

Enhancing the quality of teaching and learning through Gemini, ChatGPT, and similar generative Artificial Intelligence: Challenges, future prospects, and ethical considerations in education

Nitin Liladhar Rane^{1,*}

¹Vivekanand Education Society's College of Architecture (VESCOA), Mumbai, India

Received: 20.11.2023 • Accepted: 15.02.2024 • Published: 20.02.2024 • Final Version: 28.02.2024

Abstract: The integration of Artificial Intelligence (AI) into the field of education has ushered in a transformative shift in the creation and dissemination of assignments. This research delves into the implications and complexities surrounding the incorporation of AI-enhanced Gemini and ChatGPT submission in education. AI-enhanced Gemini and ChatGPT submissions offer a multitude of benefits. First and foremost, they offer educators a convenient means to produce a wide array of content, encompassing quizzes, essay prompts, and problem sets, thus saving both time and effort. AI has the capacity to customize assignments according to the specific needs of individual students, ensuring personalized learning experiences. Additionally, AI's ability to analyze student performance data can aid educators in pinpointing areas where students might be facing challenges, allowing them to adapt their teaching methods accordingly. Nonetheless, this innovation also raises substantial concerns. The authenticity and quality of AI-generated submission may come under scrutiny, potentially giving rise to issues of plagiarism and academic integrity. It is crucial to ensure that AI-generated content aligns with educational objectives and standards. Before disseminating AI-generated submission to students, educators must meticulously curate and review them. Furthermore, the role of teachers in the educational process extends beyond merely assigning tasks. They provide mentorship, guidance, and feedback that surpass the capabilities of ChatGPT. This human touch is indispensable for nurturing critical thinking, fostering creativity, and enhancing emotional intelligence. Ethical considerations also play a pivotal role. Both students and educators must comprehend how AI-generated assignments are created, ensuring transparency in the process. Safeguards must be in place to safeguard data privacy, and measures need to be taken to address bias in AI algorithms. Hence, it is imperative for teachers and educational institutions to critically evaluate the place of AI in education and determine the circumstances under which AI-generated assignments can be integrated to enrich the educational landscape.

Keywords: ChatGPT, Generative AI, Artificial Intelligence, Critical Thinking, Education, Teaching and Learning.

1. Introduction

In recent years, the rapid integration of artificial intelligence (AI) into education has sparked extensive discourse concerning its influence on traditional pedagogical methods and practices [1,2]. One particular area of focus revolves around the application of AI-generated submissions, where sophisticated algorithms like ChatGPT, powered by GPT, are capable of crafting assignments and

* Corresponding Author: nitinrane33@gmail.com

evaluations for students [3]. This prompts the central question of whether educators should embrace and adopt AI-generated assignments within the educational framework. This article embarks on an exploration of the advantages and drawbacks associated with the incorporation of AI-generated assignments into educational methodologies, examining the potential benefits and challenges they entail. Artificial intelligence has permeated various facets of the educational landscape, reshaping teaching and learning processes [4]. Notably, AI-generated assignments have gained prominence, which involves employing AI technologies to generate assignments, homework, quizzes, and even exam questions. This paradigm shift has been made feasible by the remarkable advancements in natural language processing and machine learning technologies, empowering AI systems like ChatGPT to comprehend and generate text resembling human expression at an unprecedented level of sophistication.

2. Advantages of Gemini, ChatGPT and other Generative AI in Education

Enhanced Efficiency and Time Savings

AI-generated assignments offer a substantial boost to the efficiency of the educational system [5,6]. Educators frequently expend significant time and effort in crafting assignments, grading papers, and furnishing feedback to students [1,6]. AI-generated assignments can automate these tasks, affording teachers more time to allocate towards other crucial educational responsibilities. This temporal advantage is particularly valuable in the context of overcrowded classrooms and burgeoning teacher workloads.

Personalized Learning

AI-generated assignments are amenable to customization, catering to the unique learning requisites of individual students [4,7]. These assignments can adjust to a student's level of comprehension and learning pace, offering tailored exercises and evaluations [1,4]. Personalized learning, a proven enhancer of educational outcomes, becomes more accessible through AI-generated assignments.

Augmented Feedback

AI-generated assignments supply instantaneous, comprehensive feedback to students [8]. This immediate feedback aids students in recognizing and learning from their errors, thereby fostering a deeper understanding of the subject matter. Additionally, AI can track a student's progress over time, enabling educators to pinpoint areas where individual students may require additional support.

Mitigation of Bias

Human biases can inadvertently permeate assignments and assessments, potentially compromising their fairness and objectivity [9]. AI-generated assignments are impervious to personal biases, ensuring a more equitable appraisal of students' work.

Access to an Abundance of Resources

AI systems, like ChatGPT, have access to an extensive repository of information and resources that they can utilize to generate assignments. This empowers students to delve into a wider spectrum of subjects and resources, enriching their learning journeys. Table 1 shows the enhancement in the quality of teaching and learning through Gemini and ChatGPT.

Table 1 Enhancing the quality of teaching and learning through Gemini and ChatGPT

Area	Opportunities	Challenges	Future Prospects	Ethical Considerations	Gemini Suitability	ChatGPT Suitability
Personalized Learning	AI-powered adaptive lessons customized to each student's abilities and pace.	Potential to neglect the social and collaborative aspects of learning.	Integrating personalized learning models that involve social interactions.*	Data privacy concerns - need for responsible AI that protects student data and learning patterns.	Highly Suitable: Gemini's access to up-to-date information and adaptability would cater well to varying student needs.	Highly Suitable: ChatGPT's language generation capabilities can create custom lesson content and feedback.
Content Generation	Rapid creation of lesson plans, quizzes, study materials, and tailored feedback.	Over-reliance on AI-generated content may lessen teacher creativity and control over curriculum design.	Teachers as curators and editors of AI-generated content.	Potential for AI-generated content to contain biases or misinformation.	Moderately Suitable: Gemini can curate and assemble information-rich resources for teachers.	Highly Suitable: ChatGPT's strength lies in quickly generating text-based content of different varieties.
Student Assessment	AI-powered essay grading and analysis of complex written works.	Risk of failing to evaluate original thinking and nuanced student understanding.	Developing assessment tools that combine AI with human evaluation for multifaceted insights.	Ensuring that AI-powered assessment does not disadvantage specific student groups.	Limited Suitability: Gemini's current capabilities may not offer robust, unbiased evaluation of student work.	Moderately Suitable: ChatGPT can grade basic writing mechanics but struggles with deeper critical analysis.
Creativity Support	Tools for brainstorming, ideation, and visual presentation of concepts.	Excessive dependence on AI may hinder independent imagination and problem-solving abilities.	Emphasis on using AI as a collaborative ideation tool rather than a substitute for creative thinking.	Developing guidelines to prevent AI-generated content from being passed off as original student work.	Moderately Suitable: Gemini can offer factual or research-based ideas as starting points.	Highly Suitable: ChatGPT can generate unusual text combinations and prompts to stimulate creativity.
Accessibility	Real-time language translation and text-to-speech tools for improved learning for diverse learners.	May widen the accessibility gap for students without reliable internet or device access.	Advocacy for equitable access to AI-powered educational technology.	Ensuring AI models address diverse cultural and linguistic backgrounds to avoid biases.	Highly Suitable: Gemini's adaptability and knowledge about a vast range of information offer great potential for accessible	Highly Suitable: ChatGPT can effectively translate and adapt language for different learners.

3. Challenges of Gemini, ChatGPT and other large language models in teaching and learning

Diminished Creativity and Personalization

While AI-generated assignments offer personalization to a certain extent, they may lack the creativity and personal touch that a human teacher can provide [1,10]. The human element in teaching entails empathy, understanding, and the capacity to tailor assignments in accordance with a student's unique strengths and weaknesses. AI systems may not adeptly capture these nuances.

Risk of Plagiarism

As AI-generated assignments become increasingly sophisticated, students might employ AI to craft assignments and present them as their original work [11,12]. This raises concerns of plagiarism, rendering it challenging for educators to differentiate between genuine student work and AI-generated content. The utilization of AI-driven tools such as ChatGPT in the realm of education has yielded both advantages and apprehensions, with one of the most prominent concerns revolving around the specter of plagiarism [13,14]. Plagiarism arises when students present the work or ideas of others as their own, and AI tools have the unintended capacity to exacerbate this issue in multiple ways. In the first instance, ChatGPT produces text that can often pass as human-authored content. Consequently, when students employ this AI for their academic assignments or essays, they may inadvertently integrate entire or partial responses generated by ChatGPT without adhering to the necessary citations, thereby infringing upon established academic integrity norms. Secondly, AI-powered content generation simplifies the process of "copy and paste" from the internet, bypassing the need for comprehensive research and genuine comprehension. This shortcut undermines the educational process by circumventing the requirement for in-depth investigation, thereby fostering a shallow grasp of the subject matter and knowledge deficiencies.

Furthermore, ChatGPT might, without intention, supply incorrect or misleading information [15,16]. If students incorporate such data into their academic work, it can detrimentally impact the quality and precision of their submissions. To counteract the peril of plagiarism within educational settings, institutions and educators must institute proactive strategies. These measures may encompass comprehensive instruction on plagiarism and citation conventions, the promotion of critical thinking and original thought, and the implementation of plagiarism detection software. Additionally, they should adapt assignments and assessments to necessitate personal analysis, interpretation, and the synthesis of information, making it more challenging for students to rely solely on AI-generated content. Although AI tools like ChatGPT have the potential to augment the educational experience, they concurrently pose a substantial risk of plagiarism owing to their ability to generate text that closely resembles human authorship. It is imperative for educational institutions to remain watchful and proactive in addressing this challenge, thus upholding academic integrity and cultivating a genuine learning environment.

Ethical Considerations

The use of AI-generated assignments raises ethical dilemmas [17]. Educators must weigh the impact on students, including the potential deprivation of authentic learning experiences through excessive reliance on AI. It is essential to ensure that AI-generated assignments conform to ethical and

educational standards. The incorporation of AI chatbots, such as ChatGPT, into the field of education raises numerous ethical considerations [18]. Foremost among these is the imperative to prioritize data privacy and security, ensuring the protection of student data and its exclusive use for educational purposes. Obtaining informed consent is a fundamental requirement, ensuring that both students and their guardians are fully informed about the utilization of AI, data management, and the option to opt out if any concerns arise. Addressing issues of bias and fairness is paramount, as AI models can inadvertently inherit biases from their training data. Proactive measures are necessary to minimize any potential discriminatory effects. Transparency is of utmost importance, with educational institutions obligated to be forthcoming about both the utilization of AI and its limitations. Preserving the role of educators, maintaining human supervision and accountability, is vital to ensure that AI enhances the learning experience without replacing it [19]. Striking a balance between customization and accessibility is crucial. Furthermore, the long-term implications, such as job displacement and cultural sensitivity, should be carefully considered. Additionally, it is essential to define intellectual property rights and establish mechanisms for accountability and redress. Achieving this equilibrium is imperative in the responsible utilization of AI's potential within the realm of education.

Data Privacy and Security

AI-generated assignments may necessitate the collection and storage of student data, invoking concerns about data privacy and security. Educational institutions must ensure that the data used for generating assignments is safeguarded and used responsibly.

Learning Quality

A potential concern is that ChatGPT and similar AI-generated assignments may not consistently yield high-quality educational experiences [20,21]. While AI can generate content, it may not possess an in-depth understanding of the pedagogical principles that underpin effective teaching. Consequently, educators must ascertain that the quality of AI-generated assignments aligns with their educational objectives.

4. The Role of Teachers

Amid the advantages and challenges inherent to AI-generated assignments, the role of educators in this evolving educational landscape holds a pivotal significance [22,23]. Teachers should contemplate the following aspects when determining whether to embrace and implement AI-generated assignments:

Augmentation, Not Replacement

AI-generated assignments should be viewed as tools that enhance the teaching and learning process, not as substitutes for teachers. Teachers can leverage AI-generated assignments to free up time for more personalized instruction, mentorship, and support.

Quality Assurance

Educators should actively participate in curating and overseeing assignments generated by AI systems. They can review, modify, or endorse assignments to ensure they align with the educational objectives and standards of their curriculum.

Ethical Considerations

Teachers must remain vigilant regarding the ethical implications of deploying AI-generated assignments. They should weigh the impact on students' intellectual development and assess whether AI usage aligns with their educational philosophy and ethical principles.

Balance Between Automation and Human Element

Striking the right balance between automation and the human element in education is imperative. While AI can streamline administrative tasks and offer feedback, educators should continue providing emotional support, guidance, and mentorship, elements that AI systems cannot replace.

Training and Professional Development

As AI continues to evolve, teachers should receive training and professional development to effectively integrate AI-generated assignments into their teaching and learning practices. This ensures that educators are well-prepared to harness the benefits of AI while addressing its challenges.

5. Conclusions:

AI-enhanced submissions in education signify a promising development with the potential to amplify the efficiency, personalization, and overall quality of the learning experience. Nevertheless, they also introduce challenges related to creativity, ethics, and the human dimension of teaching. The decision of whether teachers should accept assignments generated by Gemini, ChatGPT or any AI-generated content should be approached with deliberate consideration of their educational goals, the needs of their students, and their ethical principles. Ultimately, AI-generated assignments should be seen as potent tools that augment the role of educators rather than replacing them. The optimal approach involves the judicious integration of AI technologies, with teachers guiding and supervising AI-generated assignments to ensure alignment with their educational objectives, preserving the indispensable human touch in the learning process. The future of AI in education undoubtedly holds immense promise, and it falls upon educators, institutions, and policymakers to shape its trajectory and guarantee that AI contributes positively to the educational realm. The incorporation of AI-generated submission represents just one facet of this broader dialogue, emblematic of the ongoing evolution of education in the digital era.

References

- [1] Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and individual differences*, 103, 102274.
- [2] Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 410.
- [3] Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, 7(1), 52-62.
- [4] Opara, E., Mfon-Ette Theresa, A., & Aduke, T. C. (2023). ChatGPT for teaching, learning and research: Prospects and challenges. Opara Emmanuel Chinonso, Adalikwu Mfon-Ette Theresa, Tolorunleke Caroline Aduke (2023). *ChatGPT for Teaching, Learning and Research: Prospects and Challenges*. *Glob Acad J Humanit Soc Sci*, 5.
- [5] Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?. *Journal of Applied Learning and Teaching*, 6(1).

-
- [6] King, M. R., & ChatGPT. (2023). A conversation on artificial intelligence, chatbots, and plagiarism in higher education. *Cellular and Molecular Bioengineering*, 16(1), 1-2.
- [7] Baskara, R. (2023). Exploring the implications of ChatGPT for language learning in higher education. *Indonesian Journal of English Language Teaching and Applied Linguistics*, 7(2), 343-358.
- [8] Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 410.
- [9] Mbakwe, A. B., Lourentzou, I., Celi, L. A., Mechanic, O. J., & Dagan, A. (2023). ChatGPT passing USMLE shines a spotlight on the flaws of medical education. *PLOS Digital Health*, 2(2), e0000205.
- [10] Adeshola, I., & Adepoju, A. P. (2023). The opportunities and challenges of ChatGPT in education. *Interactive Learning Environments*, 1-14.
- [11] Khalil, M., & Er, E. (2023). Will ChatGPT get you caught? Rethinking of plagiarism detection. arXiv preprint arXiv:2302.04335.
- [12] Anders, B. A. (2023). Is using ChatGPT cheating, plagiarism, both, neither, or forward thinking?. *Patterns*, 4(3).
- [13] Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation.
- [14] Jarrah, A. M., Wardat, Y., & Fidalgo, P. (2023). Using ChatGPT in academic writing is (not) a form of plagiarism: What does the literature say. *Online J. Commun. Media Technol*, 13, e202346.
- [15] Wang, X., Anwer, N., Dai, Y., & Liu, A. (2023). ChatGPT for design, manufacturing, and education. *Procedia CIRP*, 119, 7-14.
- [16] Emsley, R. (2023). ChatGPT: these are not hallucinations—they're fabrications and falsifications. *Schizophrenia*, 9(1), 52.
- [17] Lee, H. (2023). The rise of ChatGPT: Exploring its potential in medical education. *Anatomical Sciences Education*.
- [18] Mhlanga, D. (2023). Open AI in education, the responsible and ethical use of ChatGPT towards lifelong learning. *Education, the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning* (February 11, 2023).
- [19] Stahl, B. C., & Eke, D. (2024). The ethics of ChatGPT—Exploring the ethical issues of an emerging technology. *International Journal of Information Management*, 74, 102700.
- [20] Rawas, S. (2023). ChatGPT: Empowering lifelong learning in the digital age of higher education. *Education and Information Technologies*, 1-14.
- [21] Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10(1), 15.
- [22] Jeon, J., & Lee, S. (2023). Large language models in education: A focus on the complementary relationship between human teachers and ChatGPT. *Education and Information Technologies*, 1-20.
- [23] Adiguzel, T., Kaya, M. H., & Cansu, F. K. (2023). Revolutionizing education with AI: Exploring the transformative potential of ChatGPT. *Contemporary Educational Technology*, 15(3), ep429.