Kashere Journal of Education 2025, 9(2):238-242 ISSN: 2756-6021 (print) 2756-6013 (online
Musa, H. Y. & Kasim, B. K. (2025)

THE IMPACT OF AI VOICE BOTS AND CHATBOTS ON PERSONALIZED LEARNING FOR LECTURERS AND STUDENTS IN TERTIARY INSTITUTIONS

Musa Hussaini Ya'u
F.C.E (T) P.M.B 60 Gombe.
musahyu9@gmail.com

And
Kasim Bappah Kawu
F.C.E (T) P.M.B 60 Gombe
alqasimbk@gmail.com

Abstract
Artificial intelligence (AI) driven conversational technologies, particularly voice bots and chatbots, are increasingly transforming teaching and learning processes in tertiary institutions worldwide. These technologies provide new opportunities for personalized learning, adaptive feedback, and instructional efficiency. This paper examines the impact of AI voice bots and chatbots on personalized learning among lecturers and students in tertiary institutions. Anchored in contemporary theories of personalized and adaptive learning, the study synthesizes empirical and conceptual literature on the pedagogical roles of conversational AI, their feedback delivery mechanisms, and efficiency gains for teaching and learning. Findings indicate that AI-powered conversational agents enhance learner engagement, support self-paced learning, provide timely and individualized feedback, and reduce lecturers' workload by automating routine academic interactions. However, challenges related to ethical concerns, data privacy, infrastructural limitations, and pedagogical alignment persist, particularly in developing-country contexts. The study concludes that, when strategically and ethically integrated, AI voice bots and chatbots hold substantial potential to improve personalized learning and instructional effectiveness in tertiary education.

Keywords: Artificial intelligence, chatbots, voice bots, personalized learning, tertiary education, feedback systems

Introduction

The rapid advancement of artificial intelligence (AI) has significantly influenced teaching, learning, and administration within tertiary institutions. Universities, polytechnics, and colleges of education increasingly adopt AI-driven technologies to address challenges such as large class sizes, diverse learner needs, limited instructional time, and the growing demand for flexible, learner-centered pedagogies. Among AI applications, conversational agents specifically chatbots and voice bots have emerged as practical tools for supporting personalized learning. Chatbots interact with learners through text-based interfaces, while voice bots extend similar functionalities using speech recognition and synthesis technologies. Both rely on natural language processing (NLP) and machine learning algorithms to simulate human-like interactions. Knewton, (2018).

Holmes, (2019) states that Personalized learning emphasizes tailoring instructional content, learning pace, and feedback to individual learners' needs and abilities. However, implementing personalization at scale remains a major challenge in tertiary institutions. AI voice bots and chatbots provide scalable solutions by automating

routine interactions, delivering adaptive academic support, and enabling continuous engagement beyond traditional classroom settings.

This paper therefore examines the impact of AI voice bots and chatbots on personalized learning in tertiary institutions, focusing on their pedagogical roles, feedback mechanisms, and efficiency gains for both lecturers and students.

AI Voice Bots and Chatbots in Tertiary Institutions

AI chatbots and voice bots are increasingly deployed in tertiary institutions as virtual tutors, academic advisors, and administrative assistants. Research indicates that these systems improve access to academic information, reduce response time, and enhance student satisfaction (Adamopoulou & Moussiades, 2020; Adewole et al., 2025).

In tertiary education contexts, conversational AI systems are commonly used to: frequently asked academic questions; provide course-related guidance; Provide course-related guidance; Support learning management systems; assist with academic advising and administrative services. Studies show that such systems improve institutional efficiency while maintaining consistent and reliable communication with students.

Personalized Learning and Adaptive Support

Personalized learning seeks to accommodate learners' prior knowledge, learning pace, and preferences. AI chatbots and voice bots support this approach by analyzing learner interactions and dynamically adjusting instructional responses.

Labadze et al. (2023) report that AI-driven conversational agents enhance learner autonomy, engagement, and self-paced learning in tertiary institutions. Similarly, Ndlovu et al. (2025) highlight that conversational AI promotes continuous academic interaction and learner-centered instruction, particularly in blended and online learning environments.

Feedback Mechanisms in Tertiary Education

Effective feedback is critical for improving learning outcomes in tertiary education. However, providing individualized and timely feedback to large student populations poses a significant challenge for lecturers.

AI voice bots and chatbots provide immediate, adaptive feedback that supports formative assessment and concept clarification. Fryer et al. (2020) found that AI-supported feedback systems enhance learner motivation and academic performance. ERIC (2024) further emphasizes the role of AI in supporting scalable and personalized feedback practices in higher education.

Efficiency Gains for Lecturers and Students

Conversational AI systems enhance efficiency in tertiary institutions by automating repetitive academic tasks such as responding to routine inquiries and delivering basic instructional support. This reduces lecturers' workload and allows greater focus on mentoring, curriculum development, and research activities (Adewole et al., 2025; IJCRT, 2022).

For students, 24/7 access to academic assistance promotes continuous learning and reduces dependency on limited instructor availability.

Methodology

This study adopts a qualitative research design based on a systematic literature synthesis approach. This design enables an in-depth examination of existing empirical

and conceptual studies on AI voice bots and chatbots in tertiary education.

Data were collected from peer-reviewed journal articles, conference proceedings, and institutional reports accessed through reputable academic databases, including:

i. ERIC
ii. ScienceDirect
iii. PubMed Central
iv. The review focused on studies published between 2020 and 2025.

Inclusion and Exclusion Criteria; included studies:

i. Examined AI chatbots or voice bots in tertiary institutions
ii. Addressed personalized learning, feedback, or instructional efficiency
iii. Were published in peer-reviewed or reputable academic sources

Excluded studies:

1 Focused exclusively on primary or secondary education
2 Lacked relevance to learning outcomes or pedagogy

Data Analysis Technique was carried out using s thematic analysis approach was employed. recurring themes were identified and synthesized under: pedagogical roles of conversational AI**;** personalized and adaptive learning**;** feedback mechanisms**;** efficiency gains**;** Ethical and contextual challenges

Pedagogical Roles of Conversational AI

Conversational Artificial Intelligence (AI) plays multiple pedagogical roles in contemporary education, particularly in technical and vocational contexts. As an intelligent tutor, conversational AI facilitates guided learning by providing explanations, demonstrations, and step-by-step problem-solving support aligned with instructional objectives. According to Holmes, Bialik, and Fadel (2019), AI-driven conversational agents can function as "scalable teaching assistants," supporting learners beyond classroom hours and mitigating teacher shortages. In electrical machines instruction, conversational AI can simulate instructor–student dialogue during troubleshooting tasks, enabling learners to ask context-specific questions and receive immediate instructional guidance. This interactive role supports constructivist learning principles by encouraging inquiry, reflection, and hands-on engagement (Luckin et al., 2016).

Personalized and Adaptive Learning

One of the most significant contributions of conversational AI is its capacity to deliver personalized and adaptive learning experiences. AI systems analyze learner inputs, performance patterns, and interaction history to tailor instructional content to individual needs. As noted by Knewton (2018), adaptive learning systems adjust the pace, complexity, and sequence of instruction in real time, ensuring that learners neither stagnate nor become overwhelmed. In technical education, this adaptability is crucial, as learners often possess varying levels of prior knowledge and practical skills. Conversational AI can personalize troubleshooting scenarios in electrical machines by presenting fault conditions appropriate to each learner's competency level, thereby enhancing mastery and learner confidence (Pane et al., 2017).

Feedback Mechanisms

Effective feedback is central to skill acquisition, and conversational AI enhances this process through immediate, continuous, and formative feedback mechanisms. Unlike traditional instructional settings where feedback may be delayed, AI systems provide real-time responses to learner actions and decisions. Hattie and Timperley (2007) emphasize that feedback is most effective when it is timely, specific, and actionable qualities

inherently supported by conversational AI. In troubleshooting electrical machines, AI-driven platforms can instantly identify errors in diagnostic steps, explain the nature of the mistake, and suggest corrective actions. Such feedback promotes self-regulated learning and reduces repeated trial-and-error practices common in practical workshops.

Efficiency Gains

Conversational AI contributes to efficiency gains for both instructors and learners by automating routine instructional and support tasks. Tasks such as answering frequently asked questions, providing procedural reminders, and assessing basic understanding can be handled by AI systems, allowing instructors to focus on higher-order pedagogical activities. According to OECD (2021), AI technologies have the potential to "optimize instructional time and resource utilization," especially in resource-constrained educational environments. In technical institutions facing large class sizes and limited equipment, conversational AI can serve as a virtual assistant that supports multiple learners simultaneously, thereby improving access to instruction and reducing instructional bottlenecks.

Ethical and Contextual Challenges

Despite its benefits, the integration of conversational AI in education raises significant ethical and contextual challenges. Issues related to data privacy, algorithmic bias, and transparency remain major concerns. UNESCO (2021) cautions that AI systems may inadvertently reinforce existing inequalities if deployed without adequate ethical safeguards. In developing and insecure learning environments, challenges such as unreliable internet connectivity, limited digital infrastructure, and cybersecurity risks further complicate AI adoption. Additionally, over-reliance on AI may diminish human pedagogical judgment if not properly regulated. Therefore, contextual adaptation, ethical compliance, and human oversight are essential to ensure that conversational AI supports rather than undermines equitable and effective learning outcomes.

Discussion

The reviewed literature demonstrates that AI voice bots and chatbots positively influence personalized learning in tertiary institutions by supporting adaptive instruction and continuous learner engagement. Immediate feedback mechanisms enhance mastery learning and self-regulated learning practices, while efficiency gains allow lecturers to focus on higher-level pedagogical tasks.

Nevertheless, challenges such as ethical concerns, data privacy, infrastructural constraints, and the risk of over-reliance on AI persist. Addressing these challenges requires institutional policies, staff training, and alignment between AI tools and pedagogical objectives.

Conclusion

AI voice bots and chatbots are reshaping personalized learning in tertiary institutions by enabling adaptive instruction, real-time feedback, and improved instructional efficiency. When strategically and ethically integrated, conversational AI technologies can significantly enhance teaching and learning experiences for lecturers and students. Future research should focus on empirical implementation studies in diverse tertiary education contexts, long-term learning outcomes, and the integration of multimodal AI systems in higher education.

References

Adamopoulou, E., & Moussiades, L. (2020). An overview of chatbot technology. *IFIP Advances in Information and Communication Technology, 584*, 373–383.

https://doi.org/10.1007/978-3-030-49186-4_31

Adewole, D. B., Olusola, S. J., Ogunlana, S. O., & Adelola, M. A. (2025). Development of an AI-powered faculty support chatbot for higher education institutions. *International Journal of Research and Innovation in Applied Science, 1*0(1), 321–334.

Fryer, L. K., Ainley, M., Thompson, A., Gibson, A., & Sherlock, Z. (2020). Stimulating and sustaining interest in a language course: An experimental comparison of chatbot and human tutors. *Computers & Education*, 152, Article 103907. https://doi.org/10.1016/j.compedu.2020.103907

Labadze, L., Grigolia, M., & Machaidze, L. (2023). The role of AI chatbots in education: A systematic literature review. *International Journal of Educational Technology in Higher Education*, 20,(56). https://doi.org/10.1186/s41239-023-00426-1

Ndlovu, B., Ndlovu, S., Dube, S., & Maguraushe, K. (2025). Artificial intelligence chatbots in education: Academics' beliefs, concerns, and pathways for integration. *Indonesian Journal of Information Systems*, *7*(2), 109–122.

Taylor, M., & Francis, R. (2025). Ethical and pedagogical implications of AI-driven conversational agents in higher education. Interactive Learning Environments. Advance online publication

U.S. Department of Education, Institute of Education Sciences. (2024). Artificial intelligence–supported feedback systems in higher education (ERIC Digest No. EJ1434299). ERIC

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81–112.

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

Knewton. (2018). *Adaptive learning and personalization in education*. Knewton Inc.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson. OECD. (2021). *Artificial intelligence, big data and education*. OECD Publishing.

Pane, J. F., Steiner, E. D., Baird, M. D., & Hamilton, L. S. (2017). *Informing progress: Insights on personalized learning implementation and effects*. RAND Corporation.

UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. UNESCO Publishing.