



Existing and Future Challenges Faced by Nigerian University Teachers in Artificial Intelligence Era

Vincent Chidindu Asogwa
Department of Agricultural Education and Extension,
University of Eswatini, Eswatini.

ABSTRACT

Despite the transformative potential and widespread adoption of AI in education globally, there is lack of empirical evidence on what could be the specific existing and future challenges faced by Nigerian university teachers in integrating AI into their work. To bridge this knowledge gap, this study was guided by the transformative learning paradigm, which posits that learning involves a fundamental shift in an individual's worldview and perspectives. A qualitative phenomenological research design was employed, utilizing in-depth, semi-structured interviews with 25 Nigerian university teachers from both public and private institutions, selected through purposive sampling. Trustworthiness and data saturation were achieved through the interview process, ensuring the collection of rich and comprehensive data. Thematic analysis was used to analyze the interview data, revealing significant challenges faced by Nigerian university teachers in adopting and using AI. These include a lack of awareness and understanding of AI, inadequate training and support, infrastructure and resource constraints, concerns about job displacement and bias, and limited access to AI-related resources. The study also identified anticipated future challenges such as the need for continuous professional development, an increase in AI-related workload, concerns about AI replacing human teachers, and difficulties in integrating AI with traditional teaching methods. The study recommends prioritizing comprehensive teacher training programs, establishing clear policies and guidelines for AI integration, investing in infrastructure and resources, and fostering collaboration between university teachers, AI experts, and educational technology specialists. Addressing these challenges is crucial for empowering Nigerian university teachers to harness the transformative potential of AI in education.

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INTRODUCTION

The advent of Artificial Intelligence (AI) has transformed various sectors, including education, on a global scale. Nigerian universities, like their counterparts around the world, are grappling with the integration of AI in teaching and learning (Oluwatobi, 2020). This development presents both opportunities and challenges for university teachers, who are essential to the successful implementation of AI in education

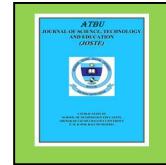
(Afolabi, 2023). AI has the potential to enhance teaching methods, improve student outcomes, and increase efficiency in higher education (Bates et al., 2020). For example, AI-powered chatbots and virtual assistants can provide personalised learning support to students 24/7 (Kaswan, 2024). Intelligent tutoring systems can adapt lesson plans and content to the individual needs of each student (Bradáč et al., 2022). AI can also automate grading and administrative tasks,

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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freeing up instructors to focus more on teaching and mentorship (Shah, 2023).

However, the adoption of AI in education also raises significant concerns. There are valid fears about job displacement, as AI-powered tools could eventually automate certain teaching tasks (Alwaqani, 2024). There are also ethical considerations around bias, privacy, and algorithmic decision-making in educational settings (Fernández Fernández, 2022). Additionally, the high costs associated with implementing and maintaining AI infrastructure can be a barrier, particularly in resource-constrained Nigerian universities (Okai-Ugbaje et al., 2022).

In this context, Nigerian university teachers face distinct challenges. Inadequate training, infrastructure, and resources are significant barriers to the effective integration of AI in teaching and learning (Okai-Ugbaje et al., 2022; Wang & Cheng, 2021). Many instructors lack the technical skills and pedagogical knowledge required to leverage AI tools and strategies effectively (Afolabi, 2023). This skills gap can lead to suboptimal implementation and a hesitancy to adopt AI-powered technologies in the classroom. Studies have shown that teachers' attitudes and beliefs about AI significantly influence its adoption and effective integration in education (Chio et al., 2023). Instructors who view AI as a threat to their profession or who are sceptical about its educational value are less likely to embrace it wholeheartedly (Sharawy, 2023). Conversely, teachers who perceive AI as a valuable tool for enhancing their teaching and improving student outcomes are more likely to champion its integration (Ghamrawi et al., 2024).

Moreover, research emphasises the need for comprehensive teacher training and capacity building in AI-related pedagogy (Altinay et al., 2024). Instructors must be equipped with the knowledge and skills to leverage AI effectively, understand its limitations, and navigate the ethical considerations surrounding its use in education. This training should cover topics such as AI-powered learning analytics, adaptive instructional strategies, and responsible data management (Saaida, 2023).

In Nigeria, there is a scarcity of research focussing specifically on the challenges faced by university teachers in the AI era. This knowledge gap is concerning, as it hinders the development of targeted interventions and policies to support instructors during this transformative period (Afolabi, 2023). To bridge this gap, a study was conducted to investigate the existing and future challenges encountered by Nigerian university teachers in the AI era.

STATEMENT OF THE PROBLEM

As artificial intelligence (AI) technologies continue to transform education globally (Chisom et al., 2023), Nigerian university instructors are faced with the imperative to adapt their teaching practices and skillsets to effectively leverage these advancements (Suleiman et al., 2020). However, there is a lack of empirical research examining the specific challenges that Nigerian university teachers encounter in integrating AI into their work (Alimi et al., 2019; Egara & Mosimege, 2024).

Existing studies suggest Nigerian educators may struggle with inadequate digital literacy (Soyemi et al., 2018), limited access to AI-enabled resources (Mughal et al., 2020), and concerns about job security as AI automates certain educational tasks (De Stefano et al., 2021). Looking ahead, Nigerian university teachers may also grapple with ethical dilemmas posed by AI (Goffi, 2023), ensuring equitable access to AI-powered learning (Goel, 2020), and the need to continuously reskill to remain competitive in an AI-driven job market (Pradhan & Saxena, 2023).

Investigating the current and anticipated challenges faced by Nigerian university teachers in the AI era is crucial for informing the development of targeted interventions and policies to support this vital teaching workforce (Ayanwale et al., 2024). This study aims to fill the gap in knowledge and provide insights to empower Nigerian educators to harness the transformative potential of AI.

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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Purpose of the Study

The purpose of this study is to investigate the current and anticipated challenges that Nigerian university teachers encounter in integrating artificial intelligence (AI) technologies into their teaching profession. The objectives were to:

1. identify the existing challenges faced by Nigerian university teachers in adopting and using AI in their teaching profession; and
2. explore the potential future challenges that Nigerian university teachers anticipate in the adoption and effective use of AI in education.

THEORETICAL FRAMEWORK

This study employed Transformative Learning Theory, proposed by Jack Mezirow in 1978, to understand the challenges faced by Nigerian university teachers in integrating Artificial Intelligence (AI) into their teaching practices. This theory posits that learning is a transformative process involving a fundamental shift in an individual's worldview and perspectives (Mezirow, 1978).

The integration of AI is a "disorienting dilemma" for Nigerian university teachers, prompting them to critically reflect on their understanding of teaching and technology. This critical reflection can lead to transformative learning, where teachers:

1. develop new understandings of AI's potential and limitations, addressing the study's first objective of identifying existing challenges.
2. adopt new beliefs and values regarding AI in education, addressing the second objective of exploring anticipated future challenges.
3. change their teaching practices to effectively integrate AI, crucial for both objectives as it highlights the transformative nature of AI integration.

Several studies have employed Transformative Learning Theory to understand technology adoption in education, such as Enkhtur

and Yamamoto (2017), Probst et al. (2019), and Sudan et al. (2024). By applying this theory, we aimed to understand the process of change and adaptation that Nigerian university teachers undergo as they navigate AI integration.

METHODOLOGY

This study employed a qualitative research design to explore the existing and future challenges faced by Nigerian university teachers in the AI era. A qualitative approach was well-suited to providing an in-depth understanding of the perceptions, experiences, and contextual factors shaping the integration of AI technologies in Nigerian higher education institutions (Creswell & Poth, 2016; Isiaku et al., 2024).

Research Design

The study utilised a phenomenological research design, which focused on examining the lived experiences of the participants (Creswell & Poth, 2016). This design was appropriate for understanding the unique perspectives and challenges encountered by Nigerian university teachers as they navigated the integration of AI in their teaching and professional practices.

Sampling and Participant Selection

A purposive sampling technique was used to recruit participants for this study. The target population was Nigerian university teachers from both public and private institutions, representing a range of academic disciplines in education, teaching experience, and levels of familiarity with AI technologies (Etikan et al., 2016), especially those that have organised training for university teachers on the use of AI in education.

The sample size was determined using the principle of data saturation, where interviews continued until no new themes or insights emerged (Braun & Clarke, 2021). A sample size of 25 participants was deemed sufficient to achieve data saturation based on similar qualitative studies in the context of Nigerian higher education (Adefulu et al., 2020; Umeokafor & Windapo, 2018).

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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Instrumentation

The interview protocol used for the study was developed by the researcher based on the study's objectives and informed by a review of the relevant literature (Kallio et al., 2016). Key areas of inquiry:

1. existing challenges in adopting and integrating AI-powered tools and systems in teaching and research practices.
2. anticipated future challenges and barriers related to the ethical implications, equity concerns, and reskilling needs posed by AI advancements.

The instrument titled University Teachers AI Challenges Interview Guide (UTAICIG) was validated through a review process by five experts in the field of education and AI, ensuring its relevance and comprehensiveness in addressing the study's objectives.

Data Collection

Data was collected through in-depth, semi-structured interviews with the selected participants. The interviews were conducted either in person or via video conferencing, depending on the participants' preferences and the prevailing Influenza pandemic protocols in Nigeria during the study between May 12th and June 23rd, 2024. Each interview lasted approximately 45-60 minutes and was audio-recorded with the participants' consent. The interview guide included open-ended questions, exploring:

1. Current experiences with AI in teaching (Oluwatobi, 2020)
2. Perceived benefits and challenges of AI adoption (Afolabi, 2022)
3. Anticipated future challenges and needs (Ajayi et al., 2023; Ojeyemi, 2021)
4. Support systems and training requirements (Eli-Chukwu et al., 2023)

Data Analysis

The interview data was analysed using a thematic analysis approach, which involved

identifying, analysing, and reporting patterns or themes within the data (Braun & Clarke, 2024). The analysis process included the following steps:

1. Familiarisation with the data: The researcher thoroughly reviewed the interview transcripts to gain a comprehensive understanding of the content.
2. Generating initial codes: The researcher systematically coded the data, identifying relevant and meaningful segments related to the study's objectives.
3. Searching for themes: The coded data was collated, and the researcher searched for broader themes that captured the essence of the participants' experiences and perspectives.
4. Reviewing and refining themes: The identified themes were reviewed and refined to ensure they were coherent, distinct, and accurately reflected the data.
5. Defining and naming themes: The researcher defined and provided clear, concise names for the final themes that emerged from the analysis.
6. Reporting the findings: The researcher presented the thematic findings, supported by relevant verbatim quotes from the participants, to provide rich, contextual insights into the challenges faced by Nigerian university teachers in the AI era.

Trustworthiness and Rigour

To ensure the trustworthiness and rigour of the study, several strategies were employed (Lincoln & Guba, 1985; Riazi et al., 2023). These included prolonged engagement with the participants (Lincoln & Guba, 1985), member checking (participant validation) (Marshall & Rossman, 2014), peer debriefing and coding validation (Belotto, 2018), providing thick descriptions of the research context and participants' experiences (Sankofa, 2023), maintaining an audit trail and detailed

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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methodological documentation, and engaging in reflexivity and external auditing.

Ethical Considerations

The study adhered to the ethical principles of research involving human participants. Throughout the study, we adhered to ethical research practices, including obtaining informed consent from all participants, ensuring the confidentiality and privacy of data, and following institutional review board (IRB) guidelines (Bryman, 2016; Kasstan et al., 2023). Approval was obtained from the researchers' institutional review board or ethics committee before the commencement of data collection. Informed consent, confidentiality, and the right to withdraw from the study were guaranteed for all participants individually. Participants provided informed consent, and their privacy and confidentiality were ensured (APA, 2020). Data

was stored securely, and pseudonyms were used to protect participants' identities.

RESULTS

The results of the study are presented in Figure 1 and 2.

Research Questions 1: What are the existing challenges faced by Nigerian university teachers in adopting and using AI in their teaching profession?

Based on the thematic analysis of the qualitative data, the study identified the following key themes related to the existing challenges faced by Nigerian university teachers in integrating artificial intelligence (AI) technologies into their teaching profession:

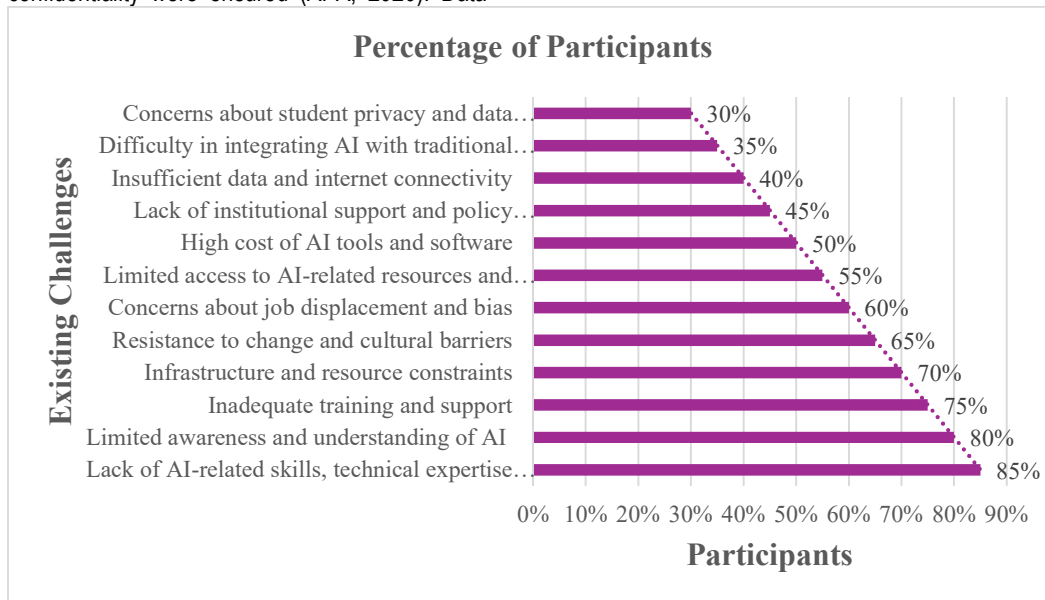


Figure 1: Percentage of participants on the existing challenges faced by Nigerian university teachers in adopting and using AI in their teaching profession

Note: The percentages represent the proportion of participants who reported each challenge.

The finding on research question one reveals that Nigerian university teachers are facing significant challenges in adopting and using AI in their teaching practices. The lack of awareness and understanding of AI, inadequate

training and support, and infrastructure and resource constraints are major barriers to effective AI adoption. Additionally, concerns about job displacement and bias, as well as limited access

Corresponding author: Vincent Chidindu Asogwa

asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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to AI-related resources and tools, are also significant challenges.

Furthermore, relevant verbatim quotes from the study participants to support the key findings include: "I feel completely unprepared to use AI technologies in my teaching. I don't even know where to start." Participant 12. "Our university needs to provide more training and workshops to help us develop the necessary skills to integrate AI tools effectively." Participant 25 "The internet connection on our campus is too slow and unreliable. It's nearly impossible to use AI-powered applications in the classroom." Participant 7. "We simply don't have access to the latest hardware and software needed to implement AI-based learning solutions." Participant 18 "Some of my colleagues are very sceptical about AI and see it as a threat to our traditional teaching methods. They are resistant to change." Participant 11. "There is a lack of institutional support and a culture that is not conducive to embracing new technologies like AI." Participant 23.

"We don't have any clear policies or guidelines from the university on how to integrate AI technologies into our teaching and research." Participant 14. "The university administration needs to provide more funding and resources to support AI-related initiatives and professional development." Participant 22

"I'm concerned about the potential for AI systems to perpetuate biases and infringe on student privacy. We need robust ethical guidelines to address these issues." Participant 9. "The use of AI-generated content and decision-making tools raises a lot of ethical questions that need to be carefully considered." Participant 1.

Research Questions 2: What are the future challenges that Nigerian university teachers anticipate in the adoption and effective use of AI in education?

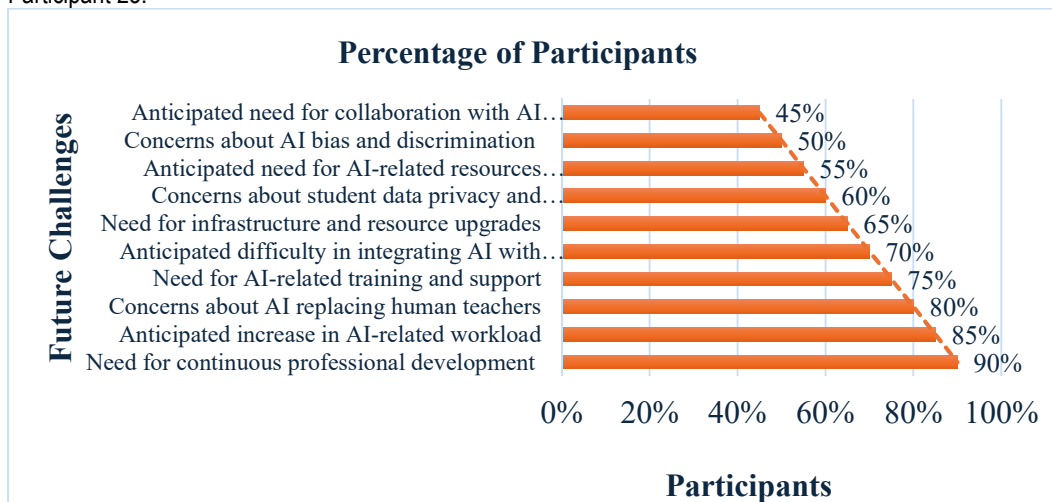


Figure 2: Percentage of participants on the future challenges that Nigerian university teachers anticipate in the adoption and effective use of AI in education

Note: The percentages represent the proportion of participants who reported each challenge.

The findings on research question 2 showed that Nigerian university teachers will face lots of challenges in the future for the adoption and effective use of AI in education. The challenges include need for continuous professional

development, anticipated increase in AI-related workload, concerns about AI replacing human teachers, need for AI-related training and support, and anticipated difficulty in integrating AI with traditional teaching methods.



Some participant statements that confirm the interview results are aligned with the themes and percentages provided, thus: "I definitely see the need for ongoing training to keep up with the rapid changes in AI and how it's being used in education." "We need to be constantly learning and adapting to stay ahead of the curve when it comes to AI in the classroom." Participant 17 "I think AI will definitely add to my workload, especially in terms of learning new tools and managing the data it generates." "It's going to be a lot of extra work to integrate AI effectively, but I think it's worth it in the long run." Participant 5.

"I'm worried that AI will eventually replace teachers altogether, which would be a huge loss for students." "I don't want to see AI taking over my job, but I'm open to learning how it can be used to enhance my teaching." Participant 24. "I need more training on how to use AI effectively in my classroom and how to troubleshoot any problems that arise." "It would be great to have a dedicated support team to help teachers navigate the challenges of using AI." Participant 4.

"I'm not sure how AI will fit into my existing teaching methods, and I'm concerned about disrupting the learning process." "I think it will take some time to figure out how to integrate AI seamlessly into my classroom." Participant 13. "We need to upgrade our technology infrastructure to handle the demands of AI, including faster internet and more powerful computers." "We're going to need more funding to purchase the necessary AI resources and tools for our classrooms." Participant 8

DISCUSSION OF FINDINGS

The finding on research question one reveals that Nigerian university teachers are facing significant challenges such as lack of awareness and understanding of AI, inadequate training and support, infrastructure and resource constraints, concerns about job displacement and bias, as well as limited access to AI-related resources and tools in adopting and using AI in their teaching practices. The findings align with the principles of Transformative Learning Theory, proposed by Jack Mezirow (1978). This theory

suggests that learning is a transformative process involving a fundamental shift in an individual's worldview and perspectives. The significant challenges identified—lack of awareness and understanding of AI, inadequate training and support, infrastructure and resource constraints, concerns about job displacement, among others—represent a "disorienting dilemma" for Nigerian university teachers. This dilemma challenges their existing beliefs and assumptions about teaching and technology, prompting them to critically reflect on their practices and the role of AI in education.

Also, Oluwatobi (2020) found that online learning environments can facilitate transformative learning experiences for students, but only if they are adequately supported and equipped with the necessary skills and resources. Li et al. (2019) emphasised the importance of teachers' beliefs about technology in influencing their adoption of technology in the classroom. Additionally, research by Francom et al. (2021) on technology adoption in K-12 classrooms found that teachers often face obstacles related to lack of training, support, and access to resources, echoing the challenges observed in our study.

The findings on research question 2 showed that Nigerian university teachers will face challenges like the need for continuous professional development, the anticipated increase in AI-related workload, concerns about AI replacing human teachers, the need for AI-related training and support, and the anticipated difficulty in integrating AI with traditional teaching methods in the future for the adoption and effective use of AI in education. The anticipated need for continuous professional development agrees with the principles of Transformative Learning Theory, proposed by Jack Mezirow (1978). This theory suggests that as AI continues to evolve, teachers will need to continuously adapt their knowledge, skills, and beliefs to effectively integrate AI into their teaching practices. According to Ajayi et al. (2023); Ojeyemi (2021), continuous professional development is critical for teachers to effectively integrate new technologies into their teaching practices. As Zahurin et al. (2024) argue, while technology can streamline some aspects of teaching, it often adds layers of

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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complexity that increase the overall workload for educators.

Teachers may find themselves overwhelmed by the need to balance traditional teaching responsibilities with the demands of AI integration. However, as Luckin (2017) suggests, AI should be viewed as a tool that complements rather than replaces human teachers (Alam, 2021). In addition, Mishra and Koehler (2006), noted that successful integration of technology in education hinges on teachers' technological, pedagogical, and content knowledge. The suggestions and the findings of the authors used in the discussion helped to add credence and validity to the findings of this study.

CONCLUSION

The advent of AI has created significant challenges faced by Nigerian university teachers in adopting and integrating AI into their teaching practices. These include a lack of awareness and understanding of AI, inadequate training and support, infrastructure and resource constraints, and concerns about job displacement and bias. Looking ahead, teachers anticipate challenges such as the need for continuous professional development, an increase in AI-related workload, and difficulties in integrating AI with traditional teaching methods. Addressing these challenges requires targeted interventions, including comprehensive teacher training in AI-related pedagogy and the provision of necessary resources and support.

RECOMMENDATIONS

1. There is a need to prioritise comprehensive teacher training programs that equip Nigerian university teachers with the necessary technical skills, pedagogical knowledge, and ethical understanding to effectively integrate AI into their teaching practices.
2. Nigerian universities should establish clear policies and guidelines for AI integration, including ethical considerations, data privacy, and resource allocation.
3. The Ministry of Education ought to invest more in upgrading infrastructure and

providing access to the latest AI tools and resources.

4. It is pertinent to encourage collaboration between university teachers, AI experts, and educational technology specialists to share best practices, develop innovative AI-driven learning solutions, and address emerging challenges.

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Declaration of Interest

The author declares no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ORCID ID <https://orcid.org/0000-0002-8743-0139>

REFERENCES

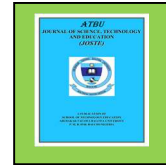
- Adefulu, A., Farinloye, T., & Mogaji, E. (2020). Factors influencing postgraduate students' university choice in Nigeria. In *Higher education marketing in Africa: Explorations into student choice* (pp. 187-225). Cham: Springer International Publishing.
- Afolabi, J. A. (2023). Employment Effects of Technological Innovation: Evidence From Nigeria's Economic Sectors. *Economic Horizons/Ekonomski Horizonti*, 25(1).
- Ajayi, S. O., Ogunode, N. J., & Ayoko, V. O. (2023). Challenges facing e-learning in basic education in Nigeria and the way forward. *Ta'lim va Rivojlanish Tahlili Onlayn Ilmiy Jurnal*, 3(5), 17-28.
- Alam, A. (2021, December). Should robots replace teachers? Mobilisation of AI and learning analytics in education. In *2021 International Conference on Advances in Computing*,

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

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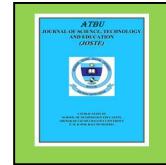
- Communication, and Control (ICAC3)* (pp. 1-12). IEEE.
- Alimi, A. E., Buraimoh, O. F., Aladesusi, G. A., & Babalola, E. O. (2021). University students' awareness of, access to, and use of artificial intelligence for learning in Kwara State. *Indonesian Journal of Teaching in Science*, 1(2), 91-104.
- Altinay, Z., Altinay, F., Sharma, R. C., Dagli, G., Shadiev, R., Yikici, B., & Altinay, M. (2024). Capacity Building for Student Teachers in Learning, Teaching Artificial Intelligence for Quality of Education. *Societies*, 14(8), 148.
- Alwaqdani, M. (2024). Investigating teachers' perceptions of artificial intelligence tools in education: potential and difficulties. *Education and Information Technologies*, 1-19.
- American Psychological Association (2020). *Ethical Principles of Psychologists and Code of Conduct*. Washington, DC: American Psychological Association.
- Ayanwale, M. A., Adelana, O. P., Molefi, R. R., Adeeko, O., & Ishola, A. M. (2024). Examining artificial intelligence literacy among pre-service teachers for future classrooms. *Computers and Education Open*, 6, 100179.
- Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can artificial intelligence transform higher education?. *International Journal of Educational Technology in Higher Education*, 17, 1-12.
- Belotto, M. J. (2018). Data analysis methods for qualitative research: Managing the challenges of coding, interrater reliability, and thematic analysis. *The qualitative report*, 23(11), 2622-2633.
- Bradáč, V., Smolka, P., Kotyrba, M., & Průdek, T. (2022). Design of an intelligent tutoring system to create a personalized study plan using expert systems. *Applied Sciences*, 12(12), 6236.
- Braun, V., & Clarke, V. (2021). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative research in sport, exercise and health*, 13(2), 201-216.
- Bryman, A. (2016). *Social research methods*. Oxford university press.
- Chisom, O. N., Unachukwu, C. C., & Osawaru, B. (2023). Review of AI in education: transforming learning environments in Africa. *International Journal of Applied Research in Social Sciences*, 5(10), 637-654.
- Choi, S., Jang, Y., & Kim, H. (2023). Influence of pedagogical beliefs and perceived trust on teachers' acceptance of educational artificial intelligence tools. *International Journal of Human-Computer Interaction*, 39(4), 910-922.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- De Stefano, V. (2019). "Negotiating the Algorithm": Automation, Artificial Intelligence, and Labor Protection. *Comp. Lab. L. & Pol'y J.*, 41, 15.
- Egara, F. O., & Mosimege, M. (2024). Exploring the Integration of Artificial Intelligence-Based ChatGPT into Mathematics Instruction: Perceptions, Challenges, and Implications for Educators. *Education Sciences*, 14(7), 742.
- Eli-Chukwu, N. C., Igbokwe, I. C., Ifebude, B., Nmadu, D., Iguodala, W., Uma, U., ... & Akudo, F. U. (2023). Challenges confronting e-learning in higher education institutions in Nigeria amid Covid-19. *Journal of Applied Research in Higher Education*, 15(1), 238-253.
- Enkhtur, A., & Yamamoto, B. A. (2017). Transformative Learning Theory and its Application in Higher. *PAACE Journal of Lifelong Learning*, 7, 1-14.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American*

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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- journal of theoretical and applied statistics*, 5(1), 1-4.
- Fernández Fernández, J. L. (2022). Ethical considerations regarding biases in algorithms.
- Francom, G. M., Lee, S. J., & Pinkney, H. (2021). Technologies, challenges and needs of K-12 teachers in the transition to distance learning during the COVID-19 pandemic. *TechTrends*, 65(4), 589-601.
- Ghamrawi, N., Shal, T., & Ghamrawi, N. A. (2024). Exploring the impact of AI on teacher leadership: regressing or expanding?. *Education and Information Technologies*, 29(7), 8415-8433.
- Goel, A. (2020). AI-powered learning: making education accessible, affordable, and achievable. *arXiv preprint arXiv:2006.01908*.
- Goffi, E. R. (2023). Teaching Ethics Applied to AI from a Cultural Standpoint: What African "AI Ethics" for Africa?. In *AI Ethics in Higher Education: Insights from Africa and Beyond* (pp. 13-26). Cham: Springer International Publishing.
- Isiaku, L., Kwala, A. F., Sambo, K. U., & Isiaku, H. H. (2024). Academic Evolution in the Age of ChatGPT: An In-depth Qualitative Exploration of its Influence on Research, Learning, and Ethics in Higher Education. *Journal of University Teaching and Learning Practice*, 21(06).
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *Journal of advanced nursing*, 72(12), 2954-2965.
- Kasstan, B., Mounier-Jack, S., Chantler, T., Masters, N., Flores, S. A., Stokley, S., ... & Routh, J. (2023). Poliovirus outbreak in New York State, August 2022: qualitative assessment of immediate public health responses and priorities for improving vaccine coverage. *Epidemiology & Infection*, 151, e120.
- Kaswan, K. S., Dhattewal, J. S., & Ojha, R. P. (2024). AI in personalized learning. In *Advances in Technological Innovations in Higher Education* (pp. 103-117). CRC Press.
- Li, Y., Garza, V., Keicher, A., & Popov, V. (2019). Predicting high school teacher use of technology: Pedagogical beliefs, technological beliefs and attitudes, and teacher training. *Technology, Knowledge and Learning*, 24, 501-518.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newberry Park.
- Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research*. Sage publications.
- Mezirow, J. (1978). Perspective transformation. *Adult education*, 28(2), 100-110.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, 108(6), 1017-1054.
- Mughal, U. R., Khan, M. A., Beg, A., & Mughal, G. Q. (2020, April). Ai enabled resource allocation in future mobile networks. In *NOMS 2020-2020 IEEE/IFIP Network Operations and Management Symposium* (pp. 1-6). IEEE.
- Ojeyemi, F. O. (2021). Full Adoption of e-Learning in Nigerian MDIs: Prospects, Challenges and the Future. *Challenges and the Future* (February 21, 2021).
- Okai-Ugbaje, S., Ardzejewska, K., & Imran, A. (2022). A mobile learning framework for higher education in resource constrained environments. *Education and Information Technologies*, 27(8), 11947-11969.
- Oluwatobi, S. E., Oluwaseun, J. N., & Adekunle, R. S. (2020). Social media tools and its effect on secondary school students' academic achievement in The Gambia. *Technium Soc. Sci. J.*, 8, 38.

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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- Pradhan, I. P., & Saxena, P. (2023). Reskilling workforce for the Artificial Intelligence age: Challenges and the way forward. In *The adoption and effect of artificial intelligence on human resources management, Part B* (pp. 181-197). Emerald Publishing Limited.
- Probst, L., Ndah, H. T., Rodrigues, P., Basch, G., Coulibaly, K., & Schuler, J. (2019). From adoption potential to transformative learning around conservation agriculture. *The Journal of Agricultural Education and Extension*, 25(1), 25-45.
- Riazi, A. M., Ghanbar, H., Marefat, F., & Fazel, I. (2023). Review and analysis of empirical articles published in TESOL Quarterly over its lifespan. *Studies in Second Language Learning and Teaching*, 13(4), 811-841.
- Saaida, M. B. (2023). AI-Driven transformations in higher education: Opportunities and challenges. *International Journal of Educational Research and Studies*, 5(1), 29-36.
- Sankofa, N. (2023). Participatory thick descriptions: a collaborative and reflective approach. *Qualitative Research in Psychology*, 20(1), 100-120.
- Shah, P. (2023). *AI and the Future of Education: Teaching in the Age of Artificial Intelligence*. John Wiley & Sons.
- Sharawy, F. S. (2023). *The Use of Artificial Intelligence in Higher Education: A Study on Faculty Perspectives in Universities in Egypt* (Master's thesis, The American University in Cairo (Egypt)).
- Soyemi, O., Ojo, A., & Abolarin, M. (2018). Digital literacy skills and MOOC participation among lecturers in a private university in Nigeria. *Library Philosophy and Practice*, 2018, 1851.
- Sudan, T., Hans, A., & Taggar, R. (2024). Transformative learning with ChatGPT: analyzing adoption trends and implications for business management students in India. *Interactive Technology and Smart Education*.
- Suleiman, M. M., Kaur, T., Kuliya, M., & Aliyu, A. S. (2020). Impact of ICT for the 21st century: a change driving tools for tertiary education in Nigeria. *International Journal of Management and Humanities (IJMH)*, 4(10), 42-49.
- Umeokafor, N., & Windapo, A. (2018). Challenges to and opportunities for establishing a qualitative approach to build environment research in higher education institutions. *Journal of Engineering, Design and Technology*, 16(4), 557-580.
- Wang, T., & Cheng, E. C. K. (2021). An investigation of barriers to Hong Kong K-12 schools incorporating Artificial Intelligence in education. *Computers and Education: Artificial Intelligence*, 2, 100031.
- Zahurin, K., Mamat, N., wan Ali, W. N. H., & Abas, H. (2024). The Influence of Robotic Process Automation on the Administrative Workload of Teachers. *Open International Journal of Informatics*, 12(1), 47-56.

Corresponding author: Vincent Chidindu Asogwa

✉ asovinchidi@gmail.com

Department of Agricultural Education and Extension, University of Eswatini, Eswatini.

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