





Exploring Prospects of Artificial Intelligence-Based ChatGPT for Higher Education Context

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ABSTRACT

This study examined the future of artificial intelligence-based ChatGPT in the context of higher education. Artificial intelligence (AI) is providing a way to demonstrate its effectiveness in the field of education by increasing the efficiency of educational processes, enabling global learning, personalising education, creating more inventive and intelligent content, and optimising the management of education, in terms of effectiveness and efficiency. The new technology has become a vital aspect of the teaching-learning process today. Education is neither a product nor a one-time event, but a process. In this sense, AI seems to be a brand-new technology that could have transformative possibilities in the educational sphere. A rapid review approach was used to investigate the future potential of artificial intelligence-based ChatGPT in higher education. The findings indicated that it is necessary to take proactive steps to ensure that the future use of artificial intelligence-based ChatGPT in higher education is helpful and safe. This study recommends that academics and students exercise caution while using this technology to verify its ethical, dependability, and effectiveness. This research substantially enriches the academic discourse by exploring ethical dilemmas, fairness in academic integrity, AI's contribution to lifelong learning, user satisfaction, and determinants affecting ChatGPT adoption in higher education, thereby providing crucial insights for the successful integration of AI.

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INTRODUCTION

Artificial intelligence (AI) has developed in recent years and has led to a wide range of applications in fields such as healthcare and education. AI systems are being trained to notice patterns in the human brain and perform routine tasks on a larger amount of data. Administrative and academic educational services can improve with the help of AI technologies. A system that simulates one-on-one tutoring is known as an intelligent tutoring system (ITS). A meta-analysis found that it is a positively influential factor for college students' academic performance.¹ However, creating ITS can be daunting since it involves not only content development and design but also precision in feedback language and conversation strategies.

The Generative Pre-trained Transformer (GPT), released in 2018 by OpenAI (San Francisco, California), is a type of Large Language Model (LLM) and works on the principle of mimicking human

¹ N. Zokaei et al., "Different Patterns of Short-Term Memory Deficit in Alzheimer's Disease, Parkinson's Disease and Subjective Cognitive Impairment," *Cortex* 132 (2023): 41–50.

language processing abilities.² It uses deep learning and intricate algorithms to engage in a variety of language-orientated tasks, such as text generation, querying, and interpretation while understanding the situation to deliver responses similar to those generated by human language.³ ChatGPT-4 was introduced by OpenAI in March 2023. This chatbot is capable of participating in a wide range of interactions.

ChatGPT has solved some problems, but it has also created new problems and new risks in education. Its ability to answer specific user questions allows it to write homework and take tests for students, sparking concerns about AI-enhanced cheating. This has led schools to block access to ChatGPT. The implication of ChatGPT in education was reviewed by Mhlanga. His study explored eight publications on ChatGPT: All studies expressed concerns about the use of ChatGPT in educational settings. They feared that students would outsource their writing to ChatGPT just because it could generate passable essays in seconds. Consequently, Mhlanga stressed the importance of deploying ChatGPT responsibly and ethically.⁴

Sallam analysed 60 articles related to ChatGPT in healthcare, medical education, and academia.⁵ Sallam found many flaws in the study, from plagiarism to inaccurate responses to false citations.⁶ Thus, the implications of ChatGPT-enhanced learning need to be quickly addressed to maximise its advantages and mitigate its disadvantages. Moreover, ChatGPT is a controversial AI programme. This powerful chatbot was developed by OpenAI and relies on machine learning algorithms to process and evaluate huge volumes of data to generate responses to consumer queries. The programme can detect human speech and writing, so it can transcribe what it is given and what it needs to return. For example, a student asks a question, and ChatGPT responds in several formats with exact requirements.

ChatGPT is different from previous chatbots because it was trained via reinforcement learning with human feedback (RLHF). RLHF involves human AI trainers and reward models that turn ChatGPT into a bot that can challenge false hypotheses, answer follow-up questions, and even acknowledge errors. This is evident in how ChatGPT can impact various educational undertakings from the search for information to making specific requests for answers to asking questions on any topic, engaging in open conversations and discussions, writing and editing reports and essays, producing software codes, tutoring students through code explanations, crafting samples of data for databases and analysis, making calculations or statistical analysis, and translating texts into multiple languages.⁷

Nevertheless, some issues arise from ChatGPT usage due to being a human-like machine on one hand and being an educational tool on the other. To mention a few, there is a possible bias and discrimination due to the framework of natural language processing, concerns on data privacy, which might save searched and queried data that can be used for other than needed reasons, job loss - replacing faculty and scholarly writers, lack of creativity and critical thinking, and also research-based falsity and plagiarism.⁸ Due to the issues with the tool, some higher education institutions (HEIs) have decided to ban ChatGPT, as they worry that students will use it to write assignments or other

² Marco, Cascella et al., "Writing the Paper 'Unveiling Artificial Intelligence: An Insight into Ethics and Applications in Anesthesia' Implementing the Large Language Model ChatGPT: A Qualitative Study," *Journal of Medical Artificial Intelligence* 6 (2023).

³ Brady D. Lund et al., "ChatGPT and a New Academic Reality: Artificial Intelligence-written Research Papers and the Ethics of the Large Language Models in Scholarly Publishing," *Journal of the Association for Information Science and Technology* 74, no. 5 (May 10, 2023): 570–81, <https://doi.org/10.1002/asi.24750>.

⁴ David Mhlanga, "ChatGPT in Education: Exploring Opportunities for Emerging Economies to Improve Education with ChatGPT," *SSRN Electronic Journal*, 2023, <https://doi.org/10.2139/ssrn.4355758>.

⁵ Malik Sallam, "ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns," *Healthcare* 11, no. 6 (March 19, 2023): 887, <https://doi.org/10.3390/healthcare11060887>.

⁶ Sallam, "ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns."

⁷ OpenAI, "About," OpenAI, 2022, <https://openai.com/about/>.

⁸ Stephen Atlas, "ChatGPT for Higher Education and Professional Development: A Guide to Conversational AI," 2023; Randy S. D'Amico et al., "I Asked a ChatGPT to Write an Editorial About How We Can Incorporate Chatbots Into Neurosurgical Research and Patient Care....," *Neurosurgery* 92, no. 4 (April 2023): 663–64, <https://doi.org/10.1227/neu.0000000000002414>; Mhlanga, "ChatGPT in Education: Exploring Opportunities for Emerging Economies to Improve Education with ChatGPT"; Eva A M Van Dis et al., "ChatGPT: Five Priorities for Research," *Nature* 614, no. 7947 (2023): 224–26.

coursework. Nevertheless, restricting or banning its use will not stop students.⁹ ChatGPT is expected to be as integral to the writing process as calculators and computers have been to mathematics and science.¹⁰

Consequently, this study aims to answer the current debate and interest in ChatGPT in higher education and to discuss the specific issues for the future potentials of AI-based ChatGPT in higher education. The research question underlying the study is this: What are the prospects of AI-based ChatGPT in Higher Education institutions?

METHODOLOGY

Due to increasing demand for the AI-based ChatGPT tool within institutions of higher education and amongst students, it is timely to identify its future educational promise and anxiety. However, writing a full systematic review can take months, if not years, making it difficult to keep up with the rapidly changing ChatGPT world. This triggered the implementation of a rapid review approach. Tricco et al. define rapid review as "a form of knowledge synthesis in which portions of the systematic review process are reduced or omitted to produce information in a brief time frame."¹¹ This approach allows quick collation and examination of newly published publications, including their main findings. This analysis is expected to provide significant insights that should allow academics, practitioners, and policymakers to respond quickly to challenges related to the future potential impact of ChatGPT based on AI in higher education.

Web of Science, Scopus, and Google Scholar were the selected databases. In three international educational databases, the search sequence contained titles, abstracts, and/or keywords. A search of the literature was conducted from May 2023 to April 2024, which identified an initial 161 documents. After the detection of 68 duplicate studies, inclusion and exclusion criteria were created to ensure that they were relevant to the review objectives. These criteria were independently applied by two reviewers to maintain neutrality and decrease bias during the study selection process. As OpenAI's AI chatbot was launched in 2022, it was agreed to restrict the search to articles written after 2022. A total of 142 records were recovered from the three electronic databases searched. After removing 68 duplicate articles, the studies were evaluated by title and abstract for eligibility, and 74 were selected. In total, 58 texts were removed because they did not meet the inclusion and exclusion criteria set. The sixteen selected articles were then individually assessed for methodological quality, and 16 studies were included in the review.

To answer the question of research, the researchers performed a content analysis of the 16 research studies collected using qualitative and quantitative methodologies. Quantitative analysis helps to observe and grasp the wide aspects of the topic area. Based on each of these concepts, this systematic review has selected 16 articles that contain relevant information about the future possibilities of ChatGPT supported by texts on AI in higher education. It should be noted that when the research collected here was organised according to the published year, all studies on artificial intelligence-based ChatGPT were found from 2022 until now. This is because ChatGPT was deployed in late 2022, and there has not been enough time to publish studies and articles on its impact until the following year. The researchers searched each database for the search term 'ChatGPT' to identify articles that contain the term 'ChatGPT' in their title, abstract, or keywords. Although multiple databases were searched, only a limited number of papers were found. Accordingly, a title search for the term "ChatGPT" was performed in Google Scholar over the same publication period. This approach allowed us to obtain more relevant articles not identified in the initial database search.

⁹ Francisco José García-Peñalvo, "La Percepción de La Inteligencia Artificial En Contextos Educativos Tras El Lanzamiento de ChatGPT: Disrupción o Pánico," *Education in the Knowledge Society (EKS)* 24 (February 6, 2023): e31279, <https://doi.org/10.14201/eks.31279>.

¹⁰ B. McMurtrie, "AI and the Future of Undergraduate Writing," *The Chronicle of Higher Education*, 2022, <https://www.chronicle.com/article/ai-and-the-future-of-undergraduate-writing>.

¹¹ Andrea C Tricco et al., "An International Survey and Modified Delphi Approach Revealed Numerous Rapid Review Methods," *Journal of Clinical Epidemiology* 70 (2016): 61–67.

The scope of this rapid review includes publications related to ChatGPT in higher education and does not have restrictions in terms of educational context. If not obtained, the literature review served as background information. However, these studies were not included in the synthesis to avoid the duplication of the results. Moreover, this review only included articles published in English. In terms of methodological design, most of the ChatGPT research in the educational domain has pursued a theoretical approach, aimed at understanding the potential and challenges of the tool. Other studies, with less intensity, opted to tackle the issue using both qualitative and quantitative methods.

FINDINGS AND DISCUSSION

Use of AI-Based ChatGPT in Higher Education Institutions

The use of AI in many fields has been on the rise in recent years, and teaching and learning in higher education is one such field. Across health, manufacturing, logistics, creative industries, and so much more, more digital solutions have emerged monthly and include design, defence, public goods, and accountability. Therefore, it is important to study the impact of technological developments on the higher education sector.

AI has rapidly developed and has already had a tremendous influence on the nature of higher education offerings. Students must also understand that AI is going to transform the future of jobs. Higher education institutions are required to change the approach to the teaching process, which means the introduction of new technologies in educational and pedagogical processes.¹² Both techniques involve the rapid adoption of newer technology in higher education to compete with alternative training delivery methods for the open population of students. There are challenges in teaching, learning, and supporting students; there are challenges in creative or entrepreneurial institutions, all of which offer new opportunities for study and analysis. To cope with the rapid changes brought about by new technologies and new intelligent machines' computing capabilities, HEIs are expected to play an important role in this transformation by acting as a digital innovation hub. Therefore, so many institutions have stepped up in the digitisation transition in many countries, and AI has followed suit.

AI and machine learning (ML) are systems that emanate from the data governance and application development processes. This is a trend that is often considered a game changer in different industries, such as education, with the introduction of these procedures into business. This means that learning programmes and apps are much more customised and align with what students know, and the education process is more efficient. This is why e-learning and higher education may benefit enormously from AI and machine learning.¹³ Therefore, the study attempts to identify its potential and application domains in higher education through secondary research and document analysis, content analysis, and primary research. This research uses multiple academic, scientific, and commercial sources of various types to better understand the research problem. The evolution of AI and machine learning enables individuals not only to surpass conventional computers but also to replicate and excel beyond the human intellect.¹⁴ These technologies are already having a tremendous impact on the educational sphere by providing new abilities for students and contributing to collaborative learning in higher education, which can have tremendous effects soon.

Whether owned or not, university curricula strive to be contemporary with educational trends and meet most of the needs of the job market and technological advancements. As a result, higher learning is taking one step at a time in the direction of a repository of knowledge and development for students and lecturers. The existing trends in that system and traditional education values have simplified the process of evolving contemporary schools with much less effort compared to before, gaining a competitive edge. The primary contest is concentrated on cost structure, branding, high-quality managerial actions, high-quality services, the community for disseminating information,

¹² Lund et al., "ChatGPT and a New Academic Reality: Artificial Intelligence-written Research Papers and the Ethics of the Large Language Models in Scholarly Publishing."

¹³ Tiffany H. Kung et al., "Performance of ChatGPT on USMLE: Potential for AI-Assisted Medical Education Using Large Language Models," *PLOS Digital Health* 2, no. 2 (February 9, 2023): e0000198, <https://doi.org/10.1371/journal.pdig.0000198>.

¹⁴ García-Peñalvo, "La Percepción de La Inteligencia Artificial En Contextos Educativos Tras El Lanzamiento de ChatGPT: Disrupción o Pánico."

intellectual property, and the final goods presented to the labour market.¹⁵ However, education for modern higher education institutions and educational technology companies means going even further than big competitors in responding to market demands, equal or better, and competing for the positions of future leaders not through simple knowledge and experience, but also potential through acute foresight and imagination. Resilient education facilitates genuine environmental, social, and governance investments to ensure that individuals and communities share the lion's share of future benefits and consequences.¹⁶

Consequently, ChatGPT can be a tool to use in higher education to aid in the process of writing better texts, to shorten facts, and to create outlines so that higher education students will save time and provide better work. It may also detect grammatical and stylistic errors, making written material easier to understand.¹⁷ ChatGPT can also help students develop research skills, as it can provide students with information and resources on a certain issue, highlight areas that they may be unaware of, and expose them to new research topics that they may need to gain a better understanding and assessment. Kung et al. found that it can help in medical education and clinical decision-making by correctly answering the questions on the medical license examination.¹⁸ According to Rudolph et al., some advantages of ChatGPT are its capacity to create human-like conversations, rapidity and effectiveness, and economic effectiveness since no human labour is involved.¹⁹ Due to this, (just like any new technology), there is fear surrounding its applications and use in checking knowledge or skills.

From the perspective of Garca-Pealvo, the transition to online learning during the COVID-19 outbreak showed great potential, but in many scenarios, it did not ensure that the proper educational process took place.²⁰ ChatGPT-generated text is not good for academic writing due to concerns about students copying and pasting without critically analysing, properly attributing sources, and identifying plagiarism.²¹ In addition, questions of identifying plagiarism and distinguishing between reality and fiction have arisen.

This challenge is audible among lecturers, who fear that students will use ChatGPT to craft written assignments, just as it has for reports. Atlas has argued against declaring the use of ChatGPT as plagiarism, stating that plagiarism is defined as the presentation of another's ideas or words as one's own, without adequate confirmation of the source.²² Hence, when using ChatGPT, writers or students should transparently disclose that they used the model and appropriately cite or reference it.

Use of AI-Based ChatGPT in Education System

In the past year, AI-enabled ChatGPT has created maximum interest in education. This new tool has become a disruptive technology that is changing the way students are taught, motivated, and supported in classroom settings. In this sense, educational institutions are also considering how to incorporate this technology into their didactic models to improve the teaching and learning process of educational agents. Therefore, academics will need to accept that technology is a tool to enrich the learning experience. This technique can focus on the individual needs of the students, provide prompt responses, and help with understanding advanced topics by providing rapid and personalised resolutions. This makes it a possible device that encourages students' participation and mental expansion, as it corresponds to their learning rhythm, and continues assisting them along the process of knowledge absorption.

¹⁵ Eason Chen et al., "GPTutor: A ChatGPT-Powered Programming Tool for Code Explanation," in *International Conference on Artificial Intelligence in Education* (Springer, 2023), 321–27.

¹⁶ Cradle, "ChatGPT Webinar #1 - What Do We Need to Know Now?," YouTube, 2024, <https://www.youtube.com/watch?v=mCCqf6tHI24>.

¹⁷ Atlas, "ChatGPT for Higher Education and Professional Development: A Guide to Conversational AI."

¹⁸ Kung et al., "Performance of ChatGPT on USMLE: Potential for AI-Assisted Medical Education Using Large Language Models."

¹⁹ J. Rudolph and S. Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?," *Journal of Applied Learning & Teaching* 6, no. 1 (January 25, 2023), <https://doi.org/10.37074/jalt.2023.6.1.9>.

²⁰ García-Peñalvo, "La Percepción de La Inteligencia Artificial En Contextos Educativos Tras El Lanzamiento de ChatGPT: Disrupción o Pánico."

²¹ García-Peñalvo, "La Percepción de La Inteligencia Artificial En Contextos Educativos Tras El Lanzamiento de ChatGPT: Disrupción o Pánico."

²² Atlas, "ChatGPT for Higher Education and Professional Development: A Guide to Conversational AI."

ChatGPT, an AI-based application, has emerged as an effective tool that helps students improve their writing skills. This tool can help students by interacting with the writing system to receive not just grammatical corrections, but also recommendations for developing their writing, and, in general, more thorough feedback on their writing, thereby improving students' written communications and enabling them to express themselves better. Hence, as helpful as this application is for scientific writing, it should not be considered a substitute for scientific content generation. It will be up to authors and researchers to bring their expertise, knowledge, and experience to verify and improve the findings. It can also be useful for leading group discussions and promoting student participation in projects and activities. This builds a community feel among students by promoting contact and exchange of ideas.

Importance of AI in Higher Education

Large language models, like ChatGPT, with multiple use cases, have become a figurative steamroller in the higher education vertical, impacting students and academia alike. They may also assist academic learning designers in performing their roles more effectively. Although ChatGPT can positively impact students, scholars, and practitioners, important concepts such as ethics, data privacy, and bias need to be appropriately handled.

Adaptive Learning

Adaptive learning is a pedagogical approach that uses personalised feedback and resources to tailor learning experiences to the needs of individual students.²³ Eisenberg and Spinelli suggest that, in the context of online learning, adaptive learning is understood as a system for delivering learning materials, whereby the engagement of students with previous content determines the nature of materials.²⁴

Because ChatGPT provides a scaffolded learning technique that reflects constructivist learning theory.²⁵ As mentioned earlier, the premise is that learning builds on earlier learning and that cognitive abstraction from previously held knowledge creates new knowledge. Academics can develop personalised, student-centred, and active learning by tailoring learning experiences to the recent knowledge of the student by integrating ChatGPT into one's Learning Management Systems.²⁶ Chatbot can provide personalised just-in-time feedback, simple explanations, exploration of motivating relationships between constructs, and on-demand learning material and assistance for students.

ChatGPT can meet the characteristics of a new generation of intelligent and adaptive learning through a constructivist method by using appropriate prompts to enhance existing knowledge.²⁷ This links existing learning to form new connections and meanings (creates knowledge). More explicitly, the conversational nature of ChatGPT promotes active knowledge construction among students, as students remain actively engaged in the task and are prompted to use a scaffolded approach to uncover solutions,²⁸ as well as, experiential learning through experimentation, which is key to the process of knowledge generation.²⁹

ChatGPT can monitor students through big data and learning analytics, producing PAL based on real-time responses from students, such as their emotional states, in line with constructivist theory.³⁰

²³ Tzu-Chi Yang, Gwo-Jen Hwang, and Stephen Jen-Hwa Yang, "Development of an Adaptive Learning System with Multiple Perspectives Based on Students' Learning Styles and Cognitive Styles," *Journal of Educational Technology & Society* 16, no. 4 (2013): 185–200; Shiu-Li Huang and Jung-Hung Shiu, "A User-Centric Adaptive Learning System for e-Learning 2.025.," *Journal of Educational Technology & Society* 15, no. 3 (2012): 214–25.

²⁴ N. Eisenberg and R. A. Spinelli, *Emotion Regulation and Children's Socioemotional Competence and Intelligence* (New York: Routledge, 2019).45.

²⁵ Dale H. Schunk, "Theory and Research on Student Perceptions in the Classroom," in *Student Perceptions in the Classroom* (Routledge, 2012), 3–24.

²⁶ Chen et al., "GPTutor: A ChatGPT-Powered Programming Tool for Code Explanation."

²⁷ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"

²⁸ Laura Stapleton and Jill Stefaniak, "Cognitive Constructivism: Revisiting Jerome Bruner's Influence on Instructional Design Practices," *TechTrends* 63 (2019): 4–5.

²⁹ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"

³⁰ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"; P. Peng et al., "A Meta-Analysis on the Relation between Intelligence and Reading/Mathematics: Effects of Tasks, Age, and Social Economics Status," *Psychological Bulletin* 145 (2019): 189–236.

ChatGPT can monitor performance, predict success, and generate real-time feedback in contact with student emotional states, which can lead to personalised adaptive learning (PAL) in agreement with constructivism theories.³¹ In general, the use of ChatGPT in the learning process affords academics and students personalised learning experiences (both resources both efficient and effective), and adaptive learning techniques that are essential to all students,³² by the principles of constructivist theory.

Students can learn by discovery by fostering their thinking and problem-solving skills, and academics can provide examples to guide the learning process rather than an explanatory method.³³ They encourage personalised learning through the use of a spiral curriculum approach where a certain topic or concept is revisited multiple times throughout a student's educational journey, creating a process of self-discovery and the construction of knowledge by students,³⁴ with the added benefit of enabling students to judge themselves on their learning and adjust their underlying strategies for problem-solving.³⁵

How AI-Based ChatGPT Propagates in Higher Education Context

In higher education, AI-based ChatGPT can help researchers and students generate text, translate languages, and answer academic questions.³⁶ Active learning, discovery-based learning, and collaborative approaches are robust teaching and learning theories that endorse the use of ChatGPT in research and writing tasks.³⁷ Thus, ChatGPT can help support the initial literature review, summarise research articles, generate a draft version of the research paper,³⁸ and even help authors from non-English speaking backgrounds break through the language barrier.

One of the fundamental concepts in theories of learning is that, as students, we do not simply receive knowledge; instead, we develop that knowledge through inquiry and by seeking out the mechanisms that underscore the subject matter.³⁹ Learning theories would name some of the activities that the student could engage in, such as interpreting, collecting data, testing hypotheses, and working collaboratively. ChatGPT appears relevant and could assist and enable the above-mentioned research initiatives. However, to maintain values such as integrity, accuracy, absoluteness, dehumanisation, acceptance, accountability, and promotion, using ChatGPT for research projects is essential.

Quality Instructional and Administrative Support Services in Higher Learning

The demand for quality instructional and administrative support services is growing to facilitate students in their studies and foster a passion for learning.⁴⁰ When students actively construct knowledge, the learning environment plays a supportive and nurturing role in facilitating and fostering

³¹ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"; Peng et al., "A Meta-Analysis on the Relation between Intelligence and Reading/Mathematics: Effects of Tasks, Age, and Social Economics Status."

³² Steve Olusegun Bada and Steve Olusegun, "Constructivism Learning Theory: A Paradigm for Teaching and Learning," *Journal of Research & Method in Education* 5, no. 6 (2015): 66–70; Stapleton and Stefaniak, "Cognitive Constructivism: Revisiting Jerome Bruner's Influence on Instructional Design Practices."

³³ Enkelejda Kasneci et al., "ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education," January 30, 2023, <https://doi.org/10.35542/osf.io/5er8f>; J. White et al., "A Prompt Pattern Catalog to Enhance Prompt Engineering with ChatGPT," *ArXiv:2302.11382*, 2014.

³⁴ Kasneci et al., "ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education."

³⁵ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"

³⁶ Kasneci et al., "ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education"; Lund et al., "ChatGPT and a New Academic Reality: Artificial Intelligence-written Research Papers and the Ethics of the Large Language Models in Scholarly Publishing."; Yogesh K. Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy.," *International Journal of Information Management* 71 (2023): 102642.

³⁷ George E. Hein, "Constructivist Learning Theory," *Institute for Inquiry* 14 (1991).

³⁸ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"; M. Rahman et al., "ChatGPT and Academic Research: A Review and Recommendations Based on Practical Examples," *Journal of Education, Management and Development Studies* 3, no. 1 (2023): 1–12.

³⁹ David C. Geary, "Reflections of Evolution and Culture in Children's Cognition: Implications for Mathematical Development and Instruction," *American Psychologist* 50, no. 1 (1995): 24.

⁴⁰ Xia Zhao, Mingming Shao, and Yu-Sheng Su, "Effects of Online Learning Support Services on University Students' Learning Satisfaction under the Impact of COVID-19," *Sustainability* 14, no. 17 (August 28, 2022): 10699, <https://doi.org/10.3390/su141710699>.

learning. With timely and accurate information, the ChatGPT integration can help create a useful learning environment for students while also taking the burden of administrative work off the shoulders of higher education institutions, saving them money. Furthermore, previous research has shown that the application of chatbots and online chat systems is positively correlated with increased student engagement in higher education institutions.⁴¹ Without a doubt, ChatGPT can provide major benefits for students and faculty within the tertiary education sector.

Learning Principles

Active learning emphasises active, rather than passive, participation of students in the learning process.⁴² When integrated into a learning system, ChatGPT can keep students engaged in learning by allowing them direct access to the system and giving them control over administrative responsibilities. Moreover, it is essential to recognise the importance of feedback in learning, as it allows students to monitor their progress and adjust their methods accordingly.⁴³ For administrative support, ChatGPT addresses the task-offloading need with data and analytics to provide timely and personalised non-academic feedback, such as alerts regarding upcoming due dates, reminders of tasks, and reports showing completion or lack thereof, regardless of student needs or preferences. For instance, ChatGPT may help summarise and clarify emails coming from students for administrative members to manage more efficiently and may be able to offer tailored templates for different staff to use in response to students.⁴⁴

Additionally, relying too heavily on traditional teaching methods can limit the use of scalable automated administrative support to inform students about ways to transform a fragmented set of raw data into a knowledge-generation process.⁴⁵ Synchronous communication reduces response times, thus improving efficiency and effectiveness,⁴⁶ and is a potential cost-cutting strategy for higher education institutions.⁴⁷ As you may already know, the impact of new and advanced ChatGPT is undeniable, as it can help automate some of the administrative chores and provide better efficiency and effectiveness in the world of higher education. Although further investigation is required to fully understand the capacity of ChatGPT in tertiary education establishments, teaching and learning approaches demonstrate that its application for administrative assistance can encourage active participation in learning, offer tailored feedback to students, and create a supportive learning environment. We believe that the use of ChatGPT as administrative support in the academic community needs exploration of its effectiveness in a higher education setting.

The Significance of Credible Assessment Activities

Innovative assessment activities are well established in higher education institutions, as they allow students to engage with learning resources, develop critical thinking skills, and acquire experience in the real world.⁴⁸ The education literature has suggested a range of approaches based on teaching and

⁴¹ Noorhan Abbas et al., "Online Chat and Chatbots to Enhance Mature Student Engagement in Higher Education," *International Journal of Lifelong Education* 41, no. 3 (May 4, 2022): 308–26, <https://doi.org/10.1080/02601370.2022.2066213>.

⁴² Hein, "Constructivist Learning Theory."

⁴³ Brady D. Lund and Ting Wang, "Chatting about ChatGPT: How May AI and GPT Impact Academia and Libraries?," *Library Hi Tech News* 40, no. 3 (May 16, 2023): 26–29, <https://doi.org/10.1108/LHTN-01-2023-0009>.

⁴⁴ Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

⁴⁵ Sue Tangney, "Student-Centred Learning: A Humanist Perspective," *Teaching in Higher Education* 19, no. 3 (2014): 266–75.

⁴⁶ Chinedu Wilfred Okonkwo and Abejide Ade-Ibijola, "Chatbots Applications in Education: A Systematic Review," *Computers and Education: Artificial Intelligence* 2 (2021): 100033, <https://doi.org/10.1016/j.caeai.2021.100033>; N. Howlett et al., "What Are the Most Effective Behaviour Change Techniques to Promote Physical Activity and/ or Reduce Sedentary Behaviour in Inactive Adults? A Systematic Review Protocol," *BMJ Open*: 5:E008573, 2017.

⁴⁷ Juan J Merelo et al., "Chatbots and Messaging Platforms in the Classroom: An Analysis from the Teacher's Perspective," *Education and Information Technologies* 29, no. 2 (2024): 1903–38.

⁴⁸ David Boud and Rebeca Soler, "Sustainable Assessment Revisited," *Assessment & Evaluation in Higher Education* 41, no. 3 (April 2, 2016): 400–413, <https://doi.org/10.1080/02602938.2015.1018133>.

learning models that stress the value of authentic assessment and formative feedback,⁴⁹ including the use of e-portfolios to support self-regulated learning and reflective practices.⁵⁰

Falchikov has suggested collaborative evaluations that incorporate peer and self-assessments to encourage cooperative learning and the improvement of metacognitive skills, aligning with the important role of collaboration and social interactions in learning.⁵¹ ChatGPT has been praised for generating assessment questions and creating lesson plans and curricula for higher education.⁵² Novel assessment activities were also shown to foster a student-centred learning approach and provide a richer way of measuring student learning outcomes than traditional methods.

ChatGPT can promote creativity and critical thinking skills through authentic evaluations grounded in learning theories,⁵³ and enable students to pursue courses they are interested in by targeting knowledge at the high end of Bloom's taxonomy.⁵⁴ Encouraging collaborative learning, scaffolding, real-time feedback, personalised learning, scalability, interactivity, and knowledge creation and dissipation⁵⁵ can be integrated into creative assessment activities that bring these technologies. Although ChatGPT, based on an AI engine, has shown positive influences on students' explicit reasoning,⁵⁶ and learning achievement, knowledge retention, and learning interest,⁵⁷ few studies at present have achieved significant increments in critical thinking, learning engagement, and motivation.

ChatGPT can generate initial design concepts for assessments, draft multiple-choice or short-answer questions for scholars, and even propose case studies or other assessments for further refinement.⁵⁸ It may also be used for assessment activities, such as students evaluating a generated text or an essay and writing a high-quality article based on generated drafts, thus challenging students' existing mental models and improving critical thinking abilities.⁵⁹ This approach enables students to develop the skills they will need to use ChatGPT in their work environment.

Due to the ubiquity of ChatGPT, assessment design has re-entered the spotlight with a new attitude that promotes creativity, critical thinking, authenticity, practice, and collaboration,⁶⁰ matching how authentic and formative assessment is pushed to the forefront of education.⁶¹ Academics must

⁴⁹ Paul Black and Dylan Wiliam, "Developing the Theory of Formative Assessment," *Educational Assessment, Evaluation and Accountability* 21, no. 1 (February 23, 2009): 5–31, <https://doi.org/10.1007/s11092-008-9068-5>. Schunk, "Theory and Research on Student Perceptions in the Classroom"; Grant Wiggins, "The Case for Authentic Assessment," *Practical Assessment, Research, and Evaluation* 2, no. 1 (1990).

⁵⁰ Diana Challis, "Towards the Mature EPortfolio: Some Implications for Higher Education," *Canadian Journal of Learning and Technology/La Revue Canadienne de l'apprentissage et de La Technologie* 3, no. 1 (2005); D. A. Schön, *The Reflective Practitioner: How Professionals Think in Action* (New York, NY: Basic Books, 1983).

⁵¹ Nancy Falchikov, *Improving Assessment through Student Involvement: Practical Solutions for Aiding Learning in Higher and Further Education* (Routledge, 2013).

⁵² Ethan R. Mollick and Lilach Mollick, "New Modes of Learning Enabled by AI Chatbots: Three Methods and Assignments," *SSRN Electronic Journal*, 2022, <https://doi.org/10.2139/ssrn.4300783>; Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

⁵³ Wiggins, "The Case for Authentic Assessment."

⁵⁴ Rudolph and Tan, "ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?"; Reg Dennick, "Constructivism: Reflections on Twenty Five Years Teaching the Constructivist Approach in Medical Education," *International Journal of Medical Education* 7 (2016): 200.

⁵⁵ Jeya Amantha Kumar, "Educational Chatbots for Project-Based Learning: Investigating Learning Outcomes for a Team-Based Design Course," *International Journal of Educational Technology in Higher Education* 18, no. 1 (December 15, 2021): 65, <https://doi.org/10.1186/s41239-021-00302-w>.

⁵⁶ Tianyu, Gao et al., "Enabling Large Language Models to Generate Text with Citations," *ArXiv Preprint ArXiv:2305.14627*, 2023.

⁵⁷ Xinjie Deng and Zhonggen Yu, "A Meta-Analysis and Systematic Review of the Effect of Chatbot Technology Use in Sustainable Education," *Sustainability* 15, no. 4 (February 6, 2023): 2940, <https://doi.org/10.3390/su15042940>.

⁵⁸ A. J. Bridgeman and D Liu, "How Can I Update Assessments to Deal with ChatGPT and Other Generative AI?," The University of Sydney, 2023, <https://educational-innovationsydney.edu.au/teaching@sydney/how-can-i-updateassessments-to-deal-with-chatgpt-and-other-generativeai/>; A. Bridgeman, D. Liu, and B. Miller, "How ChatGPT Can Be Used at University to Save Time and Improve Learning," The University of Sydney, 2023.

⁵⁹ Dennick, "Constructivism: Reflections on Twenty Five Years Teaching the Constructivist Approach in Medical Education."

⁶⁰ Juuso Henrik Nieminen et al., "Student Agency in Feedback: Beyond the Individual," *Assessment & Evaluation in Higher Education* 47, no. 1 (2022): 95–108; Verónica Villarroel et al., "Authentic Assessment: Creating a Blueprint for Course Design," *Assessment & Evaluation in Higher Education* 43, no. 5 (2018): 840–54.

⁶¹ Black and Wiliam, "Developing the Theory of Formative Assessment"; Wiggins, "The Case for Authentic Assessment."

ensure that assessment tasks are aligned with the learning outcomes of each subject.⁶² Assessment designs must involve students in critical thinking activities that ChatGPT cannot easily reproduce.⁶³ For example, students should be required to explain and cite the sources they used to support certain viewpoints. Students may also use ChatGPT as text generators in assessment assignments, where they use a critical perspective to evaluate the application of the generated output.⁶⁴ In general, ChatGPT has great possibilities to inspire new and relevant assessment activities.

Maintaining Academic Integrity

Retaining academic integrity presents a major challenge to the use of ChatGPT as an AI platform when writing academic assessments, dissertations, theses, and articles.⁶⁵ ChatGPT can help ensure academic integrity, as long as users employ the model's information responsibly.⁶⁶ Students are actively constructing meaning.⁶⁷ Passive shortcuts, which take the form of academic integrity infractions, inhibit the active engagement of students and therefore learning. If, however, this person is incorrect and ChatGPT, for some reason, cannot help but issue false information, they are also limited to the content they type into it, and thus cannot verify if any results are accurate or valid.

Users are encouraged to ensure academic integrity by referencing ChatGPT in their work, highlighting its use in data analysis and research.⁶⁸ The use of a multitude of web tools to produce academic work is not a new phenomenon. However, it is easier and more attractive for students and there is no definitive way to catch this form of academic dishonesty because AI is probabilistic and text detectors are unreliable.⁶⁹ ChatGPT is a discovery and exploration tool that facilitates the active construction of knowledge and meaning, which somehow mitigates the risk of academic dishonesty, such as plagiarism or cheating.⁷⁰

To combat the struggle to maintain academic integrity, a preventive method is provided that includes creating an academic integrity culture and helping students understand the consequences of not achieving their key learning objectives. Additionally, it is crucial to revisit the outcome metrics and explore how students learn rather than what they learn, which are easily replicated by ChatGPT.⁷¹ Authentic learning experiences provide an opportunity for academics to give students an understanding of the benefits of academic integrity and to help them realise the importance of using their ideas and work.⁷² Students are active thinkers who have meaningful learning experiences as opposed to passive consumers of knowledge.

⁶² Chiel, Van Der Veen and Bert Van Oers, "Advances in Research on Classroom Dialogue: Learning Outcomes and Assessments," *Learning and Instruction* 48 (2017): 1–4.

⁶³ Joseph Crawford, Michael Cowling, and Kelly-Ann Allen, "Leadership Is Needed for Ethical ChatGPT: Character, Assessment, and Learning Using Artificial Intelligence (AI)," *Journal of University Teaching and Learning Practice* 20, no. 3 (April 2, 2023), <https://doi.org/10.53761/1.20.3.02>; Deanna Kuhn, "Critical Thinking as Discourse," *Human Development* 62, no. 3 (2019): 146–64; Dimitra Iordanoglou, "Future Trends in Leadership Development Practices and the Crucial Leadership Skills," *Journal of Leadership, Accountability and Ethics*, 2018, <https://doi.org/10.33423/jlae.v15i2.648>.

⁶⁴ Monash University, "ChatGPT User Experience: Implications for Education," 2023, <https://www.nature.com/articles/d44536-023-00191-1>.

⁶⁵ Debby R E Cotton, Peter A Cotton, and J Reuben Shipway, "Chatting and Cheating: Ensuring Academic Integrity in the Era of ChatGPT," *Innovations in Education and Teaching International* 61, no. 2 (2024): 228–39; Miriam Sullivan, Andrew Kelly, and Paul McLaughlan, "ChatGPT in Higher Education: Considerations for Academic Integrity and Student Learning," 2023.

⁶⁶ Sullivan, Kelly, and McLaughlan, "ChatGPT in Higher Education: Considerations for Academic Integrity and Student Learning"; T. Keith, "Combating Academic Dishonesty, Part 1 – Understanding the Problem," The University of Chicago, February 16, 2022, <https://academictech.uchicago.edu/2022/02/16/combating-aca>.

⁶⁷ Hein, "Constructivist Learning Theory."

⁶⁸ Cradle, "ChatGPT Webinar #1 - What Do We Need to Know Now? ."

⁶⁹ S Raschka, "What Are the Different Approaches for Detecting Content Generated by LLMs Such as ChatGPT? And How Do They Work and Differ," *Sebastian Raschka*, 2023.

⁷⁰ Keith, "Combating Academic Dishonesty, Part 1 – Understanding the Problem."

⁷¹ J M Lodge, "ChatGPT Consistently Fails (Most Parts of) the Assessment Tasks I Assign My Students: Here's Why," LinkedIn, 2023, <https://www.linkedin.com/pulse/chatgpt-consistently-fails-most-parts-assessment-tasks-jason-m-lodge>; Cradle, "ChatGPT Webinar #1 - What Do We Need to Know Now? ."

⁷² Muhajirah Muhajirah, "Basic of Learning Theory:(Behaviorism, Cognitivism, Constructivism, and Humanism," *International Journal of Asian Education* 1, no. 1 (2020): 37–42.

One major concern for higher education institutions regarding ChatGPT is its unethical or malicious usage.⁷³ Some institutions banned ChatGPT due to the limitations of existing detection tools such as Turnitin, only to have these bans backfire and increase ChatGPT usage.⁷⁴ The challenge is to find a middle ground between preventing academic dishonesty and still fostering academic freedom and creativity.

Ethical Dilemmas in Using AI-Based ChatGPT

Due to its potential conflict with learning models and approaches that promote active student engagement and knowledge building, ChatGPT undoubtedly threatens ethical and equitable practice in higher education institutions. ChatGPT embodies instant access to content that, as a shortcut, breaches every ethos of teaching and learning. When aided with ChatGPT, unethical and biased behaviour that tarnishes the spirit of learning may persist.⁷⁵ In the same vein, digital inequity can be a concern when students have uneven access to technology and high-speed Internet, which can reinstate existing educational inequities.

The best kind of learning happens when you have a good rapport between the lecturer/learning facilitators and the students. There is much more to the learning environment, such as social groups, instructional strategies, and a motivating atmosphere. The learning environment will fall short of the above prerequisites-based learning environment when generative AI tools only like ChatGPT. Although there are several ethical and equity challenges, ChatGPT can democratise education and improve the participation of diverse students in higher education through personalised and accessible learning experiences.⁷⁶ Nonetheless, the knowledge gap⁷⁷ simultaneously raises the adequacy of students' strengths in constructing their knowledge because some students have better access to their variables of ChatGPT than others.

To make ChatGPT an inclusive technology and address inequities in the digital justice landscape, higher education institutions must ensure equal access to technology and assistive equipment.⁷⁸ Another limitation of ChatGPT is that it accepts input from AI rather than a human instructor, which further violates concepts of teaching and learning that advocate interaction among students and social identity in learning.⁷⁹ Some higher education institutions could use ChatGPT combined with human lecturers to provide feedback to students, ensuring accurate and reliable input responses and avoiding the transfer of false information.⁸⁰

Nonetheless, this probably raises copyright issues, because ChatGPT might have been trained on copyrighted information and produced output similar to them. To solve the problem and guarantee copyright restrictions are not violated by ChatGPT, policy issues guiding copyright at higher education institutions should reflect these.⁸¹ Therefore, ChatGPT may need to be paired with assistive technology such as text-to-speech software and voice recognition technology, when used by students

⁷³ Weng Marc Lim et al., "Generative AI and the Future of Education: Ragnarök or Reformation? A Paradoxical Perspective from Management Educators," *The International Journal of Management Education* 21, no. 2 (July 2023): 100790, <https://doi.org/10.1016/j.ijme.2023.100790>.

⁷⁴ Lim et al., "Generative AI and the Future of Education: Ragnarök or Reformation? A Paradoxical Perspective from Management Educators."

⁷⁵ Hein, "Constructivist Learning Theory."

⁷⁶ Stefan A D Popenici and Sharon Kerr, "Exploring the Impact of Artificial Intelligence on Teaching and Learning in Higher Education," *Research and Practice in Technology Enhanced Learning* 12, no. 1 (2017): 22; John V Pavlik, "Collaborating with ChatGPT: Considering the Implications of Generative Artificial Intelligence for Journalism and Media Education," *Journalism & Mass Communication Educator* 78, no. 1 (2023): 84–93.

⁷⁷ Hein, "Constructivist Learning Theory."

⁷⁸ Lim et al., "Generative AI and the Future of Education: Ragnarök or Reformation? A Paradoxical Perspective from Management Educators."

⁷⁹ Hein, "Constructivist Learning Theory."

⁸⁰ Terry Yue Zhuo et al., "Exploring AI Ethics of Chat GPT: A Diagnostic Analysis," *ArXiv Preprint ArXiv:2301.12867* 10, no. 4 (2023); Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

⁸¹ Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."; Rabia Abdul Karim, Salma Niazi, and Farida Saeed, "Need Analysis of Workshops for Effective Teaching among Teachers at Secondary School Level in Karachi, Pakistan," *Voyage Journal of Educational Studies* 3, no. 1 (2023): 71–84.

with disabilities, which can argue for equity constraints. Thus, higher education institutions are called to establish inclusivity by addressing digital inequity and providing students with the necessary assistive technology equipment.⁸² In response, higher education institutions should seek to encourage cooperation among students in their use of ChatGPT, so that all students partner with academics and socialise collaboratively with peers to build their personalised knowledge.

When ChatGPT became available, there were many complaints that it could be used to write papers/articles. Then people realised that it could also write computer programmes, which goes beyond writing papers/articles. This makes ChatGPT a much more powerful and disruptive tool and stresses the importance of students knowing how to use it safely. There are concerns that paper-finding technologies will not be able to detect AI-generated articles, complicating academics' efforts to track down and limit dishonest cases. It is important to note that this technology is new and evolving and that concerns are valid.⁸³

Based on the reviewed literature, it was determined that the use of ChatGPT in the higher education system supports both students and lecturers alike. This is inextricably related to performance improvement, empowerment, efficient organisation, and time management, as well as creating a more collaborative and engaged learning environment. Moreover, even though many lecturers cannot still use ChatGPT effectively, there is a shortage of teacher training on its future application and usage in educational contexts. However, the broader educational community needs to be trained in how to use this technology judiciously and ethically, or else misuse will threaten how children learn in the future.

In contrast and closely related to the above conclusion, much of the research gathered in these articles shows the substantial transformations at educational levels that the future use of ChatGPT is capable of producing through a strong influence on the teaching style and activities. Last, the authors are concerned about the clear need for student training that would need to be executed, as well as the future problems in the higher education system resulting from ChatGPT's ongoing usage. Lecturers must understand the important issues and ethical implications with regard to the use of ChatGPT powered by artificial intelligence. You can consider issues around data privacy, equal access to education, and the effect on the teacher's role. Managing these challenges proactively is crucial to ensure that artificial intelligence-based ChatGPT is used safely and beneficially in higher education in the future. In this context, neither technology nor academics should come across one as the other or overly prevail as they always revolve around the neglected factor here, which needs to address students' overall growth and their readiness in this changing environment.

Limitations of the Use of ChatGPT

ChatGPT in higher education is problematic since it can introduce biases and misinformation into information processing.⁸⁴ Although ChatGPT can help with research, analysis, and writing-related tasks in higher education, some concerns need to be addressed about possible bias and false content for its ethical and reliable use.⁸⁵ Models trained on inadequate data sets may produce biased models and outputs that reinforce preconceptions rather than help students achieve correct knowledge.⁸⁶

⁸² Lim et al., "Generative AI and the Future of Education: Ragnarök or Reformation? A Paradoxical Perspective from Management Educators."

⁸³ C. Callahan, "What We Know about How Workers Are Using ChatGPT so Far," Digiday, 2023, <https://digiday.com/marketing/what-we-know-about-how-workers-are-using-chatgpt-so-far/>.

⁸⁴ Chen et al., "GPTutor: A ChatGPT-Powered Programming Tool for Code Explanation.";

⁸⁵ M. Firat, "What ChatGPT Means for Universities: Perceptions of Scholars and Students," *Journal of Applied Learning & Teaching* 6, no. 1 (April 19, 2023), <https://doi.org/10.37074/jalt.2023.6.1.22>. Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

⁸⁶ Lund and Wang, "Chatting about ChatGPT: How May AI and GPT Impact Academia and Libraries?"; A. Pritchard, *Ways of Learning: Learning Theories for the Classroom* (New York: Routledge, 2017). Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

Poor data set training might return biased models and outputs, corroding students' assumptions rather than helping them to get more correct knowledge.⁸⁷ Due to biased training data, ChatGPT text can propagate factual errors that could confirm student preconceptions.⁸⁸ According to constructivist theories, ChatGPT-using students do not learn through communal learning and discussion, which is essential for content critique and knowledge construction in learning.⁸⁹ The counterfeit materials and references of ChatGPT can trick students. As you interact with the system, you need to fact-check these outputs for an accurate understanding of the topic and to check for potential biases or inaccuracies.

Although OpenAI has stated that the newest version of ChatGPT would include plugins or software that enable it to seek the latest information and data, none of these developments can address the concerns outlined above about biases and misleading information.⁹⁰ Higher education researchers and students must grapple with these issues as they use this technology for academic work to ensure its ethical and trustworthy use. The challenges are unmistakably ethical and credible. Therefore, it is clear that the problems of potential bias and misinformation in this type of ChatGPT information processing must be explored and tackled in higher education so that students gain knowledge and engage in collaborative learning and discussion. The issues are quite ethical and trustworthy. Thus, it should be emphasised that the issues of potential bias and misinformation in the information processing of ChatGPT cannot be neglected in tertiary education so that students create knowledge accurately through collaborative learning and discussions.

Atlas explains that ChatGPT is not meant to assess skills or graduate requirements.⁹¹ Students need to find knowledge themselves through experiences and social relationships, not passively receiving knowledge from outside technology (such as ChatGPT). More specifically, ChatGPT and similar AI models might influence the cultivation of certain skills at the graduate level, including critical thinking and problem-solving. The potential future use of ChatGPT as an assistance tool can contribute to the development of some graduate competencies.⁹²

Skills needed for future professional and personal lives include graduate skills such as critical thinking and problem-solving, communication, collaboration, teamwork, leadership, adaptability, digital literacy, global and cultural awareness, ethics, and professionalism.⁹³ The focus is on discovery-based and experiential learning approaches, where students are encouraged to engage with real-world problems and scenarios to derive their understanding of the topic. Consequently, the integration of these means within the assessment and curricula, together with the use of ChatGPT, could also, in turn, develop graduate capabilities in time.

ChatGPT offers an instant opportunity to equip graduate capabilities with AI literacy that will foster the use of large language models in the profession effectively, replacing some current jobs, but creating new jobs.⁹⁴ As ChatGPT and similar technologies continue to be adopted in the workplace, graduates must be trained to navigate and use these technologies effectively. This can include knowing what these models can and cannot do and the ethical and social implications of their use. Such capability development could be scaffolded and incrementally nurtured through intentional curriculum design and would form a part of performance assessment to highlight uniquely human capabilities.⁹⁵

⁸⁷ Lund and Wang, "Chatting about ChatGPT: How May AI and GPT Impact Academia and Libraries?"; Pritchard, *Ways of Learning: Learning Theories for the Classroom*; Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

⁸⁸ Karim, Niazi, and Saeed, "Need Analysis of Workshops for Effective Teaching among Teachers at Secondary School Level in Karachi, Pakistan."

⁸⁹ Muhajirah, "Basic of Learning Theory:(Behaviorism, Cognitivism, Constructivism, and Humanism"; Hein, "Constructivist Learning Theory."

⁹⁰ OpenAI, " ChatGPT: Optimizing Language Models for Dialogue," OpenAI, 2023, <https://openai.com/blog/chatgpt/>.

⁹¹ Atlas, "ChatGPT for Higher Education and Professional Development: A Guide to Conversational AI."

⁹² Dwivedi et al., "Opinion Paper: 'So What If ChatGPT Wrote It?' Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy."

⁹³ Beverley Oliver and Trina Jorre de St Jorre, "Graduate Attributes for 2020 and beyond: Recommendations for Australian Higher Education Providers," *Higher Education Research & Development* 37, no. 4 (2018): 821–36.

⁹⁴ Cradle, "ChatGPT Webinar #1 - What Do We Need to Know Now? ."

⁹⁵ Cradle, "ChatGPT Webinar #1 - What Do We Need to Know Now? ."

Consequently, embedding AI literacy into graduate competencies can enhance their employment and readiness in a rapidly evolving job landscape.

The limitation of this research is that there is very little literature to analyse, as there are a limited number of studies on the specific use of ChatGPT in higher education institutions. ChatGPT, and educational technology more broadly, is a fast-moving field, which means its use in higher education is new and potentially under-researched relative to other educational levels. However, the review provides an overview of the effects of ChatGPT at the university level. As more studies are conducted and the familiarity is spread within the context of higher education, it would be beneficial to expand the study to obtain a more comprehensive perspective on its effect and utility.

RECOMMENDATIONS

The application of ChatGPT presents a variety of challenges that researchers need to be aware of to avoid its misuse. All academics and students would need is enough instruction on its use and on what type of use is considered misuse in the teaching space. With proper use and discipline, this technology can expand educational opportunities and enhance the teaching and learning process in the coming years.

While AI has been around for a long time, ChatGPT has raised questions that have challenged the status quo at higher education institutions by responding to what we do, how we do it, and how we evaluate it. The tools are now available from OpenAI, and researchers across disciplines are constantly shouting about the importance, potential, and impact of these tools, the open-ended challenges they represent both in pedagogic and scientific terms and paving the way for their responsible and ethical adoption in education. There are benefits and challenges to using ChatGPT in higher education. On the one hand, ChatGPT can help students with tests, research, analysis, and writing brainstorming, providing improvements to their learning experiences. On the other hand, academic dishonesty, bias, fake knowledge, and inadequate assessment design might affect the development of important graduate skills and motivate surface learning.

To ensure that technology is used ethically, reliably, and effectively, tertiary academics and students must take care to use this technology appropriately for academia. To do this effectively, higher education institutions must place high priority on teaching students how to use ChatGPT and other generative AI with responsibility and ethics. Academics are also free to design novel assessment regimes that cannot be impersonated by ChatGPT, such as assessing learning processes rather than outputs. Academics in higher education should embrace ChatGPT for students to come together to collaborate and have authorship of the discussion, but they also need to challenge bias and propaganda.

Introducing AI literacy into the graduation skill set could increase student employability and readiness for a rapidly changing job market. In conclusion, we propose that the integration of ChatGPT into higher education should achieve a balance between combating academic misconduct, adapting academic freedom, and encouraging academic innovation while keeping student skill development as a focal point.

CONCLUSION

This article aimed to review the future of AI-based ChatGPT in higher education. According to the systematic review of the literature, scientific studies on the application of the ChatGPT tool in educational processes are still limited, given that it is a new technology that was launched at the end of 2022. ChatGPT in higher education has emerged as a new and powerful tool used to enhance the learning experience and increase student-lecturer interaction. ChatGPT has massive potential to transform teaching and learning methods as more is researched and learnt about its capabilities.

The contribution of this AI technology will not be limited only to the virtual learning method. The fact that AI encourages students to use information and communication technologies in and outside the teaching space is mainly due to the advancement of technology. The development of this AI technology will increase students' academic performance when used properly.

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