best possible use of artificial intelligence technology in the current digital age. Stakeholders in the library industry can utilize the doable actions outlined in this publication as a guide to maximize the potential of artificial intelligence technology in enhancing library services and user experience.

References

[1] S. Kosasi, C. Lukita, M. H. R. Chakim, A. Faturahman, and D. A. R. Kusumawardhani, "The Influence of Digital Artificial Intelligence Technology on Quality of Life with a Global Perspective," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 5, no. 3, pp. 240–250, 2023.

[2] K. Bajunaied, N. Hussin, and S. Kamarudin, "Behavioral intention to adopt FinTech services: An extension of unified theory of acceptance and use of technology," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 9, no. 1, p. 100010, 2023.

[3] U. Rahardja, "The Economic Impact of Cryptocurrencies in Indonesia," *ADI Journal on Recent Innovation*, vol. 4, no. 2, pp. 194–200, 2023.

[4] N. Azhar, W. F. Wan Ahmad, R. Ahmad, and Z. Abu Bakar, "Factors Affecting the Acceptance of Online Learning among the Urban Poor: A Case Study of Malaysia," *Sustainability*, vol. 13, no. 18, p. 10359, 2021.

[5] W. Sejati and T. T. Akbar, "Optimization Study of Cropping Pattern in the Klakah Irrigation Area, Lumajang Regency, Using Linear ProgrammingAmelia, R., Endrastaty, A., & Sensuse, D. I. (2022). Critical Success Factors of Knowledge Management Implementation in BPKP. 2022 1st Internat," *ADI Journal on Recent Innovation*, vol. 5, no. 2, pp. 136–145, 2024.

[6] R. Muthia, "Structured Data Management for Investigating an Optimum Reactive Distillation Design," *ADI Journal on Recent Innovation*, vol. 5, no. 1, pp. 34–42, 2023.

[7] N. P. L. Santoso, R. A. Sunarjo, and I. S. Fadli, "Analyzing the Factors Influencing the Success of Business Incubation Programs: A SmartPLS Approach," *ADI Journal on Recent Innovation*, vol. 5, no. 1, pp. 60–71, 2023.

[8] S. Pranata, K. Hadi, M. H. R. Chakim, Y. Shino, and I. N. Hikam, "Business Relationship in Business Process Management and Management with the Literature Review Method," *ADI Journal on Recent Innovation*, vol. 5, no. 1Sp, pp. 45–53, 2023.

[9] S. I. S. Al-Hawary *et al.*, "Multiobjective optimization of a hybrid electricity generation system based on waste energy of internal combustion engine and solar system for sustainable environment," *Chemosphere*, vol. 336, Sep. 2023, doi: 10.1016/j.chemosphere.2023.139269.

[10] R. C. Nagy *et al.*, "Harnessing the NEON data revolution to advance open environmental science with a diverse and data-capable community," *Ecosphere*, vol. 12, no. 12, p. e03833, 2021.

[11] K. G. Srinivasa, M. Kurni, and K. Saritha, "Harnessing the Power of AI to Education," in *Learning, Teaching, and Assessment Methods for Contemporary Learners: Pedagogy for the Digital Generation*, Springer, 2022, pp. 311–342.

[12] N. Ghamrawi, T. Shal, and N. A. R. Ghamrawi, "Exploring the impact of AI on teacher leadership: regressing or expanding?," *Educ Inf Technol (Dordr)*, pp. 1–19, 2023.

[13] T. Wang, "Navigating Generative AI (ChatGPT) in Higher Education: Opportunities and Challenges," in *International Conference on Smart Learning Environments*, Springer, 2023, pp. 215–225.

[14] J. G. Schafer, "Harnessing AI Innovation for Struggling Families," *U. Ill. JL Tech. & Pol'y*, p. 411, 2020.

[15] T. Yigitcanlar, K. C. Desouza, L. Butler, and F. Roozkhosh, "Contributions and risks of artificial intelligence (AI) in building smarter cities: Insights from a systematic review of the literature," *Energies (Basel)*, vol. 13, no. 6, p. 1473, 2020.

[16] I. Y. Ruhiawati, A. P. Candra, and S. N. Sari, "Design and Build a Multimedia System for Indonesian Religious Activities Based on Android," *International Journal of Cyber and IT Service Management*, vol. 1, no. 2, pp. 233–239, 2021.

[17] M. R. Anwar and S. Purnama, "Boarding house search information system database design," *International Journal of Cyber and IT Service Management*, vol. 2, no. 1, pp. 70–81, 2022.

[18] W. Setyowati, R. Widayanti, and D. Supriyanti, "Implementation of e-business information system in indonesia: Prospects and challenges," *International Journal of Cyber and IT Service Management*, vol. 1, no. 2, pp. 180–188, 2021.

[19] A. Hanelt, R. Bohnsack, D. Marz, and C. Antunes Marante, "A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change," *Journal of management studies*, vol. 58, no. 5, pp. 1159–1197, 2021.

[20] C. Wongwatkit, N. Thongsibsong, T. Chomngern, and S. Thavorn, "The Future of Connectivist Learning with the Potential of Emerging Technologies and AI in Thailand: Trends, Applications, and Challenges in Shaping Education," *Journal of Learning Sciences and Education*, vol. 2, no. 1, pp. 122–154, 2023.

[21] J. Scott-Branch, R. Laws, and P. Terzi, "The Intersection of AI, Information and Digital Literacy: Harnessing ChatGPT and Other Generative Tools to Enhance Teaching and Learning," 2023.

[22] Y. K. Dwivedi *et al.*, "Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy," *Int J Inf Manage*, vol. 57, p. 101994, 2021.

[23] Z. Van Veldhoven and J. Vanthienen, "Digital transformation as an interaction-driven perspective between business, society, and technology," *Electronic markets*, vol. 32, no. 2, pp. 629–644, 2022.

[24] S. Kraus, F. Schiavone, A. Pluzhnikova, and A. C. Invernizzi, "Digital transformation in healthcare: Analyzing the current state-of-research," *J Bus Res*, vol. 123, pp. 557–567, 2021.

[25] N. Verina and J. Titko, "Digital transformation: conceptual framework," in *Proc. of the Int. Scientific Conference "Contemporary Issues in Business, Management and Economics Engineering*, 2019, pp. 9–10.