Enhancing Information Literacy Delivery through Artificial Intelligence in University Libraries in Zimbabwe.

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Abstract

In the increasingly digital world, access to information is fundamental for personal development, social engagement and economic growth. In today's information-driven society, access to information has been tremendously improved through artificial intelligence (AI). Information literacy helps equip patrons with modern digital skills enabling them to navigate the information world. The purpose of this study was to investigate the attitudes and experiences of librarians regarding the use of AI in information literacy programs to enhance access to information. Libraries and information centres can harness the use of artificial intelligence to ensure that each patron is literate, thus being able to handle information and data, its use and the creation of information resources and services. This qualitative study examines the potential of artificial intelligence in delivering of information literacy skills in higher education libraries in Zimbabwe. Interviews with selected twenty-five librarians involved in information literacy instruction were conducted. Purposive sampling was used where a select 25 librarians involved in information literacy delivery were invited to participate in the study. The findings from this study show a positive attitude toward the use of AI despite its slow implementation in information literacy training. The findings of the study will be important in contributing knowledge to the broader field of technology and information literacy instruction.

Keywords: Artificial Intelligence, Libraries, Machine Learning, Information Literacy Skills, Digital Literacy

Introduction

The use of Generative Artificial Intelligence has generated some excitement and panic within the higher education sector. Excitement has emanated from the potential of using machines to ease tasks done by humans while panic has emanated from potential job losses and ethical issues over the use of these tools and applications. Information literacy (IL) is a distinct and broader area of competence that initiates, sustains and extends lifelong learning through abilities that may use technologies but are ultimately independent of them (Akidi, 2018). In information literacy skills (ILS) training, artificial intelligence (AI) has been adopted by information professionals to aid in instruction, assessment and lecturer delivery. However, not much has been documented on the rate of adoption and exactly how AI be applied in information literacy skills training. This study examines the need for designing a framework for integrating AI in ILS.

Overview of Artificial Intelligence

There are various definitions of Artificial Intelligence. UNESCO (2022) defined AI as machines that imitate some aspects of human intelligence such as perception, learning, reasoning, problem-solving, language interaction and creative work. Artificial Intelligence (AI) is concerned with extending the capacity of machines to perform functions that would be considered intelligent if performed by people (Papert, 2020). The growth of AI has been attributed to advances in neural networks and transformers (Karpathy, 2015). One of the most powerful AI tools that have emerged is ChatGPT, which belongs to a new class of technologies

commonly referred to as generative artificial intelligence (Carroll and Borycz, 2024). Having been released in 2022, AI, particularly ChatGPT, has attracted many students who have argued that it assists them in completing assignments that were originally designed to require hours of deep thinking in a matter of minutes (Duffy and Wieil, 2023). While the use of ChatGPT and similar applications on assignments can vary greatly, users have found its outputs often fit to the purpose, with researchers finding these tools to be capable of professional licensure exams in business, law and Medicine (Varanasi, 2023). Other Generative AI applications include Claude, CoPilot, Gemini Perplexity AI and Microsoft CoPilot.

University libraries in Zimbabwe

Universities in Zimbabwe are administered by the Ministry of Higher Education, Science and Technology Development. Currently, there are twenty universities registered to offer higher education in Zimbabwe. The bulk of universities are run by the government. Examples of these state-run institutions include the University of Zimbabwe, Bindura University of Science Education, Chinhoyi University of Technology, National University of Science and Technology, Midlands State University, Zimbabwe Open University and others. The few privately run universities are mostly church administered. Examples of privately run universities include the Africa University, Solusi University and Reformed Church in Zimbabwe University. Each of these institutions has a functional library that supports the teaching and learning of its students, faculty and other stakeholders. These libraries are beginning to embrace artificial intelligence in their operations. Libraries have been playing a significant role in preparing students to be digitally literate. Qadir (2023) noted that the skill to identify books in a library is slowly giving way to the use of keywords in search engines and lately generative AI systems. Delivering high-level IL instruction now requires more than traditional classroom instruction (Chatikobo and Pasipamire, 2024).

Library instruction in the AI era

Information Literacy is the "ability to think critically and make balanced judgments about any information we find and use" (CILIP, 2018). Information literacy has been defined by Zimmerman & Ni (2021) as the skill to recognise the need for information, find it and use it efficiently. Bichi & Abdullahi (2024) further noted that it involves the ability to critically assess the credibility, relevance, accuracy of information and the capacity to synthesise and apply information to solve problems, make informed decisions and engage in lifelong learning. The library has traditionally positioned itself as a strategic unit to train and prepare students to be information literate. Its role has been significant in preparing students to thrive during their studies and innovate even well after university (Akakpo, 2023). The emergence of technology has changed the teaching and learning of students with a significant amount of information now available online. Librarians have been shifting from traditional Information Literacy training to equipping students with skills that allow them to access online catalogues and other online learning materials provided by the library. There has been a tremendous shift in training students to be more digitally literate in accessing and using information. As emerging technologies increase such as generative artificial intelligence and machine learning, librarians are changing their information literacy curriculum to match the new trends. Some universities are relegating the issue of the use of AI to libraries as the skill to find, use and generate information is vital (Guo & Huang, 2021). The purpose of this study was to examine how information literacy delivery can be improved through artificial intelligence in Zimbabwe.

UNESCO (2022) defines AI as machines that imitate some aspects of human intelligence such as perception, learning, reasoning, problem-solving, language interaction and creative work. AI is concerned with extending the capacity of machines to perform functions that would be

considered intelligent if performed by people (Papert, 2020). AI is therefore the ability of machines to carry out tasks traditionally done by intelligent human beings, for example, being able to process a significant amount of data faster than humans. Despite the growth of AI, its use of systems such as Generative Artificial Intelligence applications such as ChatGPT is being adopted with caution by librarians. Librarians find themselves conflicted about the potential impact of AI tools on the practice (Miller, 2024). Research into academic librarians' level of engagement with and understanding of AI has shown considerable variation among practitioners (Gardijan, 2023).

Academic librarians serve their students and faculty to help them navigate the research process (James & Hampton-Filgo, 2023). This assistance usually comes through information literacy training. Ensuring that ILS training follows standards is necessary in the profession. For example, the American College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education standard allows for the integration of technology into the information literacy curricula. Because of the Framework's flexible nature, librarians can incorporate new technology, like ChatGPT, more easily into their instruction (James & Hampton-Filgo, 2023).

For effective information literacy delivery, the key abilities and skills required fall on the students and the librarians. Having proper AI literacy and competencies is critical for effective teaching. AI literacy can entail the ability to appropriately use, assess and apply AI tools and applications to life-long processes. It is a prerequisite to harness the power of these emerging technologies for instruction. Competency is the ability to apply knowledge in a beneficial way (Chiu et al., 2024). If one is competent, one can perform a task effectively and successfully (Fallon, 2020). Literature has focused on student-centred skills and librarian-centred skills. On the Librarian's side, researchers such as Lo (2024) have called for the reskilling of librarians to effectively prepare them for information literacy delivery. However, there has been a positive attitude towards integrating AI into the operations of academic libraries broadly and information literacy specifically (Carroll & Borycz, 2024). For an instructor to effectively use AI, some of the skills noted in the literature include programming skills (Stolpe & Hallström, 2024), technological scientific knowledge (Carroll & Borycz, 2024) ethics, impact and collaboration (Chiu et al., 2024).

In a case study of one university library that had adopted AI in literacy training, Chatikobo & Pasipamire (2024) noted that AI is being applied in ways that include chatbots, online reference aids and intelligent library systems. In the information literacy framework, there is a need for further interrogating the applicability of AI in instruction as more students and institutions are using AI-powered tools. Tsekea & Mandoga (2025) noted the need for adherence to ethical standards and awareness of the limitations and challenges posed by AI tools and applications in higher education. AI tools enhance personalised learning experiences by allowing students to access customised resources and obtain immediate feedback on their information-seeking processes (OECD,2021). AI enhances the personalisation of learning experiences by delivering focused feedback, directing search tactics and providing real-time support throughout the research process (Johnson et al., 2015).

Noted challenges in the use of AI especially in developing nations include lack of proper skills, infrastructure, attitude, resistance to change and digital divide. Researching on the use of AI in ILS in Nigeria, Tella (2022) noted that challenges librarians are facing are associated with inadequate access to ICT devices, power challenges, knowledge competency, unwillingness of some departments to collaborate with the library and inadequate funding. Scholars such as

Tshuma and Chigwada (2018) and Anunobi and Ukwoma (2016) noted a serious lack of support for the administration and university management. These challenges seriously hamper the efforts of librarians to properly deliver information literacy. Literature notes various strategies that librarians can use AI for in ILS instruction. Some libraries in developed countries are exploring the use of robots in teaching information literacy (Tella, 2022). However, no significant studies have been done in developing countries to assess the progress and experiences of librarians in using AI in information literacy instruction.

Technology acceptance is about how people accept and adopt some technology to use (Oittinen, 2006). There are various technology acceptance theories and models in literature. Some of the theories include the Theory of Adoption by Rogers (1962), the Technology Acceptance Model (TAM) by Davis (1989) and the Technology Acceptance Model (TAM2), the Theory of Reasoned Action by Fishbein and Ajzen (1975), Theory of Planned Behaviour by Arjzen (1991). These theories and models have their concepts and constructs that each theory is based on and there are also various criticisms levelled against each of these theories for their failure in predicting, explaining and understanding individuals' acceptance and use of new technologies. This study makes use of the Technology Adoption Model (TAM) by Davis as a framework to guide how librarians have adopted the use of AI technological applications. Technology Acceptance Model was developed in 1989 by Davis to explain how people come to accept and use technology. According to the model, the behavioural intention to use technology is influenced by the perceived easiness of use of the technology and its perceived usefulness. Perceived ease of use according to Davies is "the degree to which a person believes that using a particular system would be free of physical and mental health" (Davis, 1989). These objectives guided the research.

1. To find out the attitude level of librarians in using AI in information literacy delivery
2. To find out the skills and competencies required for using AI in information literacy delivery
3. To find out the challenges and barriers faced by librarians in the effective integration of AI into the ILS curriculum

Materials and Methods

This research follows a qualitative approach to explore librarian's perceptions, attitudes and experiences of using AI in university libraries. The advantage of the qualitative approach is that it helped in the exploration of in-depth activities and processes on the adoption of AI in information literacy instruction. A phenomenological approach was taken. Phenomenology is the study of the human experience and the way something is presented by an individual as seen through the human experience (Sokolowski, 2000). This approach enabled the researchers to hear the participants describe the meanings and experiences of several individual (Creswell, 2007). In this case, participants were able to fully explain their experiences with artificial intelligence in information literacy delivery within universities in Zimbabwe.

The population for this study was university librarians in Zimbabwe. The main informants were librarians involved in information literacy delivery. In the Zimbabwean context, information literacy training is normally delivered by Faculty Librarians or Subject librarians who are usually at the Assistant Librarian level, with other librarians also having Sub-Librarians and Senior Librarians playing a supportive role in the process. From these groups of librarians, we managed to purposively sample twenty-five librarians to hear their perspectives regarding the use of this growing phenomenon in information literacy delivery. As noted by Hervieux and Wheatley (2024) it is important to hear from the practising librarians as one will get first-hand information from them as they would have either engaged with AI or were considering it so

that we can learn more about the opportunities, challenges and concerns around AI and ILS instruction. The sample size was determined during the data collection process as per the dictates of qualitative studies (Malhotra et al., 2017). In qualitative studies, a sample size is determined by the saturation point (Bryman, 2016). In this study, the saturation point was reached after interviewing 25 participants. We reached the saturation point when the patterns started to repeat themselves and no new themes could be found. A purposive sampling approach was taken by the researchers as it enabled them to select those participants who possessed rich information and experience related to their direct experience with the phenomenon under study (Creswell, 2007).

We used semi-structured interviews to collect data. Interviews are a great way to collect rich qualitative data when researching lived experiences because they provide participants with a chance to elaborately express their feelings, opinions, as well as perceptions of their experiences (Mann & Mann, 2016). The interviews allowed the researcher to probe for further details about librarians' attitudes and experiences on the use of artificial intelligence in information literacy skills training. They also enabled the researchers to collect detailed information of interest to an inquiry (Bryman, 2016). Researchers such as Hervieux and Wheatley (2024) conducted research in the United States and Canada using 15 semi-structured interviews with librarians. The interviews were conducted in person. The structured interview guide that the researcher used allowed them to pre-plan the questions to be asked to the participants about the problem under investigation (Borg & Gall, 1996). Furthermore, this allowed the researchers to collect data that had a deeper meaning of the experiences of librarians unlike if other instruments like questionnaires could have been used.

We designed an interview guide that had ten questions. We covered questions that matched our three objectives that were under the thematic areas of attitude, areas of use and challenges. Some of the questions are highlighted in Table 1. Some follow-up questions arose from the originally crafted questions. Pilot testing was done with selected librarians at one of the libraries that the researchers were stationed at. The pilot-testing phase allowed the researchers to identify any errors and ensure the interview guide's trustworthiness and credibility.

Table 1: The Interview Schedule

Element	**Question**
Introductions	Welcoming, self-introduction and overview of the topic and informed consent
Bio Data Awareness	Gender, Age Range Are you aware of artificial intelligence. If YES, what are some of the applications and tools you think university libraries can use in information literacy delivery?
Attitude to AI	Do you recognise AI as part of technologies to assist in your work? Does your colleague or you use AI in ILS training Are you using any AI tools in information literacy delivery?
Competencies	Do you have any skills and competencies to use AI in ILS instruction? AI in ILS instruction? How should AI be used in ILS delivery

	Does your library have a policy or guidelines for use of AI in library instruction?
Challenges	What challenges do you face in use of AI in ILS instruction?
Closure	Are there any other comments you would like to make regarding your use of AI in ILS?

According to Creswell (2013), ethical principles must be followed in conducting research to ensure that participants' confidentiality, anonymity and consent are followed. The researchers followed this by ensuring that all the participants were informed of the study purpose and getting their consent. We asked the participants to issue verbal informed consent.

The researchers employed thematic analysis to determine patterns, themes and links among the data following the steps of familiarising with the data, creating initial codes, looking for themes, evaluating themes, defining and labelling themes and producing the final report (Braun & Clarke, 2022). Data from the recordings were transcribed verbatim and on written notes. We gave each participant a pseudonym number that consisted of alphanumeric symbols with letters and numbers from P1 to P25, P representing Participant. The data generated produced themes, and these were presented thematically. Data coding helps to understand large amounts of data by eliciting some patterns (Saunders et al., 2020).

Results

Sample characteristics

The study sample comprised mainly female librarians (60%) and male librarians (40%). Most of the age group that responded to this research was mainly in the middle age group, a reflection of the current demographics of the librarianship profession where most librarians are middle-aged. Participants for this study were mainly in the age group of 20-40 (70%) followed by those in the 41-50 (20%) and above 50 (10%).

We established three thematic themes that came from the participants. These were readiness to accept AI, state of ILS training in university libraries and challenges and attributes of AI uptake.

Attitude of librarians

Participants were asked if they knew Artificial Intelligence and all of them noted that they were aware of the phenomenon. However, there was an indication of low skills knowledge of how AI can be applied in information literacy skills training. One participant had this to say,

> *I have heard of AI yes. We are currently using it for communicating with students on our live chat facility. On that platform, we can assist in the training of our students on how they can access our e-resources. But using AI in the classroom, ah we are still to do that* (Participant P2).

We also asked participants what they think about the role of AI in library processes particularly in AI instruction. Here are some of the responses from the participants:

> *I believe AI can aid us in assessments. We can use AI applications to study the behaviour and performance of our students. If I give them assignments, I can be able to observe the performance of each by properly monitoring how they performed (*Participant P3).
>
> *In doing my lesson plans, I can use AI to properly design them. This makes my life easy as I will be able to concentrate on other issues. So, I believe as libraries we should adopt and use AI* (Participant P6)
>
> *Ah, at this University we have not started using AI. Perhaps it's because of a few technologies I don't know, or perhaps it's because our bosses are afraid that we may lose jobs due to this AI.* (Participant P11).

These evidential statements demonstrate the attitude of the interviewed participants which showed a positive development. While the librarians noted the slow adoption of AI, some were able to express their willingness to use AI in assisting them with library instruction. Some noted that they viewed AI as a useful tool in library processes and were willing to adopt it.

State of AI in ILS instruction

The researchers asked participants to express their views regarding their current experiences and practices of AI. It was noted that some university had begun the integration of AI in ILS instruction. Some had started to review their ILS curriculum to incorporate more modern areas that students can be assisted on. Three librarians noted that they were using AI to prepare their lesson plans, and such plans will assist in preparing students to be critical thinkers and problem solvers.

Librarians noted that they had started adoption of social media applications in AI delivery. For example, five participants noted that they are using WhatsApp Video Conferencing to deliver their classes. Some noted the use of Learning Management Systems such as Moodle and MyVista as platforms which they can interact with students. Participants also noted that they had already started using some AI connected applications such as anti-plagiarism software like Turnitin, reference management software like Zotero, Mendeley and e-resources authentication software like RemoteXs. The major processes that libraries were using AI for was for communication where chatbots such as Tawk.to and other reference virtual assistance are being used. One these platforms, librarians noted that they can assist users who have different queries. There were also some participants who showed they were using AI applications to generate lesson plans, helping in saving the instructors' time as noted by the responses of the participants below:

> *Yes, AI assist in lesson planning. At the beginning of our semesters, we do our lesson plans. We offer Information Literacy as part of the Information Technology course that is done by all first-year students. So, AI assist me in planning my lessons and I tailor make it to large classes or small classes.* (Participant P10)
>
> *We offer ILS as part of the Communication Skills Course in the University and it's a university wide course. We are supposed to plan our lessons and offer the training within the stipulated time frames. So, I use AI in lesson planning to assist me in coming up with lesson plans that will make students want to attend and listen more* (Participant P11).

Challenges in AI use

Participants noted use of AI in ILS is still in its infancy in Zimbabwe and there are various challenges which they are facing. These challenges ranged from institutional, personal and attitude and status of student stakeholders. Findings show that in implementing ILS, librarians are faced with institutional infrastructure challenges. AI requires a great investment in technology and skills training. This is a challenge that most universities in Zimbabwe are seriously facing. Participants had this to say:

> *Our university has no proper ICT laboratories where training on information literacy can be done. The laboratories have very few computers available (Participant 7). We also do not even have proper laptops which we can use to store our data and to do our trainings* (Participant P19).
>
> *Ah, I believe one of the serious challenges that we face is erratic Internet network. Sometimes the network is down, and it becomes difficult to be online to assist your students* (Participant P16).

Some participants lamented the challenge of skills and competencies that trainers have. Librarians have not been capacitated enough to be able to deliver ILS using AI. Such lack of training may give a negative attitude towards adoption of a technology as users will regard it as not easy to use as proposed by Davies. This is shown by what the following participants said:

> *Eh look, I cannot use robots to assist me in ILS despite their ability. We don't even have the robots. It's still a dream for us. We don't even have the skills to do data analytics. So how do we then use AI to do analysis?* (Participant P20).
> *We haven't been trained in AI and therefore I think I am not yet there. The University needs to send us for training* (Participant P1).

Participants also noted the lack of policies to guide the use of AI in their universities. The participants expressed that they were unaware of any policies or guidelines of how to use AI. The lack of guidelines has some effects of implementing ILS without following the proper ethical standards. These policies will help in empowering how librarians, educators and other researchers will know how they will handle the use of writing applications such as ChatGPT or use of literature review applications like Connected Papers. It is therefore necessary to use AI with proper guidelines and policies to prevent misuse while ensuring equal access and the provision of training to the university community.

Discussion

Findings have demonstrated the slow adoption of AI in ILS integration. For any technology to be effectively adopted, Davis (1989) proposed a need for it to be easy to use and being perceived to be useful. The findings of this study showed a positive attitude towards AI and willingness to use it despite the challenges noted. It was also highlighted that despite the skills shortages which librarians noted, which may change their attitude towards the adoption of AI due to its complexities, some believed that it is a useful invention and will assist greatly in library processes and activities. Study participants expressed that they see AI assisting helping them as robots to represent human beings and assist in information delivery, especially through the live chat facilities that some libraries are introducing in Zimbabwe. The major applications that were being used, Talk.2 and Virtual reference services platforms have the capacity to train users online and equip them with the necessary digital and information literacy skills that can make them independent learners who can effectively search for information, retrieve it and use it ethically and legally. Participants expressed a dire shortage of the request infrastructure to implement training using AI. There was also a lack of awareness among librarians on any policies and guidelines on how to use AI. The lack of awareness was also noted by Chatikono and Pasipamire (2024), who observed that the general lack of awareness among IL educators regarding the exact software criteria for AI integration shows the lack of readiness in skills and competencies to fully adopt this phenomenon. There is a need for both the library management and university executives to work together in seriously planning for the adoption of AI.

The issue of infrastructure cannot be overemphasised as a serious challenge affecting many university libraries. The same observations were noted by Chigwada (2024). Similarly, Choice (2023) also noted that lack of computational knowledge regarding AI and lack of funds to support the ILS programme are some of the challenges faced by librarians in implementing AI in ILS. Universities must consider their readiness to implement AI in IL instruction before adoption. Yin et al. (2024) cautioned that organisations aiming to incorporate AI into their services must carefully evaluate their readiness before launching such projects. Walkme (2024) noted that conducting a thorough change readiness assessment can yield valuable insights to enhance the performance and outcome of change initiatives.

Conclusion

Despite the slow adoption of AI to assist in ILS, there is a need for university librarians to integrate AI into their ILS training because AI appears to be with us for good. Despite lacking the necessary skills and competencies to deliver ILS using AI, librarians are quickly developing an interest in it and are exploring how to best include it in their instructional practices. AI can show ways for trainers and educators how to apply effective teaching that allows learners to gain relevant skills such as problem-solving or critical thinking. By integrating AI tools into information literacy classrooms, educators and trainers can provide personalised learning experiences and reinforce the importance of critically evaluating sources, ultimately providing students with information literacy and analytical skills (Wetzel & Kani, 2024).

There is a need to equip librarians with skills for AI. An AI literacy course should be diverse and contain the latest curricula. Librarians will also need to be able to deliver such training using AI. For example, at McGill University, two librarians who had no extensive knowledge of AI enrolled for online training to equip themselves with some elements of AI training (Wheatley & Hervieux, 2022). Such skills are important in equipping librarians to be able to effectively conduct information literacy training that will assist in empowering students with digital skills necessary for searching, finding and using information ethically.

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