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AI-Driven Information Literacy Instruction in Nigerian Universities

by

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Abstract

In the evolving digital era, information literacy remains vital within academic settings. Integrating Artificial Intelligence (AI) into university library programs presents a promising opportunity to enhance efficiency and accuracy in academic activities. This study examines the transformative impact of AI on traditional information literacy approaches, particularly within the context of Nigerian universities as they adapt to the changing educational landscape. By incorporating AI into these programs, universities can improve research skills and better prepare students for the demands of the digital world. This study adopts a desk research methodology, utilizing theoretical and secondary data sources through a comprehensive review of relevant studies, reports, and academic articles on integrating AI into information literacy within Nigerian universities. By synthesizing existing knowledge, the research identifies key trends and explores the implications of AI integration in academic settings. The primary focus is to familiarize students with AI's operational mechanisms and its diverse advantages, while also addressing challenges such as potential limitations to students' practical skills. In conclusion, the paper emphasizes AI's transformative potential and its role in advancing information literacy in the digital age. It further recommends acquiring the necessary technological skills to support effective use of AI in research and other academic pursuits.

Keywords: Artificial Intelligence (AI), Information Literacy (LI), Nigerian Universities, University Libraries

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Introduction

Educating students on the effective utilization of library resources and honing their general information search skills have been part of the major duties of academic librarians. Initially termed library user education, this instructional domain has evolved into what is now termed as library instruction and, in contemporary academia, referred as, information literacy (IL) instruction. The transformation of the instructional practices has been catalyzed by the exponential growth in both the volume and diversity of available information resources and sources. This evolution reflects a recognition of the shifting landscape of information access and dissemination, necessitating a corresponding adaptation in the skills and strategies imparted to students in the name of IL.

University libraries in Nigeria are saddled with the responsibility of inculcating information-search skills. Anunobi and Ukwoma (2018) mentioned that the regulatory body overseeing universities in Nigeria has underscored the importance of equipping students with a structured study plan that enables them to effectively locate, access, evaluate, and utilize information resources in a manner that complies with legal standards. However, they lamented the inadequacies of the skills being taught by most of the Nigerian university libraries. Akakpo (2023) has also observed that there are limitations in the current IL programme being taught in the African universities which focused on bibliographic management. He therefore called for its improvement to include digital literacy in the context of generative AI.

The current development in information growth and its complexity makes it imperative for university libraries to adjust their training on information search with whatever name it is called. The emergence of information literacy (IL) represents a holistic approach to addressing the dynamic challenges presented by the evolving information landscape. As elucidated by Agbo and Igwebuike (2014), the primary goal of cultivating information literacy is to equip students with the necessary tools to navigate this intricate terrain with heightened effectiveness, efficiency, and autonomy. Information literacy goes beyond mere information retrieval; it empowers students with the critical thinking abilities required to assess, integrate, and ethically employ the diverse array of resources at their disposal.

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In addition, we are witnessing the emergence of yet another important technology that has profound implications for information creation and retrieval: generative artificial intelligence (AI). It presents a new layer of complexity to the landscape of information access and utilization, thereby presenting a challenge to IL instruction. Artificial Intelligence has made significant inroads into Nigerian universities, transforming various aspects of teaching, research, and administrative processes (Bali, 2024). Obi, Ole, and Uzoigwe (n:d), have also observed the rapid growth of AI that was witnessed over the past few years in Nigeria, and lamented its unregulated use. They finally suggested taking urgent action to guide its usage in Nigerian academia. Generally, the growing and ever-increasing advancements in technology are affecting IL (Tella, 2022). Unfortunately, Pham and Udoh (2021) noted that existing curricula in Nigerian tertiary institutions do not offer coursework that reflects these new advances in technologies.

This suggests the need to integrate generative AI in the course content of information literacy (IL) of Nigerian universities. This will enable students to understand how AI algorithms operate, their potential biases, and their limitations. It will also enable students to cultivate critical thinking skills to assess the reliability, credibility, and relevance of AI-curated content. Therefore, this paper discusses the concepts of information literacy, and artificial intelligence, and their importance, and suggests the important components of AI that need to be integrated into the teaching of IL in Nigerian universities.

This study employs a desk research methodology, leveraging theoretical and secondary data sources. The research involved a literature review and analysis of relevant studies, reports, and academic articles on the integration of AI in information literacy in Nigerian universities. The methodology focused on synthesizing existing knowledge, identifying key trends, and exploring the implications of AI integration in academic settings.

Information Literacy (IL)

Information Literacy is a multifaceted concept that encompasses a wide range of skills, competencies, and dispositions. The concept is widely discussed by scholars and academic bodies. Information literacy are set of skills, competencies, and attitudes that enable individuals to effectively identify, locate, evaluate, and ethically use information from various sources.

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Information Literacy is defined by CILIP (2018: 3) as "the ability to think critically and make balanced judgments about any information we find and use." ACRL Framework for Information Literacy for Higher Education (2015), mentioned that IL, comprises a collection of interconnected skills that involve thoughtful exploration to uncover information, comprehension of the processes involved in information creation and assessment, and the ethical utilization of information to generate new insights and engage responsibly within learning communities.

Information literacy involves the ability to critically assess the credibility, relevance, and accuracy of information, as well as the capacity to synthesize and apply information to solve problems, make informed decisions, and engage in lifelong learning. Information literacy encompasses proficiency in accessing and utilizing information in different formats, including print, digital, and multimedia, while also recognizing the ethical and legal implications of information use. Overall, information literacy empowers individuals to navigate the complexities of the information-rich society and participate actively and responsibly in academic, professional, and personal contexts.

Importance of Information Literacy

As technological advancements continue to shape the information landscape, information literacy is becoming very important if not necessary. Stressing the need for IL, UNT University Libraries argued that due to the proliferation of information resources and the rapid pace of technological change, individuals are confronted with a plethora of information choices across various domains, including academia, professional settings, and personal endeavors. Accessible through libraries, online platforms, community resources, and the Internet, information arrives in diverse and unfiltered formats, prompting questions regarding its authenticity, validity, and reliability.

Proficiency in information literacy is crucial for thriving in the personal, professional, and academic realms. In college, these abilities are indispensable for excelling in research papers, projects, and presentations. In the workplace, there will inevitably be instances where you need to acquire new information to make informed choices. At home, you're consistently challenged with consumer decisions and shaping perspectives on social and political matters. Each scenario

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demands active participation in the process of information literacy (Tachie-Donkor & Ezema, 2023).

Information literacy has five core components; identify, find, evaluate, apply, and acknowledge sources of information (Seminole State Library; Information literacy is a lifelong learning process, something beginning before you arrive at college and developing as you grow. Anunobi and Udem (2014), further elucidate these five core components of IL as follows:

1. Identifying Information Needs: Information literacy begins with recognizing the need for information to address a particular question, problem, or task. This involves defining the scope of inquiry, determining relevant keywords and concepts, and understanding the context in which the information will be used.
2. Locating and Accessing Information: Once the information needs are identified, individuals must know how to effectively search for and retrieve information from various sources. This includes utilizing library catalogs, databases, search engines, and other information retrieval tools to access relevant resources.
3. Evaluating Information Sources: In an age of abundant information, it's crucial to critically evaluate the credibility, reliability, and relevance of the sources. Information literacy involves assessing factors such as authority, accuracy, objectivity, currency, and bias to determine the quality of information.
4. Synthesizing and Integrating Information: Information literacy goes beyond simply finding and evaluating information; it also involves synthesizing and integrating diverse sources of information to create new knowledge or insights. This may involve analyzing, organizing, and synthesizing information from multiple sources to develop a coherent understanding of a topic or issue.
5. Ethical Use of Information: Information literacy emphasizes the ethical and responsible use of information. This includes understanding and adhering to copyright laws, intellectual property rights, and ethical guidelines for citation and attribution. Individuals must also recognize and avoid plagiarism and uphold principles of academic integrity.

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Critical Thinking and Problem-Solving: At its core, information literacy cultivates critical thinking skills that enable individuals to evaluate information critically, identify biases and assumptions, detect logical fallacies, and draw well-reasoned conclusions. These critical thinking skills are essential for making informed decisions, solving problems, and engaging in reasoned discourse.

Lifelong Learning: Finally, information literacy is a lifelong learning process that extends beyond formal education. In a rapidly changing information landscape, individuals must continuously adapt and update their information literacy skills to stay informed, engaged, and effective in their personal and professional lives.

Overall, information literacy is a multidimensional skill set that empowers individuals to navigate the complexities of the information age, make informed decisions, and participate actively in society. It's not just about accessing information; it's about critically engaging with it, ethically using it, and leveraging it to achieve personal, academic, and professional goals.

Artificial Intelligence (AI)

The definition of AI remains a topic of ongoing debate within the scientific community, lacking a universally accepted delineation. Broadly speaking, AI can be conceptualized as a domain within computer science that aims to emulate or simulate human intelligence in machines (Yudkowsky, 2022). This pursuit enables machines to execute tasks traditionally associated with human cognitive abilities, with the potential to perform them as efficiently as, or even surpassing, human capabilities. The American Association of School Administrators AASA, (2023) also sees AI, as a branch of computer science aimed at creating machines that mimic human intelligence. It's used to perform tasks that usually require human thought, like understanding language, recognizing patterns, or making decisions. AASA (2023) added that types of AI range from systems doing specific tasks, like recommending movies or autocorrecting typing errors to more advanced forms that can generate new content or predict future outcomes.

Artificial Intelligence powers innovations such as self-driving vehicles and digital assistants like Siri or Alexa. Fundamentally, AI enables machines to acquire knowledge, adjust to changing conditions, and execute tasks resembling human capabilities, frequently with heightened

speed and accuracy. The AI technology is grouped into classes either based on their capabilities or functionalities, For example, predictive AI, which makes inferences by identifying patterns and contrasts, with generative AI, which creates new content—in effect, new data—by patterning itself after existing data the system has indexed. (Purestorage) AASA has further categorized AI into three based on their functionalities:

i. Reactive, tools that respond to specific inputs or situations without learning from past experiences (e.g. Alexa, Roomba, chess-playing computer).
ii. Predictive, tools that analyze historical data and experiences to predict future events or behaviors (e.g. Netflix, credit-scoring systems).
iii. Generative, tools that generate new content or outputs, often creating something novel from learned patterns (e.g. ChatGPT, Stable Diffusion).

Generative AI, specifically, is a subset of artificial intelligence focused on creating new content, often in the form of images, text, audio, or other multimedia, that is original and realistic. Unlike traditional AI systems that are designed for specific tasks like classification or prediction, generative AI models are trained to generate new data samples from existing datasets, often by learning the underlying patterns and structures present in the data. Generative AI has applications across various domains, including art, entertainment, design, medicine, and more. It enables the creation of new content, the synthesis of realistic data for training purposes, and the exploration of creative possibilities in human-computer interaction. However, it also raises ethical and societal considerations, such as the potential for misuse in generating fake content or the implications of AI-generated content on copyright and intellectual property laws.

Generative AI is a fascinating field within artificial intelligence that focuses on the creation of new content or data that is not directly copied from existing examples but rather generated from learned patterns and structures present in the data. One of the most exciting applications of generative AI is in creative content generation. This includes generating images, artwork, music, poetry, and even entire stories or narratives. For example, generative AI models can create realistic-looking images of nonexistent objects or landscapes, compose music in various styles, or write poems in the style of famous poets.

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Artificial Intelligence holds immense potential for driving innovation and creativity across various domains. It plays a crucial role in academia across multiple disciplines, contributing to research, education, and innovation in various ways. Some of these contributions by Su and Yang (2023) and Abunaseer (2023) were summarized as:

i. Artificial Intelligence can analyze vast datasets to identify skills gaps in employees efficiently, allowing for tailored learning experiences. This ensures that training efforts are targeted and effective, saving time and resources.
ii. Artificial Intelligence can automatically scan various sources to suggest the most relevant content for learners, streamlining the learning process and saving time.
iii. It can assist in creating educational content by sourcing and consolidating information from diverse sources, including converting audiovisual content into text format through natural language processing.
iv. It also assists in personalizing learning experiences based on individual learner characteristics such as pace, age, gender, and learning style. This optimization leads to improved retention, recall, and overall learning outcomes.

Other advantages are, enabling tailored instruction and recommendations for students, fostering trust, and enhancing the teacher-student relationship. This personalized approach addresses individual learning needs, such as providing detailed explanations for math problems. Efficient Question Answering, streamlines the process of answering students' questions, freeing up teachers' time for other tasks. It provides accurate responses on various educational topics, like game-based learning, thereby facilitating efficient knowledge dissemination. It also enhances teaching methods, assessments, and educational ecosystems by promoting interaction between teachers, students, and technology. Virtual tutors and personalized recommendations create an immersive and enjoyable learning experience for students.

Artificial Intelligence assists in coordinating virtual and physical interactions within educational systems, fostering innovation, and forming a new educational ecosystem. It is increasingly being applied in scientific research to model complex systems, simulate phenomena, and generate hypotheses. In fields such as physics, chemistry, biology, and environmental science,

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generative models help researchers simulate and analyze data, leading to new insights and discoveries. For example, generative models can simulate protein folding, predict molecules' structure, or simulate ecological systems' behavior.

Generally, AI has become an integral part of academic research and education, driving innovation, interdisciplinary collaboration, and societal impact across a wide range of domains. As generative modeling techniques evolve, academia will continue to play a central role in advancing the state-of-the-art and leveraging generative AI for the greater good.

Integrating Artificial Intelligence in the Teaching of Information Literacy

The integration of Artificial Intelligence (AI) into education has the potential to significantly enhance learning, offering personalized educational support and automating many administrative tasks. In Nigeria, AI adoption is steadily growing, with more students and institutions using AI-powered tools in their academic activities. As Alimi, Buraimoh, and Aladesusi (2021) noted, this growing use of AI in Nigeria's educational sector reflects a broader global trend towards integrating technology into learning.

However, while AI provides numerous benefits, its role in information retrieval introduces new challenges for information literacy (IL) instruction. Artificial Intelligence systems, like search engines and content curation algorithms, often prioritize information based on specific algorithms, which can sometimes perpetuate biases or present incomplete perspectives (Jones, 2021). As a result, educators must carefully evaluate the ethical implications of AI and ensure that students are equipped to navigate these technologies critically.

Incorporating AI into education also requires adherence to ethical standards and an awareness of the limitations and challenges posed by AI tools. Educators, parents, and policymakers need to work together to ensure that AI is used responsibly and equitably in educational settings (Abunaseer, 2023). This collaboration is essential to address issues such as data privacy, fairness, and the risk of reinforcing societal biases through AI systems.

Developing Critical Thinking Skills in an AI-Driven World

One of the key objectives of information literacy is to develop students' critical thinking skills. As AI systems play a larger role in curating and presenting information, students must be

taught to critically evaluate the reliability, credibility, and relevance of AI-generated content. Without these skills, students risk accepting AI-presented information without questioning its validity or considering potential biases.

Artificial Intelligence systems often prioritize certain types of information based on algorithms that reflect specific assumptions. Therefore, IL programs need to emphasize the importance of critical thinking when using AI-powered tools, helping students understand how these systems work and how they might influence the information being presented.

Integrating Generative AI Skills into Information Literacy Curriculum

To fully prepare students for the AI-driven future, information literacy instruction should also incorporate lessons on generative AI. As proposed by the American Association of School Administrators (AASA) and the University of Maryland, a comprehensive AI curriculum should include an introduction to AI concepts like machine learning, deep learning, and neural networks. These foundational topics will help students understand how AI operates and its potential applications across various fields.

In addition, ethical considerations must be a central component of the curriculum. Students should explore real-world case studies that highlight the ethical dilemmas surrounding AI technologies, fostering the development of ethical reasoning skills. This aspect of education is critical to ensuring that students not only understand AI's potential but also its limitations and the risks associated with its use.

Addressing the Risks and Limitations of AI

While AI offers significant benefits, it also presents challenges that must be addressed within the IL curriculum. Students need to be aware of the potential risks, such as algorithmic bias, data privacy breaches, and cybersecurity threats. By understanding these risks, students can make informed decisions about how to use AI tools in a responsible and secure manner.

Additionally, AI systems are not without limitations. Issues such as interpretability, accountability, and reliability can impact the accuracy and fairness of AI-generated information. Therefore, IL

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instruction should emphasize these limitations, encouraging students to critically assess AI tools rather than relying on them uncritically.

Hands-On Learning and Practical Applications of AI

To reinforce theoretical knowledge, IL programs should include hands-on exercises that allow students to experiment with AI tools and technologies. These exercises can help students develop practical skills in applying AI to real-world scenarios, from healthcare and finance to education and entertainment. By engaging with AI tools directly, students will not only learn about the technology but also gain the confidence to apply it creatively in their academic and professional lives.

Moreover, students should be guided through the process of integrating AI into research projects. This could involve everything from data collection and preprocessing to model selection and evaluation. By providing practical examples and case studies, educators can help students understand how AI can enhance research while also highlighting the ethical and methodological considerations that accompany its use.

Ethical Citation Practices for AI-Related Sources

Another essential aspect of integrating AI into IL instruction is teaching students proper citation practices for AI-related sources. As AI-generated content and data-driven research become more common, students must learn to attribute sources accurately, whether they are citing academic papers, datasets, or software libraries. This not only promotes academic integrity but also helps students navigate the complex web of information that AI systems present.

Recommendations

1. **Integrate AI Concepts into Information Literacy (IL) Curricula**
   Nigerian universities should incorporate foundational AI topics, such as machine learning, natural language processing, and neural networks, into IL programs. This will give students the skills to understand how AI functions and how it impacts information retrieval processes, preparing them for AI-driven academic environments.
2. **Focus on Ethical AI Education**

Information literacy courses should include lessons on the ethical dimensions of AI. Emphasizing issues such as bias, data privacy, fairness, and transparency in AI tools will help students critically evaluate the content generated by AI systems. Real-world case studies highlighting these challenges should be used to build critical thinking and ethical reasoning skills.

3. **Provide Hands-on AI Training**

   In addition to theoretical knowledge, universities should provide practical, hands-on exercises that allow students to experiment with AI tools. This could involve tasks like information retrieval using AI-driven platforms, natural language processing tools for content generation, and AI-based citation management tools, giving students an applied understanding of how AI can be used in academic and professional research.

4. **Promote Critical Thinking Skills in AI Usage**

   Critical thinking should be at the core of IL programs. As AI becomes a key player in information curation, students must learn to evaluate the reliability and credibility of AI-generated content. IL programs should foster skills that help students identify bias, distinguish between credible and unreliable sources, and challenge AI-curated information.

5. **Ensure Continuous Professional Development for Educators**

   Educators themselves need ongoing training to stay updated on the evolving AI landscape. Universities should invest in regular workshops and professional development initiatives to equip librarians and educators with the skills to teach AI literacy effectively, ensuring that they can guide students in responsible AI use.

6. **Foster Cross-Disciplinary Collaboration**

   To maximize the benefits of AI integration, universities should encourage collaboration between departments, particularly between information sciences, computer science, and education. This can foster a holistic approach to teaching AI, blending technical knowledge with information literacy skills.

7. **Address Infrastructure and Access Challenges**

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Given the infrastructural challenges in many Nigerian universities, institutions should prioritize investing in technological infrastructure that supports AI integration. This includes reliable internet access, AI-powered tools, and software, as well as technical support for both students and faculty to ensure successful AI integration into IL programs.

Conclusion

The integration of Artificial Intelligence into Information Literacy (IL) programs offers a promising pathway to enhancing the learning experience for students in Nigerian universities. Artificial Intelligence has the potential to transform how students access, process, and evaluate information, making research more efficient and personalized. However, this shift also brings with it a range of challenges, including the need for ethical considerations, critical thinking, and addressing infrastructural limitations.

As AI tools become increasingly involved in curating information, students must develop the ability to assess the reliability and credibility of AI-generated content. This necessitates an IL curriculum that not only introduces students to the technical aspects of AI but also instills a deep understanding of the ethical issues surrounding its use, such as bias and data privacy.

Furthermore, the success of AI integration in IL programs depends on equipping both educators and students with the necessary knowledge and practical skills. By providing hands-on training and fostering critical thinking, Nigerian universities can help students navigate the complexities of an AI-driven world while maintaining academic integrity and independent judgment.

Artificial Intelligence holds immense potential to enhance Information Literacy instruction, its implementation must be carefully balanced with ethical awareness and a commitment to developing students' analytical and evaluative skills. When done thoughtfully, AI can empower students to become more effective and responsible researchers, prepared to tackle the challenges and opportunities of the digital age.

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