The influence of ChatGPT on digital learning: experience among university students

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Abstract

Purpose – This study aims to investigate the influence of ChatGPT, an AI-based chatbot, on the digital learning experience of students at Mzumbe University.

Design/methodology/approach – This study adopted a qualitative research design to gather in-depth insights from participants. Semi-structured interviews and an analysis of previous chat content were used as primary sources of data. Thematic analysis was used to analyze the qualitative data, allowing for the exploration of participants' perspectives, experiences and opinions regarding the integration of ChatGPT into the learning process.

Findings – The results of the study demonstrated that ChatGPT is widely used in educational contexts and has a positive influence on students' study habits, academic performance, and understanding of course material. Students appreciated the system's simplicity, tailored instructions, and the promptness and accuracy of the responses. Despite the possibility of isolated mistakes.

Research limitations/implications – It is important to recognize the limitations of this study. First, the sample size was small, limiting the broad application of the results. Second, this study's narrow emphasis on students at Mzumbe University limits its applicability in other situations. Furthermore, depending on self-reported experiences, biases, such as individual interpretation or recollection bias, can occur.

Practical implications – Educators can maximize ChatGPT in the classroom by using study insights. Its advantages, such as effectiveness and enhanced performance, highlight the possibility for student-centered learning. Practitioners are guided by their awareness of problems, such as probable errors. Constant updates guarantee ChatGPT's applicability and provide educators with useful advice.

Social implications – Peer impact is highlighted in this study concerning social factors on the adoption of AI in education. Resolving issues preserves public confidence. Views influence public opinion and direct policymakers in discussions about safe AI use. It influences public attitudes while navigating the ethical integration of AI.

Originality/value – This study offers insightful information about the impact of ChatGPT on digital learning in Tanzania's higher education. It makes innovative research contributions that enhance educational practices and emphasizes the advantages, difficulties and demands of responsible usage in the context of AI-based chatbots.

Keywords Academic performance, Cognitive benefits, Social influence, Challenges, User-friendliness, AI chatbots, ChatGPT, Digital learning experience

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Introduction

A lot of attention has been paid to the incorporation of artificial intelligence (AI) technology, particularly AI-based chatbots like ChatGPT (Generative Pretrained Transformer), as a transformative tool to improve the learning experience (Knox, 2020; Huang, 2021; Essel *et al.*, 2022; Dergaa *et al.*, 2023). OpenAI's ChatGPT is a cutting-edge language model renowned for its capacity to produce responses that resemble those of a human depending on the input it receives (Essel *et al.*, 2022). For example, ChatGPT can write excellent essays for students, condense research papers, provide sufficient answers to pass medical exams and produce useful computer codes. It has also produced research summaries that academics have found challenging to differentiate from human-written ones (Dergaa *et al.*, 2023). By filling the gaps caused by a lack of educational resources and qualified professional assistance, these advancements have shown significant potential in enhancing academic journeys, particularly in university settings (Alphonce and Mwantimwa, 2019; Farrokhnia *et al.*, 2023; Lund and Wang, 2023).

The use of AI-based chatbots in education, particularly in Sub-Saharan Africa, remains a noteworthy lack of research. Although some studies have examined preparation for and skills related to AI in learning, there is a glaring dearth of knowledge addressing the specific influence of ChatGPT on the digital learning environment in Tanzanian settings (Mwilongo *et al.*, 2022; Owolabi *et al.*, 2022). This knowledge gap provides opportunities for future research.

To close this gap, this study examines the role of ChatGPT in Tanzania's higher education system. The study's main goals are to examine how ChatGPT is currently used in education, judge how it affects students' academic achievement, pinpoint any potential difficulties and identify the variables that influence the adoption of the technology. By attaining these objectives, this study hopes to offer insightful contributions to AI's role of AI in education and helpful suggestions for successfully integrating AI-powered chatbots in Tanzanian colleges.

These five sections constitute the layout of the study. The second section provides background information for the project by presenting a thorough literature review on AI-based ChatGPT in education. The findings and analyses of the qualitative study are presented in the third section, providing in-depth insights into participants' opinions and experiences. A summary of the main findings and their consequences is presented in the fourth section, which also serves as a conclusion. The final section, which aims to encourage relevant educational practices and experiences, provides crucial advice to direct the responsible and successful integration of ChatGPT into digital learning settings.

Literature review

Overview of ChatGPT in academic settings: The current state of ChatGPT usage in the learning process demonstrates an increasing desire for its inclusion in educational contexts, driven by the increasing digitization and evolution of the academic environment (Bozkurt, 2023; Filipec *et al.*, 2023; Papa and Jackson, 2021). This AI-based chatbot has become a popular and interesting instructional tool, known for its ability to mimic conversations with real people. ChatGPT improves the personalization of the learning experience by analyzing inquiries and providing clear responses because of its natural language processing skills (Latif *et al.*, 2023; Rathore, 2023).

Effect of ChatGPT on educational components: ChatGPT, which is recognized for its amazing ability to respond quickly, encourages continuing dialogue and learning dynamics toward new levels of adaptation, interactivity, and personalization. The impact of ChatGPT on many educational components has been significant, spanning duties such as spotting,

anticipating programming errors and expediting difficult academic procedures such as summarizing and answering questions (Fuchs, 2023; Surameery and Shakor, 2023). By offering relevant conversational responses and improving academic workflows, OpenAI's revolutionary introduction to ChatGPT has shifted the educational paradigm of education (Fuchs, 2023; Tajik and Tajik, 2023). This ground-breaking chatbot driven by AI has the power to disrupt educational processes, improve learning outcomes and produce a more effective and enjoyable learning environment (Tajik and Tajik, 2023).

Improving the educational process: The efficiency and efficacy of the educational process as a whole increases as more educators use the flexible, student-centered learning options provided by ChatGPT (Fuchs, 2023; Mhlanga, 2023). In addition, its adaptable features give educators the freedom to experiment with different teaching methods and promote dynamic and individualized learning environments (Mhlanga, 2023). The addition of ChatGPT expands the parameters of conventional classrooms, enabling students to participate in individual studies while also creating an engaging and immersive experience (Mhlanga, 2023; Tajik and Tajik, 2023). The current state of ChatGPT in the learning process highlights its importance as a novel and transformational technology with positive ramifications in the future of education.

ChatGPT and academic performance: The potential of chatbots that integrate AI, such as ChatGPT, to boost academic performance is an emerging area of research in educational technology. The effect of ChatGPT on academic performance can be seen in its ability to provide students with personalized, rapid and interactive feedback, potentially improving their comprehension of course material and, as a result, their academic outcomes (Fuchs, 2023; Mhlanga, 2023). The use of AI chatbots in educational settings improves student engagement, which is essential for improving academic performance (Firat, 2023).

By enabling round-the-clock participation and quick responses, ChatGPT played a critical role in keeping students actively involved in their learning processes. Consequently, higher academic achievement is encouraged by this (Lund and Wang, 2023). In addition, ChatGPT makes a significant contribution to promoting independent learning. The use of AI chatbots has encouraged self-directed learning, which is strongly associated with improved academic performance (Mhlanga, 2023; Wardat, 2023). Academic performance can be improved by giving students the opportunity to study the course content at their own leisure, get their questions answered and learn more as they use ChatGPT (Fuchs, 2023).

Personalized learning with ChatGPT: ChatGPT stands out in the field of personalized learning owing to its adaptability. According to research, personalized learning has been shown to increase students' academic achievement. ChatGPT's ability to alter responses based on the learner's input provides personalized learning experiences, meeting each student's specific academic needs and ultimately improving performance (Fuchs, 2023; Haleem *et al.*, 2023). The part played by ChatGPT in the assessment is also important. Its ability to conduct formative assessments enables continual assessment of students' understanding and provides valuable information on their learning progress. This knowledge enables students to focus their efforts where they are most needed, thus improving their academic performance (Mhlanga, 2023).

However, ChatGPT's usefulness, like that of any other educational tool, depends on how well it is integrated into teaching and learning processes. Additional research into the best practices for ChatGPT integration might ensure that its full promise for improving academic performance is realized (Wardat, 2023).

The effective use of ChatGPT can considerably enhance academic achievement. The secret to this development lies in its inherent skills, which include fostering engagement, enabling independent learning, developing customized learning experiences and providing

helpful formative evaluation. Major improvements in academic accomplishments might be attained through continuous research and proper use of ChatGPT in educational settings (Firat, 2023; Limna *et al.*, 2023; Lund and Wang, 2023).

Factors affecting adoption of ChatGPT: Different factors that have a large impact on the adoption and use of technology in education shape how ChatGPT is integrated into classroom activities. Peer pressure and social influence are important elements that affect how people choose to use technology for learning (Faqih, 2022; Kurdi *et al.*, 2020; Park *et al.*, 2019). For instance, the adoption of augmented reality (AR) is significantly influenced by social pressures and cultural acceptance. In addition, social influences, including peer pressure, instructor influence and societal standards, have an impact on how well liked and used electronic learning platforms are. These social factors must be considered to successfully integrate educational technologies such as ChatGPT (Faqih, 2022; Kurdi *et al.*, 2020).

The ease of use and user-friendliness of ChatGPT are important factors that have influenced its popularity for educational purposes. It is recognized as a user-friendly tool that makes fixing programming errors easier (Surameery and Shakor, 2023). ChatGPT's natural language processing skills enable it to offer simple explanations, which is especially helpful for students who may find traditional debugging tools difficult. Computer engineering majors have found ChatGPT to be encouraging, helpful and user friendly. It offers well-structured responses that support tasks connected to schooling and the workplace (Shoufan, 2023).

Furthermore, the cognitive benefits and information gain provided by ChatGPT have a significant impact on how it is used for learning. ChatGPT supports cognitive development and information acquisition through adaptive learning opportunities, intelligent tutoring capabilities and tailored language and math learning elements (Mhlanga, 2023). ChatGPT develops a personalized learning environment by assessing each learner's unique requirements, abilities and limitations based on interactions and replies and then providing individualized recommendations and feedback (Fuchs, 2023).

Educators should be aware of these factors when developing and using instructional technology. Educators can use ChatGPT to offer students individualized and engaging learning experiences by considering elements such as social influence, usability and cognitive benefits. To ensure that ChatGPT is successfully incorporated into learning environments, it is crucial to overcome the difficulties and restrictions related to its use, including the accuracy of responses and necessity for continued improvement (Faqih, 2022; Shoufan, 2023; Surameery and Shakor, 2023).

Challenges in implementing ChatGPT: ChatGPT is an example of AI-based technology that can be integrated into educational processes to improve learning outcomes and experiences. However, several problems must be resolved before they can be effectively used (Fuchs, 2023; Grassini, 2023).

The complexity of AI tools, which necessitate a high level of technical proficiency for both teachers and pupils, is a key barrier. Users may find it challenging to efficiently use ChatGPT in the learning process because of the steep learning curve (Haleem *et al.*, 2023). Users also face various difficulties, with varying degrees of technological aptitude and adaptation. In a digital learning environment, data security and privacy concerns are heightened, requiring particular attention to protect student information and to maintain confidentiality (Fuchs, 2023).

The ability of AI chatbots to replicate human interaction, such as ChatGPT, presents another problem because they fail to properly address the socio-emotional aspects of learning (Ali and Khowaja, 2023). Even though they have advanced features, AI tools may

not be sufficiently sensitive to recognize or effectively react to emotional cues, which would affect the development of engaging learning experiences. Ineffective communication with students may result from the inability of AI technologies to understand the subtleties of the human language (Nishant *et al.*, 2023).

Both students and educators use ChatGPT; however, not everyone has the same level of access, although it can boost productivity and creativity. It is difficult for many countries and low-income people to use the internet successfully, because it requires reliable connectivity and basic technological skills. Consequently, there is a digital divide, with some people benefiting more from ChatGPT than others. To address this issue, efforts must be made to increase internet accessibility and guarantee that everyone has an equal chance of using and gaining tools such as ChatGPT (Ali and Khowaja, 2023).

A substantial problem is presented by the accuracy and relevance of AI chatbot responses in rapidly evolving research topics that are evolving rapidly (Fuchs, 2023). The frequency of updates directly affects the accuracy and timeliness of data delivered by AI models deliver (Fuchs, 2023). Discussions on maintaining the accuracy and dependability of AI chatbot data in the face of ongoing advancements in several technical disciplines have been sparked by this challenge (Shoufan, 2023). Students doubted the accuracy of the system, noting its outstanding powers and shortcomings compared with human intellect. As old training data can limit the relevance and value of responses and make it difficult to understand recent advances, ensuring access to current data is essential for preserving accuracy in educational contexts (Fuchs, 2023; Shidiq, 2023).

Studies in this area have shown that incorporating AI language models such as ChatGPT into educational settings encourages pupils to take caution. Students regularly cross-reference external sources while using these AI tools, particularly when they encounter possibly inaccurate information or errors (Ali and Khowaja, 2023).

Despite the enormous promise that ChatGPT and other AI tools possess to enhance education, it is critical to overcome the difficulties posed by their implementation. For its successful integration into learning environments, a comprehensive strategy that covers technological, educational, ethical and accessible considerations is important (Ali and Khowaja, 2023; Grassini, 2023). Educators may fully use ChatGPT to improve learning outcomes and provide students with meaningful educational experiences by being aware of and tackling these obstacles.

This study expands on the analysis of ChatGPT's revolutionary impact in Tanzania's higher education system, guided by foundational studies (Bozkurt, 2023; Fuchs, 2023; Latif *et al.*, 2023; Surameery and Shakor, 2023; Lund and Wang, 2023; Mhlanga, 2023; Haleem *et al.*, 2023; Ali and Khowaja, 2023). This research investigates how it is now used in education, evaluates its effect on students' academic performance, pinpoints possible obstacles and analyzes the factors driving its uptake. Technology adoption is heavily influenced by factors such as social influence, usability and cognitive benefits (Faqih, 2022; Shoufan, 2023; Grassini, 2023). Simultaneously, obstacles such as technical competence and socio-emotional factors, greatly influence the study agenda (Haleem *et al.*, 2023; Ali and Khowaja, 2023). Based on existing research, this study offers insightful recommendations for AI chatbots that work well.

Methodology

This section outlines the techniques used to examine how ChatGPT affects students in the digital learning environment at Mzumbe University. To improve understanding of the topic, the qualitative research style was used. In addition, A qualitative study approach was chosen to provide rich and thorough knowledge of the impact of ChatGPT on students'

digital learning experience. A thorough examination of the research issue was made possible by this design's facilitation of the exploration of participants' perspectives, experiences and opinions in their own words (Creswell, 2009). More accurately, it was identified as the best approach to investigate and learn about phenomena, as well as to address new questions. This study sought to investigate how ChatGPT integration affects students' study habits, academic achievement, encountered difficulties and general perceptions of their learning experiences. In addition, an exploratory case study technique was determined to be a suitable methodology in the qualitative sector, especially in cases where there is a dearth of literature and little existing knowledge (Creswell, 2009).

Data collection

The main source of data for this study was semi-structured interviews with 15 Mzumbe University students. To attain data saturation, this sample size was chosen. Further, as Streubert and Carpenter (2003) suggested, the sample sizes of 5–50 participants could reach the saturation point of qualitative research. Reaching the saturation point was made easier by the intentional selection of participants who were rich in information, guaranteeing thorough coverage of pertinent ideas and viewpoints. These interviews examined the impact of ChatGPT on students' online learning. The semi-structured interview method was selected to promote an open-ended and engaging discussion while guaranteeing that the main study objectives were covered (Creswell, 2009).

Sampling procedure

Study participants were selected using a purposive sampling method. Students who were enrolled at Mzumbe University and had prior experience of using ChatGPT as part of their online learning activities were included in the selection criteria. This ensured that participants understood the material and offered insightful comments (Bakkalbasioglu, 2020).

Interview protocol

To collect the data, a semi-structured interview guide was developed. The purpose of the interview questions was to delve into many facets of students' ChatGPT digital learning experiences. Open-ended questions were included in the guide to enable individuals to express their perspectives, stories and experiences.

Data collection procedure

All the participants provided informed consent before conducting the interviews. Depending on the preferences of the participants and available resources, interviews were conducted in person. To ensure reliable data collection, the interviews were audio-recorded with participants' consent. The duration of each interview session ranged from 30 to 45 min, providing participants with sufficient opportunities to express their opinions and comments. The interviewer engaged in active listening with the participants, followed by additional questions to elucidate their answers, and invited them to expound on their interactions with ChatGPT.

Data analysis

The original comments of the interviewees were preserved through *verbatim* transcription of audio recordings of the interviews. A thematic analysis (TA) was used to examine the transcripts.

TA is an excellent qualitative research technique for looking at experiences, perceptions and understandings. It can be used with various theoretical frameworks and is flexible enough to cope with a broad range of qualitative data (Braun and Clarke, 2019). To identify the initial themes, the researchers separately analyzed and coded the transcripts. Subsequently, to ensure consistency and dependability, the author compared the coding. Any disagreements were resolved. Subsequently, using relevant categories further developed and aggregated into overarching themes, the coded data were arranged into meaningful groups.

Thematic analysis

Microsoft Word and Excel were used to do the TA for this study. The researchers separately examined and coded the transcripts after transcribing the semi-structured interviews' audio recordings. Excel was used to arrange and classify coded data, making it easier to identify underlying trends. Microsoft Word was used for text-based coding. This strategy made sure that all the participant's experiences, viewpoints and comprehensions of how ChatGPT affected their digital learning at Mzumbe University were thoroughly studied.

Data saturation

Data saturation was achieved when no new themes or insights emerged from subsequent interviews (Braun and Clarke, 2019). Based on this criterion, the sample size was chosen to ensure that there was an adequate amount of data to answer the study questions and to reach saturation.

Ethical considerations

This study complied with ethical standards for safeguarding participants' rights and privacy. Participants received confidentiality assurances and were given the opportunity to withdraw from the study at any time with informed consent. The information gathered was managed securely and was used only for research purposes.

Results and discussions

This section explores the current state of ChatGPT usage at Mzumbe University, variables that have influenced its adoption, effects on academic performance and difficulties associated with its use.

The current state of using ChatGPT in the learning process

Several major themes define the current condition of ChatGPT in the educational process. Similar opinions were held by seven respondents, who agreed with the sentiment that one participant (RESP15) had expressed:

> My study habits have been dramatically altered. ChatGPT has had a huge transforming effect on my study habits. I no longer waste a lot of time on prolonged Google searches because I could obtain direct answers from the ChatGPT (RESP15).

This finding is consistent with Bozkurt (2023) finding that AI can be used as a time-saving teaching aid, confirming a common experience among students at Mzumbe University and in other educational situations. Another participant mentioned accessibility and convenience:

> I rely on ChatGPT for explanations and examples (RESP12).

Nine other participants echoed this opinion, which emphasizes how crucial ChatGPT is in giving these people easily understandable explanations and examples. This experience is

consistent with that of Latif *et al.* (2023) and Rathore (2023), who highlighted the related applications and advantages of AI tools in education while highlighting the human-like contact that these tools may offer. Other participants who were asked about accuracy said:

> ChatGPT provides direct and accurate answers, unlike other tools that may not always provide necessary information (RESP2).

> ChatGPT consistently provides clear and correct responses, outperforming alternative technologies that occasionally fail to provide crucial information (RESP 3).

This is in line with the findings of George *et al.* (2023), who highlighted the accuracy of AI responses in educational contexts and supported the suitability of ChatGPT in contemporary learning situations. According to this study, ChatGPT integration at Mzumbe University has benefited students' educational experience. This supports the conclusions of Filipec *et al.* (2023), who recognized the advantages of AI, including effective information retrieval, ease of access to pertinent materials and deeper knowledge of topics, all of which were also stressed by the participants.

In summary, Mzumbe University's current use of ChatGPT in the educational process is consistent with that of more general academic studies (Bozkurt, 2023; George *et al.*, 2023; Latif *et al.*, 2023). The advantages of AI in education are widely acknowledged to include time-saving, ease of information access and the supply of direct and correct responses. These features were emphasized by the participants, highlighting the transformative impact of ChatGPT on education. The importance of ChatGPT's ability to deliver meaningful conversational responses, particularly in higher education contexts and to match the experiences at Mzumbe University, has been emphasized (Fuchs, 2023; Tajik and Tajik, 2023). As a result, the status of ChatGPT in the learning process demonstrates its potential to support student-centered, adaptable learning methods and enhance educational efficiency and efficacy.

The influence of ChatGPT on academic performance

The study revealed that ChatGPT significantly contributes to enhancing academic performance by assisting in diverse tasks and assignments. Fifteen participants emphasized its advantageous impact across various academic activities, including coding-related tasks, project proposals, assignments and report writing. For example, two respondents contended that:

> ChatGPT has been particularly helpful in coding-related tasks and examinations and has contributed to my success in these areas (RESP6).

> I used the ChatGPT to prepare project proposals and complete assignments in class (RESP5).

The use of ChatGPT as a tool for specific tasks and assignments aligns with previous research findings that have shown that AI-powered tools, including chatbots and virtual assistants, can assist students in task completion and improve their academic performance (Fuchs, 2023).

Furthermore, the study revealed that ChatGPT enhanced the understanding and comprehension of course materials. Participants expressed how ChatGPT enhanced their understanding and comprehension of course material. They highlight simplified language, direct answers and additional explanations. For example, three participants mentioned,

> ChatGPT's simplified language makes it easier for me to understand course material. The direct answers and additional materials provided by the ChatGPT have also enhanced my understanding (RESP11).

> The course material is easier for me to understand thanks to ChatGPT's simplified language. My understanding has also been improved by ChatGPT's straightforward responses and supplementary materials (RESP 14)

> My comprehension of the course material is greatly aided by ChatGPT's use of simplified language. Its direct and supplementary material has been helpful in improving my understanding (RESP 2).

The use of simplified language by ChatGPT aligns with research suggesting the importance of plain language in facilitating comprehension and knowledge retention (Fuchs, 2023; Mhlanga, 2023). By presenting information in a straightforward manner, ChatGPT helps students overcome language barriers and grasp complex concepts more easily. This is particularly relevant in the Tanzanian context, where English may not be the first language for many students at Mzumbe University.

Challenges of using ChatGPT

The participants identified various challenges encountered when using ChatGPT in their educational activities. However, two individuals offered divergent viewpoints:

> Personally, I did not encounter any significant challenges or problems when using ChatGPT. It has made my life easier (RESP7).

> Using ChatGPT did not present any major obstacles or problems for me personally. In fact, it has greatly improved the efficiency and convenience of my academic life (RESP 11).

This finding indicates that some participants did not face any notable difficulties when using ChatGPT in their learning process. The absence of significant challenges reported by some participants suggests that ChatGPT is a helpful tool for educational activities, contributing to increased efficiency and convenience. These findings align with previous research, where AI tools such as ChatGPT have been recognized for their positive impact on learning processes (Tajik and Tajik, 2023). However, it is important to note that these findings may not reflect the experiences of all students, because challenges may vary depending on individual circumstances and academic requirements.

Furthermore, 12 participants highlighted drawbacks or inadequacies in ChatGPT's performance or functionality. For example, two participants mentioned:

> One drawback is that ChatGPT sometimes provides incorrect answers. This may require correction or verification from other sources (RESP5).

> There is one drawback I've found, ChatGPT occasionally gives inaccurate answers. Consequently, to guarantee the accuracy of the information gathered, careful verification must be done utilizing several sources, such Google or peer consultation (RESP 9).

This finding indicates that there may be instances in which ChatGPT may not always provide accurate responses, thus necessitating additional verification. The presence of inaccuracies in ChatGPT responses raises concerns regarding their reliability as sole sources of information. Participants emphasized the need to cross-verify the answers

provided by ChatGPT with other sources, such as Google or consulting with classmates and teachers. This finding is consistent with previous research, which indicates that students often cross-referenced with other sources when they encountered unreliable information or errors (Ali and Khowaja, 2023). Moreover, these findings are in line with previous research that highlighted the limitations of AI tools in terms of the accuracy and completeness of information. This underscores the importance of critical thinking and the role of human judgment in assessing the credibility of AI-based responses (Fuchs, 2023).

Moreover, 15 participants mentioned that encountering errors or unreliability in ChatGPT answers or data could affect their trust and confidence in using the tool for educational purposes. One participant stated:

> Encountering errors or unreliability in ChatGPT's answers decreases my trust in and confidence in using them. I relied on other sources to compare the information I received (RESP9).

Fifteen participants also mentioned the risk of ChatGPT data not being current, a limitation for rapidly evolving or new topics. Some respondents stated the following.

> ChatGPT's knowledge is limited to information from 2021 onwards, so it may not have answers to questions about earlier topics (RESP3).

> Sometimes, ChatGPT lacks specific literature reviews or data from previous sources (RESP11).

These findings highlight the challenge of outdated data in ChatGPT and their impact on addressing contemporary educational needs. Similar challenges have been identified in previous studies on AI chatbots in education (Fuchs, 2023). Furthermore, all the participants emphasized the importance of continuously updating the system's knowledge base to ensure relevance and accuracy. They stated:

> To keep up with the rapidly evolving educational landscape, AI chatbots should be designed to access and incorporate updated information (RESP13).

Shidiq (2023) also noted the need for ongoing improvements to address the limitations of AI chatbots while keeping up with rapidly evolving topics.

This section highlights the difficulties encountered when using ChatGPT in education, including sporadic inaccuracy and the requirement for cross-verification. Participants highlighted the limitations of the old data and the effect of inaccuracies on trust. To accommodate changing educational demands, ongoing updates are crucial (Borji, 2023; Fuchs, 2023; Shidiq, 2023). For ChatGPT to perform its full potential in educational contexts, it is essential to recognize and address these problems.

Factors impacting the use of ChatGPT in learning activities

The results of the study on the variables affecting the use of ChatGPT for educational purposes point to several major topics. Ten participants highlighted how seeing other people use ChatGPT has an influence. For example, one participant emphasized the impact of watching others using ChatGPT:

> I saw others using it, and I started using it too (RESP8).

The results show that social acceptance and peer pressure play a significant role in how widely ChatGPT is used as a teaching tool. This is consistent with earlier studies by Faqih (2022) and Kurdi *et al.* (2020), who also emphasized the impact of social variables on the adoption of educational technologies. The time-saving benefit of ChatGPT was emphasized by another participant, who stated the following:

> I can finish projects that would have taken me a week in just two days (RESP6).

Other 13 participants agreed with this statement, indicating that ChatGPT's time-saving benefit is widely acknowledged. This emphasizes the importance of productivity and efficiency in determining whether to use ChatGPT. This conclusion is corroborated by Mhlanga (2023) who emphasized the importance of time-saving advantages in the adoption of AI tools in education. Eleven participants also listed ease of use and a lack of need for in-depth expertise as reasons for using ChatGPT during the learning process. One respondent stated:

> It is simple to use and does not require deep understanding such as Google Bard (another source) (RESP4).

This shows that ChatGPT's appeal as a learning tool is mostly because its user-friendliness. Similar findings were observed by Surameery and Shakor (2023), who stressed the significance of ease of use in the adoption of educational technologies. Fourteen participants identified higher thinking skills, greater information, time savings and the ability to assist others as the main advantages or benefits of using the ChatGPT system. For example, one respondent stated:

> This enhances one's capacity to think, broadens knowledge, saves time, and enables one to assist others (RESP1).

This result is consistent with earlier studies on AI tools in education, which emphasize the potential for cognitive advantages to impact ChatGPT in educational tasks (Fuchs, 2023; Mhlanga, 2023).

The results imply that the observable advantages and simplicity of usage significantly influenced the participants' choice to continue using ChatGPT as a learning tool. This shows that the perceived value of ChatGPT and its successful educational outcomes are factors in its continued use.

Recommendations

This section presents suggestions to improve the incorporation of AI-based chatbots into educational settings, based on research findings and insights regarding the impact of ChatGPT on Mzumbe University students' digital learning experiences.

Collaboration and continuous improvement

It is critical for ChatGPT creators to work together with educators and students to consistently enhance programmers' effectiveness in addressing issues related to inaccuracies. Collaboration with academic institutions may result in updates that are more useful and pertinent, ensuring that ChatGPT continues to be a dependable and beneficial learning tool.

Complete digital literacy training

To properly use ChatGPT, universities should place a high prioritize providing students and educators with complete digital literacy training. This education should cover the limitations of AI technology, best practices for cross-referencing credible sources and critical thinking abilities to assess materials provided by AI. Students who have received solid digital literacy education can use AI tools with discernment.

Enhance socio-emotional help

While ChatGPT provides beneficial intellectual help, it is imperative to combine its use with interpersonal contact. To meet the holistic requirements of students, educators should keep putting a prioritize personal interactions, encourage meaningful discussions and provide socio-emotional support. Overall educational experience can be improved by creating diverse and encouraging learning environments.

Study and ethical issues

As ChatGPT and other AI-based technologies continue to influence education, more studies are required to examine their long-term effects on students' learning results, ethical ramifications and privacy issues. The creation of and adherence to ethical standards for the use of AI in education will protect student rights and encourage responsible usage. Following these suggestions will enable universities to take full advantage of ChatGPT's promise to transform student access to digital learning. Responsible AI-based technology integration and proactive problem-solving will pave the way for a more equal, efficient and enjoyable educational experience for all students. A well-rounded and revolutionary learning environment will result from embracing ChatGPT as an additional tool, in addition to individualized education, to prepare children for success in the digital age.

Conclusion

This study offers insights into the integration of ChatGPT and its effects on the online learning environment at Mzumbe University. The results demonstrate how commonly ChatGPT is used and how it has changed how students study. It has been demonstrated to be a useful tool that favorably affects study habits, academic performance and the comprehension of course material. Its broad use among students is partly because of the convenience of quick and precise responses, individualized explanations and ease of use.

The factors that affect how widely ChatGPT is used in education have been determined. Social acceptance and peer pressure are key factors in deciding whether to use an AI-based application. Its popularity among students is also influenced by its advantages in terms of saving time, ease of usage and lack of specialized technical knowledge. Students also acknowledged the cognitive advantages of ChatGPT, such as improved knowledge and higher-order thinking abilities, as significant factors in their decisions to use it.

Through its support of numerous chores and assignments, ChatGPT has an obvious impact on academic success. It has facilitated better student performance in tasks involving coding, project proposals, assignments and report-writing. This has improved the students' comprehension of the course material, leading to superior academic results because of its straightforward language and solutions.

Despite its many advantages, the use of ChatGPT has also been linked to difficulties. Students started cross-verifying materials from other sources because sporadic mistakes in responses created questions about the validity of the instrument. Potential drawbacks have been noted, particularly in fast-growing fields such as outdated data and the need for ongoing updates. In addition, the tool's inability to adequately address the socio-emotional aspects of learning may have affected the learning process.

Implications for research, practice and society

Research: The knowledge of incorporating ChatGPT in Tanzanian higher education is emphasized by this study. Positive results, which highlight time savings, easier access and

cognitive advantages, are consistent with AI research. Problems like sporadic errors draw attention to the necessity of regular updates and motivate more study for the successful application of AI in education.

Practice: Educators can maximize ChatGPT in the classroom by using study insights. Its advantages, such as effectiveness and enhanced performance, highlight the possibility for student-centered learning. Practitioners are guided by their awareness of problems, such as probable errors. Constant updates guarantee ChatGPT's applicability and provide educators with useful advice.

Society: Peer impact is highlighted in this study concerning social factors on the adoption of AI in education. Resolving issues preserves public confidence. Views influence public opinion and direct policymakers in discussions about safe AI use. It influences public attitudes while navigating the ethical integration of AI.

Theory/practice: With established literature as a basis, the research accomplishes a smooth integration of theory and practice. The research is directed by foundational studies (Bozkurt, 2023; Fuchs, 2023; Latif *et al.*, 2023; Surameery and Shakor, 2023; Lund and Wang, 2023; Mhlanga, 2023; Haleem *et al.*, 2023; Ali and Khowaja, 2023) that guarantee a theoretical foundation. These studies indicate important elements and obstacles in the adoption of AI in education, which help to determine the investigation's focus. With the help of foundational studies, the study combines theory and practice to address important issues and obstacles related to the adoption of AI in education. ChatGPT's use at Mzumbe University is examined, and the analysis provides useful implementation insights that guarantee the applicability of the findings in actual educational settings.

Limitations

It is important to recognize the limitations of this study. First, the sample size was small, limiting the broad application of the results. Second, this study's narrow emphasis on students at Mzumbe University limits its applicability in other situations. Furthermore, depending on self-reported experiences, biases, such as individual interpretation or recollection bias, can occur.

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