JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website:www.jriiejournal.com ISSN 2520-7504 (Online) Vol.9, Iss.1, 2025 (pp. 161 - 170)

The Exploration of Artificial Intelligence Tools and Their Applications in Higher Education Institutions for Information Professionals in Tanzania

Matendo Didas & Shuubi Alphonce Mutajwaa
Center for Information and Communication Technology
St. John's University of Tanzania
ORCID: https://orcid.org/0000-0001-8672-0807
Email: matendodidas@gmail.com

Abstract: *The main objective of this paper is to assess the possible uses of artificial intelligence (AI) tools and applications for information professionals employed by Tanzania's higher education institutions (HEIs), particularly in the areas of end-user services and information technology where AI tools and applications may be employed. To find out what they thought about the use and adoption of AI techniques by information professionals of HEIs in Tanzanian, ten information officers were surveyed using a qualitative method. The results' descriptive tabulation demonstrates that information professionals are knowledgeable about AI tools and applications. Information professionals use Natural Language Processing (NLP)-based applications like Google Assistant, Voice Search, and Google Translate. Pattern recognition methods, such as text data mining, are also used for online searching and information retrieval. OneDrive, Google Drive, cloud computing, and other services can all provide access to Big Data (BD). The population has very little knowledge of chatbots and robotics. The study guides how to use AI technologies and tools for information professionals who have not yet embraced or deployed them or wish to employ more advanced solutions. To establish AI laboratories for information professionals and information science in general, Tanzanian HEIs should collaborate with departments, computing units, and subject matter specialists. Lack of funding and technological know-how is one the biggest challenges facing information professionals in HEIs when implementing AI technologies and solutions.*

Keywords: *Artificial intelligence, Machine learning, Higher education institutions, Information, Deep learning*

How to cite this work (APA):

Matendo, D. & Mutajwaa, F. A. (2025). The Exploration of Artificial Intelligence Tools and Their Applications in Higher Education Institutions for Information Professionals in Tanzania. *Journal of Research Innovation and Implications in Education*, *9*(2), 161 – 170. **https://doi.org/10.59765/lpt381bg.**

1. Introduction

Artificial intelligence (AI) and its subsets are among the most significant global breakthroughs of the present day, affecting a wide range of industries, businesses, education, aviation, medicine, surgery, and autos. Technological advancements enhance information and user services (Arlitsch & Newell, 2017). When information and communication technology (ICT) technologies are used appropriately, information services in higher education institutions (HEIs) can be updated and made unique. AI is also becoming more prevalent in the information-generating arena through the usage of chatbots, robotics, big data (BD), natural language processing (NLP), and text data mining (TDM). AI impacts both information workers and information services. Even though there are many definitions depending on the specific situation, the researcher thinks the following are the most relevant to the current study: AI is a field of computer science that focuses on creating machines that are capable of tasks

that frequently require human intelligence (Jakhar & Kaur, 2020).
Berendt (2019) asserts that the immediate outcome of AI is information that both humans and machines can understand and apply. Additionally, among the societal impacts of AI are search engines, large social networks, and national and multinational surveillance programs (Berendt, 2019). Sharing information and knowledge is viewed as a social virtue. Technologies that assist in managing user data, resource usage, and information-gathering metadata in technological services include big data analytics (BDA) and text data mining (TDM). Information retrieval and user services have gradually embraced technologies such as chatbots, robotics, NLP, and pattern recognition.

While writing a research proposal for the Dartmouth Summer Study Conference in 1955, McCarthy coined "AI" (McCarthy et al., 1955). AI hasn't been defined by a single, accepted organization since then. Tredinnick (2017) defines AI as "a cluster of technologies and approaches to computing focused on the ability of computers to make flexible rational decisions in response to unpredictable environmental conditions." Another is the incorporation of human intelligence into machines. ML and deep learning (DL), a subset of ML, are the two main components of AI. ML and DL are the two categories into which examples of AI technologies fall. This includes chatbots, robotics, BDA, and TDM in terms of machine learning (ML). On the other side of DL are image processing, pattern recognition, and NLP. In DL, a subset of ML, artificial neural networks (ANNs), algorithms modeled after the human brain, learn from enormous volumes of data. Machines can tackle complex problems with DL even when they are working with a wide variety of connected, unstructured data sources.

Without explicit design, computers may automatically learn from experience and get better thanks to ML, an AI application. Creating computer programs that can access data and use it for self-learning is the primary objective of ML. The information archive's ability to collect resources and provide user services depends heavily on machines. In summary, information is gathered using both ML and DL. The following research question (RQ) served as the study's compass:

What are the insights of AI tools and applications in HEIs by information professionals in Tanzania?

The paper is structured as follows: Section 2 provides pertinent literature on the subject being studied. The methodology used to carry out the study is described in Section 3, the results and discussion are presented in Section 4, and finally, the study's conclusion and recommendations are briefly discussed in Section 5.

2. Literature Review

2.1 Potential AI Tools in Information Archives:

AI, robotics, and automation are expected to threaten HEIs in several ways. First, jobs will be lost, national economies will shift, and global economic advancement will be hampered by automation, robotics, and AI (Siau & Yang, 2017). Instead of replacing jobs, established role identities can be challenged, which could cause instability in the workforce (Tredinnick, 2017).

According to a recent study by Wood and Evans (2018), 56.3% of academics in the United States of America were asked if they believed AI would transform information professional services. Only 47.42% of them, however, said they would be open to attending a workshop to gain more knowledge about AI. According to Wheatley and Hervieux (2019), AI is still a relatively new technology in academic archives, even though prominent information-gathering institutions like Stanford and Massachusetts Institute of Technology (MIT) are actively using it.

More than thirty years ago, Hilker (1986) created a thorough inventory of the AI information resources that are currently available. He recognized the potential for AI to drastically alter service sectors like medical diagnostics. Even though AI was not yet accepted as a field of study, it was believed to offer new opportunities. AI is an extensive and complex field of study that aims to enable machines to function, behave, and make judgments that are comparable to those of humans. As AI develops beyond the notion of human intelligence, more and more ICT devices are being built and designed to function and think like people (Asemi & Asemi, 2018). In their 2015 study, Wu et al. (2015) examined how AI was incorporated into CiteseerX, a digital information search engine, with an emphasis on algorithmic searching and citation analysis.

An AI developed by the CiteseerX team is capable of several tasks, including document copying, metadata extraction, and table indexing for search. A study on the application of AI technology in BD across different industries was carried out by Mahanty and Mahanti, (2020). The types of insights that can be gained by automating complex, analytical processes have particularly caught the writers' interest. Asemi and Asemi (2018) have examined the use of intelligent information-gathering systems in Iran in three domains: public/user services, management services, and technical services. Four criteria; TDM, NLP, intelligent decision support or recommender systems, and expert systems/knowledge systems have been used to assess the number of AI tools that have been implemented. According to the authors, recommender systems are the most sophisticated in Iranian information archives, while

natural NLP is the least developed. AI will be developed in 2030 and gradually applied to all knowledge domains and professions, according to the results of an expert survey (Müller & Bostrom, 2016). The study examined the following possible AI tools that information professionals could use in information archives:

2.2 Pattern Recognition

The automatic search for regularities and patterns in data is known as pattern recognition. AI, ML, and database knowledge-seeking applications like data mining (DM) all depend on pattern recognition. To confirm whether a user is human, for example, the Completely Automated Public Turing test (CAPTCHA) is widely employed. Similar to how different digital devices are used for information access and security, information archive data barcodes are associated with quick response (QR) codes and other codes. With a single swipe, library patrons can check out or check in materials.

NLP: NLP was created in the 1970s, and its nuances are still a focus of subfields of linguistics and computer science (Edgcomb & Zima, 2019). Electronic health management systems are one significant area where NLP is used. AI in the form of NLP is already widely used by information users in search engines such as Google and YouTube. Except for English, other languages have progressed from permitting mistakes to occur during searches to offering voice search capabilities. According to Wolfram (2016), NLP is helpful in the design of information retrieval systems, bibliometrics, and subject indexing all crucial components in the creation of digital information archives.

2.3 Text Data Mining (TDM)

TDM is now widely employed to meet a variety of governmental, scientific, and business needs. All three groups can utilize TDM to keep track of their documents and locate documents related to their daily tasks. Attorneys can use TDM as a technique for electronic discovery. Governments and military agencies employ TDM as a weapon for national security and intelligence. To solve the issue of unstructured data, scientists employ TDM techniques to arrange massive text data sets and identify concepts through language, including sentiment analysis in social media (Paltoglou & Thelwall, 2012; Pang & Lee, 2008).

Scholars will need to reach a new consensus on the categories used to organize the data, the tools required to access, process, and structure the data, and what makes for valid and trustworthy descriptions of the data, given the substantial ways in which the methods for obtaining and reusing data are changing (Shah, Cappella & Neuman, 2015). Database searching, document delivery, and reference services are examples of user services that use AI, whereas technical services use it for tasks like descriptive cataloging, subject indexing, and collection building. An overview of AI's present application in technical and user services is given in Table 1.

2.4 Chatbots

Chatbots are computer programs that mimic intelligent conversations using speech, text, or occasionally a physical embodiment. Digital assistants, virtual agents, and intelligent agents are some of the titles they go by. They are designed to communicate with people by closely mimicking human speech as it is mimicked in the AI Turing test (Bohle, 2018).
Chatbots such as Google Assistant and Amazon's Alexa are currently utilized in daily life. Chatbots are intended to answer frequently asked questions about information archives. Referencing queries and services should have substantial potential benefits for specialists and users of information archives (Mckie & Narayan, 2019; Meincke, 2018).

Xiaotu is one of the more popular chatbots, (Huang et al., 2018); Wang, 2017; Yao, Zhang & Chen, 2015). The talking robot created for the Tsinghua University information archive is referred to by Yao et al. (2015) as a "participatory information archive service, in which users participate in the resources collection and become content co-creators." Self-learning and NLP for Chinese are among its features. Yao et al. (2015) discovered that the information archive's specialists and employees were quite enthusiastic about integrating AI technology into reference services. One information professional said, "Information professionals do not have to worry that Xiaotu may replace them."

2.5 Robotics

According to Ziemke (2016), robots are commonly viewed as the visual representation of AI from a social standpoint since, in contrast to the majority of traditional AI systems; they are genuine and interact with their surroundings. Robotics is a significant AI technology used in library services. Jaume University created a robot for information professionals to help users and information professionals locate and retrieve books from the shelf (Prats et al., 2004). The three main components of this system were sensor-based navigation, book recognition, and user-robot interaction. Other examples include automated retrieval facilities, such as the University of Utah's Willard Marriott Information Archive, where objects are automatically found, recovered, and put on shelves (Wang, 2017). Phillips (2017) discusses the use of AI robotics in information archive services. Finally, he says:

"People typically think that automation is a positive thing when it frees up human labor for tedious or unpleasant activities, according to the study's findings, which are supported by the literature. However, there are also justifiable concerns that jobs may disappear and that there won't be enough new jobs to replace them".

A recent pilot study in China focused on robotic information archiving services (Wang, 2017). According to the author, some workers think that when it comes to locating information archive resources, such as books, robotics is extraordinarily accurate and fast. Employees can be replaced by robots in tasks like shelving and stock-taking. At the same time, other workers expressed concern about how automation would affect their jobs in the future.

BD: For example, BD can be analyzed to offer insights that support more informed decision-making and strategic business activities. Tuarob et al. (2016) proposed a prototype search engine named Algorithm Seer to extract algorithms from academic BD. Data that is too large, too fast, or too complicated to handle using traditional techniques is called "big data."
Getting and storing large amounts of data for analysis has long been a practice. Aradau and Blanke (2015) claim that BD can be seen as AI in a setting where there are new human-machine interactions, which has raised serious security concerns. The massive amount of structured and unstructured data that constantly floods an organization is known as business data. Nevertheless, the amount of data is irrelevant. What matters is what businesses do with the data.

Table 1: The usage of AI techniques in information archives

S/N	Tool	Services
1	Chatbot	Retrieval of instructions and information, archiving of information, acquisition, query services, and descriptive cataloging
2	Robotics	Taking inventory, organizing shelves, reviewing library resources, and archiving information, as well as registering and checking out
3	NLP	Processing information and books, knowledge management, book grouping, text translation, material reading, and information retrieval
4	BD	Resource utilization, data storage, repository management, and information archive consumption reports.
5	TDM	Reference Services, Altimetry Citations Support and Analysis, online public access catalog (OPAC) searches, metadata, #archive trends, and social media appearance
6	Pattern Recognition	User names, security passwords, library security materials, and QR codes for content indexing and image abstraction.
7	Image Processing	Conservation and restoration, monitoring the database of image and video archives, medical records, facial recognition software for library patrons, and 3D printing.

Source: Synthesized by the Author (2025)

2.6 The status of AI Tools in Tanzania HEIs information archives

Tanzanian higher education institutions' information archives are creating and applying innovative approaches to update their operations. More than 65 percent of information archives at higher education institutions have already been automated (Sarakikya & Kitula, 2024). Some information archives now incorporate RFID technology to prevent theft and destruction. The establishment of a digital library, electronic content resources, and an institutional repository are all ongoing undertakings. The three principles of data stewardship, data literacy, and digital literacy are introduced sequentially. On the other hand, as technology advances, so do instruments, methods, and new ways of thinking. As a result, information archives use substantially more technology than physical labor.

Ahmad, JianMing, and Rafi (2019) conducted a recent survey on the application of BDA in information archives, which is similar to but not linked to AI. The authors identified a strong association between the skills and competencies required of librarians for the use of BDA in academic information archives. They determined that sufficient training was required to improve procedures in these types of information repositories.

There has been no research on information professionals' thoughts on AI in the academic information archives of Tanzanian higher education institutions. The goal of this study is to fill a gap in the literature. Koloniari and Fassoulis (2017) conducted an empirical literature-based study to determine academics' and university information workers' perceptions of the Semantic Web's suitability for digital information archives. Respondents were notably questioned about AI software agents because the Semantic Web uses fuzzy reasoning and AI

techniques to boost database computer search skills. According to the authors, the majority of respondents expected the future outcomes of using AI software in a digital information archive to be more accurate.

3. Methodology

This study project was an exploratory qualitative investigation. This study investigated how AI might be used in information archives by information professionals and end-users at higher education institutions in Dodoma, Tanzania. Ten top HEIs information archiving professionals and leaders were interviewed for this study from both private and public HEIs (University of Dodoma, St. John's University of Tanzania, College of Business Education, Mtumba Teachers' College, and Institute of Rural Development Planning).

An open-ended questionnaire was designed and used for recording the results of interviews with information professionals as similar methods apply (Cox, Pinfield & Rutter, 2019).

4. Results and Discussion

4.1 Current Application of AI in Information Archives

Table 2 shows a lack of information archiving using chatbots or robotics, as well as a low level of AI awareness. In contrast, three information archives check in and out using thumb verification, commonly known as pattern recognition (PR). When it comes to using Google Assistant, Voice Search, and Google Translation, NLP is just slightly knowledgeable. Cloud computing, OneDrive, and Google Drive have all been associated with the usage of BD. Text data mining is another approach for collecting information from the internet.

Table 2 provides an overview of the open-ended answers to the RQ.

Table 2: Current AI application in information archives by information professionals in HEIs of Tanzania

S/N	AI application	
1	Pattern Recognition	
2	Data text mining #hash tags are utilized in information archives, as well as Google voice search.	
3	Pattern Recognition and Google Assistant	
4	Pattern recognition using QR codes, bar codes, and RFID scanners for material security and check-outs.	
5	Google Assistant, YouTube voice search, Google voice search, and NLP. Google Translate	
6	BD in the form of cloud computing, Drive One, Google Drive, and data text mining for the search of information archive material from many sources.	Participant feedback
7	BD takes the form of Google Drive, Drive One, and cloud computing.	
8	AI is currently the beginning point for information archives. NLP technology, such as voice search and Google Translation, is utilized to access information archives.	
9	Features include data mining, catalog search, voice search, and Google Chat for reference.	
10	NLP Google Translation is used.	

Source: Field Data (2025)

Although AI technology has not yet been fully implemented in Tanzanian information archives, information professionals contacted reported that certain AI features are now in use. According to the findings, people seek information using Google Assistant, Voice Seek, and Translation. NLP is in use at Dodoma's higher education institutions. Information workers also employ pattern recognition, which is an important part of AI's ML discipline. Information workers employ patterns such as thumb impressions and mobile patterns.

Academics and information professionals in Tanzanian higher education institutions use social media networks (SMNs) such as X (formally Twitter). TDM uses Twitter's #tag (hashtag) to identify specific debate subjects. Tanzania's national level has given services that have improved BD's accessibility, including the National Digital Library and the Tanzania Research Library.

Regarding robots and chatbot applications and their potential future usage in information archives, the researchers were unable to elicit a response from higher education information archives. As a result, they proposed two possible causes. First, technical support for the increasing number of IT systems and devices in

information archives may be a challenge. Not every information archive has the budget to hire a worker.

Furthermore, there may be instances where access to institutional IT professionals is limited. Second, to use these technologies in information archives, users must be educated. Emerging AI technologies that will transform knowledge and information will be the focus of future research, education, and learning (Dwivedi et al., 2021; Popenici & Kerr, 2017). Hence, Users of information archives require sophisticated programs.

4.2 AI effects on information archive services

Out of ten responses, every single one (100%) believed that AI would have an impact on information professional user services.
Leaders of academic information archives were optimistic in their survey responses about the potential benefits of AI for information professionals and user services. Ontology mapping and the Semantic Web, for example, have the potential to replace current indexing services. Voice Searching and Google Assistant will be used to retrieve search results, while natural language search algorithms will be developed.

Future advances in AI may result in intelligent information archiving systems tailored to the needs of academic information archives (Asemi and Asemi, 2018; Cox et al., 2018). In addition to potentially hurting future information archive reference services, chatbots (Amazon Alexa, Siri, and International Business Machine (IBM) may reduce in-person traffic to the archive.
More complex scientometrics, such as those that use ML and AI to provide more accurate altimetry, will benefit information professionals and users. Future AI-based information archive systems could be designed to suit both the functional needs of the information archive and the increasingly sophisticated user requirements. According to Wood and Evans' (2018) survey on AI adoption in information archives, only 47.42% of respondents said they would like to have AI installed.

4.3 Integration of AI tools in HEIs information archives

Within the next five to seven years, five respondents (or 50%) believe AI will be used in the day-to-day operations of information archives. Three (20%) chose a 5- to 10-year timeframe. Ten percent of respondents believe AI will be widely employed in Tanzanian higher education institutions' information archives within the next seven to ten years, while another ten percent believe it will take about twenty years. Table 3 summarizes the results of incorporating AI techniques into higher education information repositories.

Respondents stressed the critical role that higher education institutions, which house information archives, play in making this feasible. For example, they suggested that to promote awareness of AI, AI laboratories could be established in existing information archives. One responder also mentioned the urgent need for Tanzanian higher education institutions to improve their information archive curriculum to properly prepare future information workers. NLP, chatbots, robotics, and TDM are some examples of these breakthroughs. Thinking about integration could be a step in the right way for computer science and library and information science (LIS) departments.

Respondents agreed that during the next five to ten years, AI would be fully integrated into HEIs information archives. Only one respondent believed it would take twenty years, or much longer. The findings are consistent with prior research predicting that AI would pervade all aspects of civilization by 2030 to 2040 (Müller & Bostrom, 2016). According to a different survey, the majority of information professionals believe that the impact of AI will be obvious in ten years.

Table 3: Information Professional responses to the usage of AI technologies in information archives

Statement	BD	DM	VS	GT	GA	RFID	PR
Feedback	no	no	No	no	no	yes	yes
	no	no	No	no	yes	no	yes
	no	no	No	no	yes	no	no
	yes	no	No	yes	no	no	no
	no	no	No	yes	no	no	no
	no	no	Ok	yes	yes	no	no
	yes	yes	No	no	no	no	no
	no	no	Yes	yes	no	no	no
	no	no	No	no	no	yes	yes
	no	yes	Yes	no	no	no	no

Key: **BD**-Big Data, **DM** –Data Mining, **VS**-Voice Search, **GT**-Google Translation, **GA**-Google Assistants, **RFID**- Radio Frequency Identification, **PR**- pattern recognition

Given the present integration of AI into academic information archives within enterprises, strategic planning, documentation, planning, and collaboration with other organizations are critical (Wheatley & Hervieux, 2019). Furthermore, it is claimed that money plays an important role in the implementation of AI technology in information archives.

4.4 Job fear as a result of AI applications and tools in information archives

Technology might be worrisome to those who work in information professions and archives. When asked how AI will affect their jobs, information professionals shared their perspectives. Five people (or 50 percent) stated they were courageous. Twenty percent expect their rank or category in the information archive will shift. According to two (20%) respondents, lower-level positions such as information archive attendant would be eliminated. Furthermore, roles involving classification and cataloging may be considered for deletion in future information archives. In response, one (10%) stated, "Data scientists and analytics will replace their jobs." Table 4 shows the outcomes of information professionals' job-related concerns as a result of AI technology.

Senior information archive personnel (information professionals) who are older and feel they will retire soon will not be concerned about how AI would affect their careers, according to Wang's (2017) observations. A job danger was also mentioned (Cox et al. 2018). Although the participants expected middle management jobs to survive, they predicted that their features would change. The responses reinforced the widely held idea that low cadre vocations would disappear since their activities would have been entirely mechanized, as previously stated in the research evaluation. Employees who engage strategically in AI capabilities, on the other hand, may be able to keep their jobs (Rao, 2017).

Despite the common belief that AI will improve the quality of information archiving services, it has the potential to change the nature of labor. The survey results can be summarized into three organizational cadres: There is no threat to top management, a low amount of risk to middle management, and a high risk to support workers.

Table 4: Information Professionals' responses to fear of job loss due to AI technology

Open Participant Feedback	S/N
I'm not terrified of a job now, but there will be a shift Information Archive Cadre	1
The number of information specialists and archivists will decrease.	2
The impact on classifier and cataloger jobs will be realized shortly.	3
There will be a movement in the information professional ranks.	4
Information professionals do not dread their professions, but as a result of RFID and automation, lower-level information archives attendant positions will no longer exist.	5
No Fear of the Job Loss	6
The professional designation in information will play other roles	7
Information professionals shouldn't be terrified of becoming information officers.	8
The information profession will be phased out, with data scientists, analysts, and stenographers taking its place.	9
The position of information archivist remains intact; however, lower-level post-employment will disappear.	10

Source: Field Data (2025)

4.5 AI Technology Implementation Challenges in the HEIs Information Archive

With a 70% response rate, participants identified financial issues as the most commonly reported AI technology implementation challenge in the HEIs information archives. According to 30% of respondents, technological barriers to the use of AI technology in HEIs information archives exist as well. Table 5 presents a summary of these findings.

Nonetheless, three information professionals (30%) agreed that the biggest barrier to utilizing AI in libraries is technological, including the processor of computers, laptops, tablets, and mobile phones; internet connection speed; and the capacity to use hardware and software designed with AI in mind. As previously stated, technological methods for applying AI in information archives are being developed gradually and steadily (Wheatley & Hervieux, 2019).

Information archives are another area that is being disregarded when it comes to technology adoption in countries like Tanzania, where public and private sector investments in higher education institutions are insufficient. In the case of a funding crisis or budget deficit, information archives are always ready to halt operations. The majority of head information archive

leaders agreed that a shortage of funds makes it difficult to implement AI-related tools and technologies.

Table 5: Information Professional's responses to AI technology implementation issues in HEIs information archives

Study statement	
Funding	**Technology**
no	yes
yes	no
yes	no
yes	no
yes	no
no	yes
yes	no
yes	no
no	yes
yes	no

Source: Field Data (2025)

5. Conclusion and Recommendations

5.1 Conclusion

The information professionals in Tanzania's higher education institutions have a good understanding of AI. Text data mining, pattern recognition, and NLP are a few of the AI-based technologies currently in use. However, Tanzanian academic information archives have yet to adopt cutting-edge technology that is being introduced globally, such as chatbots and robotics. Furthermore, no further attempts have been made to resolve the issues presented by BD outside of the national information repository. Information professionals should collaborate to persuade universities to revise their curricula to include a more complete examination of AI technology. Finally, information archives have two options: either they take a proactive approach by considering how they might interact strategically with a future in which AI is dominant, or they take a reactive approach in response to the expected increased integration of AI into their goods and services. Academic information archives provide an excellent opportunity to interact with other key industrial players to enhance AI research at their various academic institutions. For example, they may start communicating with any departments or organizations that have developed an AI hub. They could work with computer science departments to co-sponsor events such as talks and workshops to raise public awareness of AI. This paper discusses the application of AI in academic information archives.

5.2 Recommendations

This paper covers the AI (subset and tools) in the context of information archive applications. The study offers the following recommendations:

1. The study commends further investigations on programming concepts such as computational algorithms, neural networks, and fuzzy logic in the same context.
2. The study recommends the researchers use the study findings as a way of expanding on understanding how AI tools and applications can improve information archiving by information professionals in HEIs of Tanzania.
3. As the study is limited to a specific part of the education sector (HEIs) within Tanzania, then the study recommends further investigations on possible avenues where AI applications and tools can improve services and products for the entire continuum of Tanzania's education sector right from lower level of education to higher one.
4. The study recommends further investigation to cover other regions of Tanzania with different HEIs
5. Ultimately, information professionals can take a reactive approach to the foreshadowed greater integration of AI within their products and services or they can choose to adopt a proactive approach by examining how they can engage strategically with an AI-dominant future.

References

Ahmad, K., JianMing, Z., & Rafi, M. (2019). An analysis of academic librarians competencies and skills for implementation of big data analytics in libraries: a correlational study. *Data Technologies and Applications*, *53*(2), 201-216.

Aradau, C., & Blanke, T. (2015). The (Big) Data-security assemblage: Knowledge and critique. *Big Data & Society*, *2*(2), 2053951715609066.

Arlitsch, K., & Newell, B. (2017). Thriving in the age of accelerations: A brief look at the societal effects of artificial intelligence and the opportunities for libraries. *Journal of Library Administration*, *57*(7), 789-798.

Asemi, A., & Asemi, A. (2018). Artificial Intelligence (AI) application in Library Systems in Iran: A taxonomy study. *Library Philosophy and Practice*, *2*(2).

Berendt, B. (2019). AI for the Common Good?! Pitfalls, challenges, and ethics pen-testing. *Paladyn, Journal of Behavioral Robotics*, *10*(1), 44-65.

Bohle, S. (2018). "Plutchik": artificial intelligence chatbot for searching NCBI databases. *Journal of the Medical Library Association: JMLA*, *106*(4), 501.

Cox, A. M., Pinfield, S., & Rutter, S. (2019). The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. *Library Hi Tech*, *37*(3), 418-435.

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. *International journal of information management*, *57*, 101994.

Edgcomb, J. B., & Zima, B. (2019). Machine learning, natural language processing, and the electronic health record: innovations in mental health services research. *Psychiatric services*, *70*(4), 346-349.

Hilker, E. (1986). Artificial intelligence: a review of current information sources. *Collection building*, *7*(3), 14-30.

Huang, C. Y., Yang, M. C., Huang, C. Y., Chen, Y. J., Wu, M. L., & Chen, K. W. (2018, December). A chatbot-supported smart wireless interactive healthcare system for weight control and health promotion. In *2018 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)* (pp. 1791-1795). IEEE.

Jakhar, D., & Kaur, I. (2020). Artificial intelligence, machine learning, and deep learning: definitions and differences. *Clinical and experimental dermatology*, *45*(1), 131-132.

Koloniari, M., & Fassoulis, K. (2017). Knowledge management perceptions in academic libraries. *The journal of academic librarianship*, *43*(2), 135-142.

Mahanty, R., & Mahanti, P. K. (2020). Unleashing artificial intelligence onto big data: A review. *Cognitive Analytics: Concepts, Methodologies, Tools, and Applications*, 1682-1697.

McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (2006). A proposal for the Dartmouth summer research project on artificial intelligence, August 31, 1955. *AI magazine*, *27*(4), 12-12.

Mckie, I. A. S., & Narayan, B. (2019). Enhancing the academic library experience with chatbots: An exploration of research and implications for practice. *Journal of the Australian Library and Information Association*, *68*(3), 268-277.

Meincke, D. (2018). Experiences Building, Training, and Deploying.

Müller, V. C., & Bostrom, N. (2016). Future progress in artificial intelligence: A survey of expert opinion. *Fundamental issues of artificial intelligence*, 555-572.

Paltoglou, G., & Thelwall, M. (2012). Twitter, myspace, digg: Unsupervised sentiment analysis in social media. *ACM Transactions on Intelligent Systems and Technology (TIST)*, *3*(4), 1-19.

Pang, B., & Lee, L. (2008). Opinion mining and sentiment analysis. *Foundations and Trends® in information retrieval*, *2*(1–2), 1-135.

Phillips, D. (2017). *Robots in the Library: gauging attitudes towards developments in robotics and AI, and the potential implications for library services* (Doctoral dissertation, C).

Popenici, S. A., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and practice in technology enhanced learning*, *12*(1), 22.

Prats, M., Ramos-Garijo, R., Sanz, P. J., & Del Pobil, A. P. (2004, October). Recent progress in the UJI librarian robot. In *2004 IEEE International Conference on Systems, Man, and Cybernetics (IEEE Cat. No. 04CH37583)* (Vol. 6, pp. 5227-5232). IEEE.

Rao, A. (2017). A strategist's guide to artificial intelligence. *Strategy+ business*, *87*, 46-50.

Sarakikya, G. M., & Kitula, P. R. (2024). Application of Artificial Intelligence Platforms and Its Influence on Education of Students in Higher Learning Institutions in Arusha City, Tanzania. *Journal of Research Innovation and Implications in Education*, *8*(4), 445-456.

Shah, D. V., Cappella, J. N., & Neuman, W. R. (2015). Big data, digital media, and computational social science: Possibilities and perils. *The ANNALS of the American Academy of Political and Social Science*, *659*(1), 6-13.

Siau, K. L., & Yang, Y. (2017). Impact of artificial intelligence, robotics, and machine learning on sales and marketing.

Tredinnick, L. (2017). Artificial intelligence and professional roles. *Business Information Review*, *34*(1), 37-41.

Tuarob, S., Bhatia, S., Mitra, P., & Giles, C. L. (2016). AlgorithmSeer: A system for extracting and searching for algorithms in scholarly big data. *IEEE Transactions on Big Data*, *2*(1), 3-17.

Wang, Z. (2017). How do library staff view librarian robotics? Librarian staff ignored humanistic views on the impact and threat of robotics adoption.

Wheatley, A., & Hervieux, S. (2019). Artificial intelligence in academic libraries: An environmental scan. *Information Services & Use*, *39*(4), 347-356.

Wolfram, D. (2016, June). Bibliometrics, information retrieval and natural language processing: natural synergies to support digital library research. In *Proceedings of the joint workshop on bibliometric-enhanced information retrieval and natural language processing for digital libraries (BIRNDL)* (pp. 6-13).

Wood, B. A., & Evans, D. (2018). Librarians' perceptions of artificial intelligence and its potential impact on the profession. *Computers in Libraries*, *38*(1).

Wu, J., Williams, K. M., Chen, H. H., Khabsa, M., Caragea, C., Tuarob, S., ... & Giles, C. L. (2015). Citeseerx: Ai in a digital library search engine. *AI Magazine*, *36*(3), 35-48.

Yao, F., Zhang, C., & Chen, W. (2015). Smart talking robot Xiaotu: participatory library service based on artificial intelligence. *Library Hi Tech*, *33*(2), 245-260.

Ziemke, T. (2016). The body of knowledge: On the role of the living body in grounding embodied cognition. *Biosystems*, *148*, 4-11.