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ChatGPT (AI) Integration into Teaching and Learning: Opportunities and Challenges

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Abstract

As studies about artificial intelligence (AI) in the education sector increase, some scholars believe that teachers' roles in instruction-delivery may change drastically. This conceptual paper, thus, sets out to establish the role, benefits and challenges that are associated with the utilisation of ChatGPT (Generative Pre-trained Transformer) in learning. Ultimately, this analysis reveals that while generally ChatGPT has benefits, it has a number of drawbacks too. Consequently, the advantages and benefits of ChatGPT in learning as discussed in this chapter include: provision of instant feedback, audio-language tutoring, offers interactive learning, helps brainstorm ideas on new topics, enables automatic test-grading, offers personalised tutoring and provides lesson-preparation assistance to educators. On the other hand, the drawbacks of ChatGPT include: integrity and ethical issues, interferes with students' development of core-competencies/skills, leads to over-reliance on AI, generation of inaccurate information and unfair assessment of learning/ learners. It is thus, recommended that instructors and teachers supervise the integration of ChatGPT in learning environments and guide learners on how and when to utilize the programme. Accordingly, proper acknowledgement should be an integral part of ChatGPT utilisation in learning and research.

Keywords: Artificial intelligence, ChatGPT, Benefits, Advantages, Risks, Challenges, risks

Introduction

Rapid technological developments in the 21st century have impacted several sectors including education. The integration of technology into educational systems has helped modify and bring about positive change in pedagogical strategies and approaches, all aimed at maximizing learners' experiences and educational outcomes. Consequently, educators are increasingly incorporating technological innovations such as artificial intelligence (ChatGPT, Google Bard), pre-recorded video lessons, electronic-books and remote/online lessons into their day-to-day instruction-preparation and delivery (Sullivan, Kelly, & McLaughlan, 2023).

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That notwithstanding, integration of technological tools into learning requires proper policies and guidelines. Consequently, effective integration and adoption of technology by school systems should result in equitable responsive pedagogies, far from the traditional teacher centred-strategies and approaches that previously dominated learning. Furthermore, Turgut and Aslan, (2021) contend that successful technological integration in learning should promote and foster an innovative culture and student-cantered pedagogical goals. Similarly, García-Peña, Mora-Marcillo and Ávila-Ramírez (2020) indicate that effective integration of technology in learning improves students' knowledge construction, creates student-cantered learning environments and also promotes independent learning.
Notably, several frameworks and policy guidelines that explain how to effectively incorporate technology into educational systems exist. However, the majority of educators adopt frameworks that advocate for the utilisation of text-based digital content in conjunction with the traditional teaching-learning approaches, ultimately negating the benefits of technological integration in learning, and eventually resulting in low learning outcomes (Jackson, 2016).

Adoption of Artificial Intelligence (AI) in Learning

The education sub-sector, in a bid to respond to emerging technologies, is selectively embracing artificial intelligence and its related tools in learning. There is no agreed-upon definition of artificial intelligence. According to Forman, Udvaros and Avornicului (2023), the phrase "artificial intelligence" describes machines, particularly computers that mimic human behaviour and thought processes, such as speech, learning or problem-solving. Subsequently, speech recognition, natural language processing, machine-vision and images are all applications and functions of Artificial intelligence.

Hence, advances in "machine learning" and "deep learning" algorithms, along with the availability of extremely potent computing power coupled with access to massive amounts of data, have enabled the utilisation and adoption of Artificial intelligence in various systems including the education sector. The utilisation and adoption of artificial intelligence in the classrooms takes various forms and include: artificial intelligence tutoring, data tracking and monitoring programmes, adaptive learning software and grading and grade-book automation. Remote/online learning which is also an application of artificial intelligence has, since its introduction, personalised and optimised educational processes around the world *(*Elsen–Rooney, 2023). However, concerns about ethics, data security and human rights are continuously being raised even as Artificial Intelligence continues to take centre stage and dominate teaching and learning processes the world over (Jara & Ochoa, 2021).

García-Peña, Mora-Marcillo and Ávila-Ramírez (2020) contend that learning processes have been significantly enhanced by artificial intelligence technologies while other several studies report otherwise. This chapter, thus, delves into the benefits and challenges that emanate from the adoption and utilisation of ChatGPT and other related artificial intelligence technologies in education and other learning environments.

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ChatGPT

ChatGPT (Generative Pre-trained Transformer) is an Artificial Intelligence Tool (Chatbot) that produces human-like responses through its natural language processor and engages in natural-sounding conversations when prompted (Deng & Lin, 2023). Accordingly, ChatGPT can undertake more complex tasks as compared to other available artificial intelligence tools and as a result, since its introduction in November 2022, ChatGPT has gained traction amongst teachers, students and researchers. Consequently, the integration and utilization of ChatGPT in education has stirred debates and varied views from learners, instructors and educators worldwide. Accordingly, other tasks that ChatGPT undertakes include: writing poems, articles, essays and computer codes, together with summarising, translating and expanding texts (Tate et al, 2023; Williams, 2023). Consequently, due to ChatGPT's efficacy, learners are increasingly utilizing it for academic, personal and social purposes (Forman, Udvaros, & Avornicului, 2023). Thus, this systematic review aims to explore the opportunities and challenges of the utilization of ChatGPT in educational settings.

Although artificial intelligence is not new in the educational paradigm, the emergence of ChatGPT has raised debate questioning aspects of education such as instructional methodology and assessment. Consequently, while some experts perceive ChatGPT and related Artificial Intelligence tools as the future of teaching and learning, others believe that they impede the development of core competencies and attributes such as analytical skills and problem-solving abilities (Baidoo-Anu & Ansah, 2023). As a result, most learning institutions have prohibited learners from utilizing the program (Sullivan, Kelly & Mclaughlan, 2023; Elsen–Rooney, 2023).

Nevertheless, integration of Artificial intelligence in learning, on the other hand, has the potential to maximize student's learning outcomes and experiences (Forman, Udvaros, & Avornicului, 2023; Opara, Theresa & Aduke, 2023), implying that prohibiting ChatGPT's usage in teaching and learning might not be the best approach. Educators and instructors should instead adequately explore ChatGPT's impact on teaching and learning and provide requisite regulations and guidelines with regard to its incorporation in learning, ethically and credibly (Baidoo-Anu & Ansah, 2023). Hence, educators should consider incorporating ChatGPT into the education system and at the same time adjust and strengthen teaching, examination regulations and standards. Accordingly, responsive institutional protocols and assessment practices should be developed to cater for integrity issues that result from adoption of artificial intelligence in learning institutions.

Similarly, Grassini (2023) indicates that ChatGPT has raised questions concerning its role in a human world. Accordingly, subsequently, there are questions as to whether or not chatGPT will lead to a rise in misinformation or ultimately replace human skills. In the educational sector however, concerns are mostly centred on dishonesty and integrity in examinations and in course assignments. Out of this concern, a large number of learning institutions and more so, colleges and universities have banned its usage and are calling for the redesigning of course assignments in a bid to circumvent the unethical and dishonest utilisation of ChatGPT by students in unauthorised areas of learning (Elsen-Rooney, 2023; Grassini, 2023). Hence, proper induction of learners and teachers is necessary, if only to achieve proper ChatGPT use and enhanced learning outcomes.

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Benefits and Prospects of ChatGPT

Unlike other Chatbots, ChatGPT is unique in that that it generates nearly human-like, relevant speech responses in a conversation-like manner. The conversation tone with ChatGPT seems like online chatting between two humans. ChatGPT, thus, presents countless opportunities for educators, teachers and researchers because of its ability to understand and contextualises spoken and written language (Baidoo-Anu & Ansah, 2023). Consequently, ChatGPT subscription-model offers additional features that include an internet browsing tool and access to more current information than the original subscription-free model. According to Montenegro-Rueda et al (2023), ChatGPT usage and adoption in research and education has the ability to enhance and optimize educational and learning experiences if well implemented. However, its adoption and implementation requires that educators thoroughly familiarise themselves with how it works. Qadir (2022) indicates that artificial intelligence tools influence learners' everyday lives, hence banning ChatGPT in academic settings may not be the best solution.

One advantage of ChatGPT in education is that it can be utilised to evaluate educational programs while also providing instant feedback on students' performance. Immediate feedback particularly motivates students while also heightening their curiosity and the need to perform better in the next test (Oranga, 2023). .Furthermore, instructors can also utilize ChatGPT to assess their own knowledge of the subject matter

ChatGPT too, fosters individualised/personalised learning and adapts instruction to each learner's interests and learning pace while also providing the learner with constant support in the process (García-Peña, Mora-Marcillo & Ávila-Ramírez (2020). As a result, ChatGPT is increasingly being perceived as a technology with great teaching potential due to its ability to customise instruction and offer customised learning. Needless to say, individualised learning meets the learner at her/his point of need and responds to each learner's deficiencies (Mhalanga, 2023; Qadir, 2022). Notably, individualised learning motivates learners while also increasing their curiosity. ChatGPT thus, adapts to individual students' learning pace enabling them to progress at their own speed while also providing personalised support based on their unique needs.

On the other hand, ChatGPT promotes cooperative and collaborative learning amongst learners by allowing students to undertake group-work assignments. The learners hold discussions and collectively undertake research and eventually communicate their findings. This enhances learners social and communication competencies while also developing teamwork skills (Oranga, 2023). ChatGPT is, thus, a learning motivator for both individual and collective learning.

Another advantage of ChatGPT is that it is easy to adopt and utilize by both learners and teachers. The tool can seamlessly and easily be integrated into classroom learning activities, ultimately breaking the monotony of caused by traditional teaching-learning methodologies. Particularly, chatGPT helps enhance pedagogical practices through the development of new teaching approaches and may also help to develop and design curricula, curse-outlines, content, learning resources and learning assessment activities, eventually helping free up time for instructors and educators to focus on other pertinent instructional activities (Grassini, 2023). Similarly, Sullivan, Kelly and Mclaughlan (2023) contend that ChatGPT provides support in the development and generation of learning activities, eventually enabling educators to focus on other significant classroom issues.

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Needless to say, for effective utilization of ChatGPT in school settings to be realised, educators should be appropriately trained to enable them understand ChatGPT's benefits and limitations. Moreover, educators should acquaint themselves with ChatGPT's associated pedagogical and ethical challenges and setbacks. Hence, the implementation of ChatGPT should be done in a reflective manner to ensure a healthy and responsible classroom environment. Furthermore, its adoption and utilization in the classroom and the entire education system should be keenly evaluated to ensure that it does not replace acquisition of critical and evaluative skill. Furthermore, it should never replace the teacher or the instructor. Apparently, with proper implementation and constant supervision, ChatGPT can open up new educational possibilities and greatly enrich the teaching and learning process.

Limitations and Challenges of chatGPT

As discussed earlier, while some experts perceive ChatGPT and related Artificial Intelligence tools as the future of teaching and learning, others believe that they in essence impede the development of core competencies and attributes such as analytical skills and problem-solving abilities (Baidoo-Anu & Ansah, 2023). As a result, some learning institutions have prohibited learners from utilizing ChatGPT (Sullivan, Kelly & Mclaughlan, 2023; Elsen–Rooney, 2023).

To begin with, ChatGPT's knowledge is limited as it has not had an update since 2021 (Topsakal & Topsakal, 2022), implying that ChapGPT's responses may not always be correct or reliable. This is particularly true with regard to topics on specialised events and occurrences. This poses a challenge to learners and educators who rely on it for updates and research. Accordingly, ChatGPT may also not be able to access the most current available evidence, thus, generating stale information (Kleebayoon & Wiwanitkit, 2023).

Concern has also been raised with regard to bias in the responses and information provided by artificial intelligence tools like ChatGPT (Kleebayoon & Wiwanitkit, 2023). This is because ChatGPT is built upon vast amounts of data from all kinds of articles and online forums, some of which may be biased toward other races or gender. These websites may use harmful language, resulting in ChatGPT using this same harmful language in response to related topics, ultimately spreading and perpetuating bias, harm and disharmony in the society. Furthermore, according Sallam, (2023), since ChatGPT is reliant on training data, if the training data has biases, then responses from ChatGPT will also be biased. Accordingly, the main biases include overreliance on studies from high-income nations, gender and demographics biases (Sallam, 2023).

Similarly, Sallam (2023) and Rahimi and Abadi (2023) indicate that lack of precision and reliability is a significant drawback in ChatGPT use. The authors explain further that ChatGPT was trained on massive amounts of unpolished, raw data, raising the issue of ChatGPT's precision and reliability (Sallam, 2023). Thus, the precision and quality of ChatGPT's outputs is a concern as it depends upon the data it was trained on.

Moreover, another drawback of ChatGPT is that while it is good at sounding convincing, it does not check facts, ultimately increasing and disseminating misinformation in the communities. Similarly, Topsakal and Topsakal (2022) contend that ChatGPT easily provides responses that are incorrect or nonsensical but sound plausible. This essentially implies that ChatGPT may generate responses that

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are coherent and well-written but are unsubstantiated and erroneous. Have (2023) also reports that ChatGPT fabricates convincing responses using non-existent references and URLs in its feedback while Kleebayoon and Wiwanitkit, (2023 contend that the reliability and accuracy of information generated by ChatGPT should be determined. This is because, quite often, it provides erroneous information. This may ultimately, result in learners' receiving confusing information that may significantly impact their learning and knowledge acquisition. Hence care should be taken to countercheck ChatGPT generated information before adopting or utilizing it.

Furthermore, ChatGPT impedes academic integrity thereby weakening learners' abilities to critically think and create individualized original content. In the same vein, Elsen-Rooney (2023) also indicates that ChatGPT utilization by students can have significant negative impact on student learning and development and academic integrity. Accordingly, ChatGPT usage may circumvent students' needs to learn and comprehend instruction and respond effectively.

Moreover, ChatGPT also reduces the ability of students to handle complex situations since ChatGPT's knowledge foundation is based on pre-existing knowledge. This is heightened by the lack of acknowledging ChatGPT utilisation by learners after its utilization. . Kleebayoon and Wiwanitkit (2023) contend that failure to cite or acknowledge ChatGPT after its use should amount to academic misconduct. This is context of the fact that studies have established that sophisticated Artificial intelligence tools can bypass traditional plagiarism tools such as Turnitin, enabling students to present and pass ChatGPT-generated content as their own (Khalil & Er, 2023; Basic, Banovac, Kruzic, & Jerkovic 2023). This should be a concern for educators worldwide.

Furthermore, ChatGPT masks students' learning deficiencies and hinders effective student evaluation. Consequently, educators struggle to determine individual students' correct level of understanding of content. This also eventually interferes with educators' ability to intervene early on learners' with manageable learning difficulties (Sullivan, Kelly, & McLaughlan, 2023; Grassini, 2023).

Ultimately, the over-dependence on ChatGPT may lead to ineffective development of core skills as learners can create work and complete homework based entirely on ChatGPT's output and not their own decision-making and analytical skills (Sok &Heng, 2023). Hence, over-use of ChatGPT may hinder the emergence of significant competencies such as problem-solving, critical thinking, research abilities and imagination in learners. This may eventually negatively impact students' academic and professional success (Sok & Heng, 2023). Hence, it should always be borne in mind that ChatGPT or artificial intelligence generally, come with ethical issues and challenges worth considering before intergrading them it into learning.

On the whole, the integration of artificial intelligence as a learning complementary tool in the teaching–learning process has shown promise and subsequently generated varied research (Kleebayoon & Wiwanitkit, 2023; Oranga & Gisore 2023). From the studies, artificial intelligence, and specifically, ChatGPT, can enhance learners' academic performance. Additionally, due to the provision of quick and accurate responses (in most instances) to questions, ChatGPT enables access to relevant information that is beneficial to students, generally (Khalil & Er, 2023).

Therefore, it is imperative to continue to investigate and explore the potential of artificial intelligence and its effect on learning and instruction. ChatGPT is still evolving, thus, it requires constant research

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on its usage and limitations. As more studies are undertaken and knowledge about ChatGPT utilization in education increases, more understanding and insights will be developed. Hence, it is imperative to consider and evaluate all the known challenges and limitations of ChatGPT, and especially those related to inaccuracy and integrity before utilizing ChatGPT in educational settings (Rudolph, Tan & Shannon, 2023).

Conclusion

ChatGPT's drawbacks should be adequately addressed in order to ensure effective Artificial intelligence adoption and its unbiased ethical use in educational environments. It is a fact that issues of academic integrity are threatening the adoption and utilization of ChatGPT in educational settings and gets worse when students fail to acknowledge their utilization of ChatGPT on assignments and homework. As stated above, the utilisation of ChatGPT in education systems also brings about benefits and challenges that educational stakeholders need to be aware of in order to enhance the quality of education provided in classrooms. Study findings on ChatGPT utilization in education are still scarce, since it was launched only in 2022. However, the integration of ChatGPT in education has emerged as a promising, innovative tool that seeks to improve learning experience and enhance greater interaction amongst learners and between learners and teachers and has immense potential to transform instructional and learning strategies. Hence, ChatGPT can aid educational institutions in positively changing educational efficiency and help learners adapt and respond to societal needs. Conclusively, security and privacy of student data should be upheld and educators must direct and play a leading role in the utilization of artificial intelligence in educational settings even as integrity issues associated with ChatGpt issues are addressed.

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