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# Artificial intelligence in higher education South Africa: The role of ChatGPT in students' learning

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## Abstract

We conducted this systematic review pertaining to the role of ChatGPT in higher education, with a particular focus on its impact in South African universities and on students' learning experiences. We reflect on students' use of ChatGPT's in their learning processes to provide accurate and helpful responses. Furthermore, considering the unique challenges faced by South African institutions, including uneven access to technology and varying levels of digital literacy, we evaluate its implications for academic integrity. Using PRISMA guidelines, we analysed 31 peer-reviewed articles including studies from South African universities and comparable international contexts published between 2022 and 2024. Findings indicate that ChatGPT3.5 provides a convenient and adaptable learning resource that promotes student engagement and conceptual understanding in South Africa. However, ethical concerns, including plagiarism and over-reliance on Artificial Intelligence, were noted, alongside specific challenges such as the digital divide in the South African higher education system. The study highlights the need for South African higher education institutions to develop contextually appropriate strategies for the ethical and effective integration of ChatGPT, ensuring that it enhances rather than undermines academic integrity while addressing local technological and socioeconomic disparities. Additionally, the study emphasises the importance of rethinking the digitalised curriculum in higher education to incorporate reference to ethical considerations in AI to ensure that the use of tools like ChatGPT aligns with broader educational goals and ethical standards. We recommend further research to explore the broader implications and potential ethical issues associated with AI tools in education, particularly in the South African higher education sector.

**Keywords**: ChatGpt, higher education, students, reliability, fourth industrial revolution, artificial intelligence

# Introduction

Like other education sectors, South African higher education is responsible for training and preparing students for the workforce. During this time, universities and colleges adopt various educational technologies for teaching, learning, and research in the era of the Fourth Industrial Revolution (4IR). Higher education institutes in South Africa such as the University of Cape Town, Rhodes University, and Stellenbosch University are well known for being the top performing universities in Africa in knowledge production and student training (Cloete, 2014). While South African universities have incorporated 4IR tools into their curricula, challenges remain in effectively integrating Artificial Intelligence (AI) into student learning (Khoza, 2020). Consequently, Lubinga et al. (2023) emphasised that the adoption of 4IR technologies, including AI, to support teaching and learning in South African higher education still requires further investigation and attention.

If we trace back to the invention of technologies leading to AI, we note that the phenomenon of machines that could think independently was first speculated on by the ancient Greeks. Such machines became known as Artificial Intelligence (AI) and gained momentum officially in 1956 at Dartmouth College when a group of scientists and mathematicians met to deliberate on the potential of computers that could think and reason in a human-like manner (Deng & Lin, 2022; Hassani et al., 2020). Just seven decades later, the 4IR innovations in AI, such as cyber technology and AI software, have pushed the boundaries of teaching and learning in the higher education sector globally to a new era (Dwivedi et al., 2023).

On November 30, 2022, a fully functional AI known as Chat Generative Pre-trained Transformer (ChatGPT3.5) was emitted to the world, to be used limitlessly in all spheres of work, with incredible success (Haleem et al., 2022). The founding software company of ChatGPT3.5 is OpenAI. According to Omar et al. (2023), ChatGPT3.5 was developed to answer questions, provide clarity on a vast area of expertise, create dialogues, and engage with follow-up questions. This suggests that ChatGPT is classified as a language model chatbot also known as an advanced Natural Language Processing model (NLP) (Alawida et al., 2023).

The goal of ChatGPT3.5 is to enable the creation of conversational AI systems that can understand and respond to human text inputs in a way that is informative, helpful, and engaging. ChatGPT has a wide range of potential applications, including chatbots, virtual assistants, customer service agents, and more. ChatGPT3.5 responds to users in the same way a human would respond to another human and is able to reason and to mend, write, and optimise coding (Deng & Lin, 2022). The advancement in ChatGPT's ability has led to significant changes in higher education for both teaching and learning, particularly in the digitalisation of the curriculum. It enables personalised learning experiences, provides instant feedback, enhances access to digital resources, and supports interactive and adaptive learning approaches (Baidoo-Anu & Ansah, 2023).

Understanding how this type of technology supports students' learning can better equip the higher education sector in the optimisation and evolution of the digital curriculum. In

addition, understanding the implications of ChatGPT for students' learning is essential to ensuring students' academic success while maintaining institutions' academic integrity. It has been evident in the literature that the rapid progressiveness of these sophisticated systems such as ChatGPT promotes improvement in deep learning (Deng & Lin, 2022). This is done by designing and integrating learning material in purpose-driven ways by developing specialised tools from an analysis of existing data, such as images, videos, graphics, and written text, and identifying learning patterns and distributions. (Baidoo-Anu & Ansah, 2023). This implies that there is a growing need for scholars to explore the multifaceted correlation between the higher education curriculum, pedagogical practices, and AI innovation and implementation (Dwivedi et.al., 2023). Thus, the purpose of this study is to gain insight into the role of ChatGPT3.5 in higher education in South Africa with a particular focus on students' learning. We developed three research questions to understand how students engage with ChatGPT in higher education. The research data generated in this study responds to the following key research questions.

1. What is the role of ChatGPT3.5 in students' learning in South African higher education?
2. How does ChatGPT3.5 support students' learning in South African higher education?
3. What are the implications of using ChatGPT3.5 in students' learning in South African higher education?

# Methodology

## Search strategy

In this systematic review, we developed a search strategy to identify relevant literature relating to students' use of ChatGPT in higher education. The search strategy followed in this study included the use of keywords such as ChatGPT, Artificial Intelligence, Students, South Africa, and higher education. We inserted our search string as follows in all these databases [(*ChatGPT* OR *Artificial Intelligence* OR *Students* OR *South Africa*) AND (*higher education*)]. We searched two databases including *SAGE Journals* and *SciELo* as well as the search engine *Google Scholar* to retrieve data for the study. The initial search conducted from March 2023 to January 2024 without data parameters resulted in 120 articles retrieved from *Google Scholar* alone. However, we excluded a total of 41 documents consisting of non-peer-reviewed literature from the initial search. Hence, 79 peer-reviewed academic journal articles emerged from our search strategy. First, we narrowed down our data parameters to encompass literature published between 2022 and 2024, resulting in 49 journal articles. We then filtered out articles not written in English, reducing the count to 31. Subsequently, we conducted a search to identify and eliminate duplicate articles sourced from various websites, further reducing the tally to 23. Finally, we screened the titles and abstracts of the remaining articles meticulously and selected only 15 from those retrieved via *Google Scholar*. Following a similar methodology, we applied our search criteria to the two databases. From the *SAGE Journals* database, we identified 9 relevant articles and from *SciELo*, we found

seven articles that met our criteria. In total, our study encompassed 31 peer-reviewed academic journal articles sourced from these databases and search engine.

## Selection criteria

The selection criteria related to the articles included in this systematic review were based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA) statement which encourages transparent and complete reporting of systematic review studies (Sarkis-Onofre et al., 2021). The PRISMA detailed criteria can be used by researchers to guide transparent reporting by outlining clearly the data synthesis methods (Sarkis-Onofre et al., 2021). Moreover, PRISMA is comprised of a seventeen-item checklist to ensure scientific reporting of systematic reviews (Moheret al., 2016). In this study, we used four out of the 17 PRISMA checklists to find relevant articles. This includes the identifying of articles from databases, screening of the journal articles, assessing their eligibility, and including only relevant journal articles that address students' use of ChatGPT in higher education. Skimming the journal articles was a manual procedure that included reading the titles, the abstract, and the introduction. We further assessed the eligibility of the journal articles using the inclusion criteria outlined in Table 1. Using PRISMA, we were able to evaluate the quality and relevance of the articles to be included in the study. It also provided uniformity in the procedure followed in accessing and retrieving relevant articles for the study. Our search also focused mainly on mapping existing peer-reviewed literature related to the explored phenomenon. Thus, articles included in this systematic review were selected based on the inclusion and exclusion criteria presented in Table 1.

**Table 1**
Inclusion and Exclusion criteria

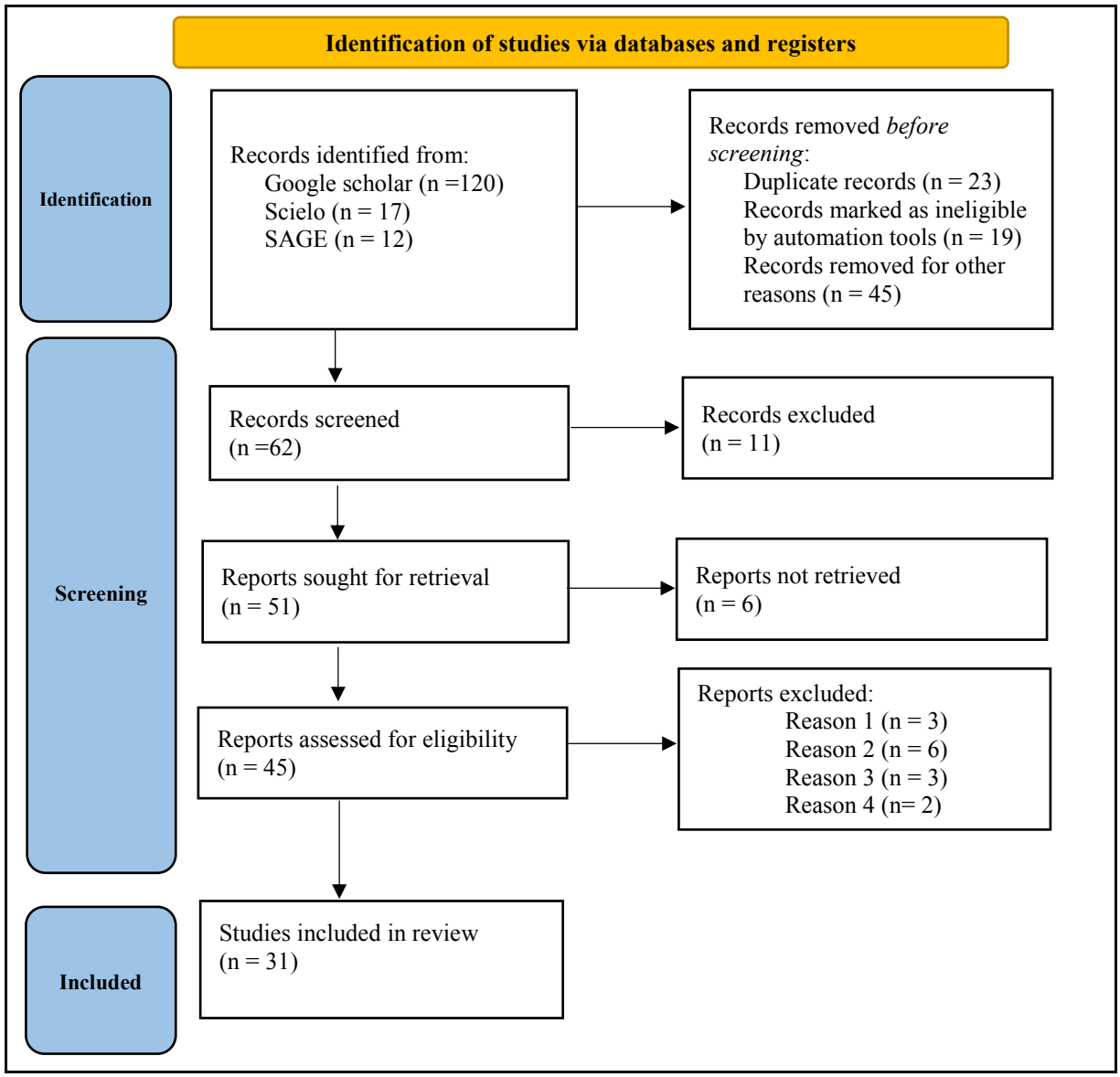
| Inclusion criteria | Exclusion criteria |
|---|---|
| Studies related to students' use of ChatGPT in higher education<br>Studies discussing the role of ChatGPT3.5 and how it supports students' learning in South African higher education<br>Studies published in referenced or peer-reviewed journals, published in English<br>Studies published between 2022 and 2024 | Studies not published in English<br>Studies published in non- peer reviewed journal and grey literature (opinion pieces, reports, blogs, newspaper articles, etc)<br>Studies published before 2022<br>Studies not focused on higher education and students' learning |

## Quality assessment

To ensure the quality of the literature included in this current systematic review study, we reduced the initial sample of studies included in the literature review by removing duplicates found from the two searched databases and search engine. The process of removing duplicate articles resulted in duplicates being erased in the continuation of the literature search. This screening ensured that we included only relevant and high-quality articles that had been peer-reviewed. After screening the articles in which we conducted a careful examination to further assess eligibility for inclusion in this systematic review study, we were left with 31 articles in

the final examination phase which were included in this study for analysis of students' use of ChatGPT in higher education. The procedure followed to ensure quality assessment of articles included in this study is summarised next using a flow diagram from PRISMA below.

**Figure 1**
PRISMA 2020 flow diagram for systematic reviews adapted from Dempere et al. (2023)




## Data analysis

Data analysis involves organising and interpreting data into specific discussions to gain further insight into the explored phenomenon (Nassaji, 2015; Springer, 2010). In qualitative research, descriptive analysis is conducted to develop a deep understanding of a topic (Thorne, 2000). The data generated from this study was analysed using themes. The themes used for analysis were guided by the study's research questions. Thus, the thematic analysis was used in conjunction with the key research questions as a guide for discussion.

# Findings

The findings section of this systematic review is based on a comprehensive analysis of 31 studies that were screened and assessed for eligibility. The studies were obtained from two databases and one search engine identified in the methodology section and evaluated based on strict inclusion and exclusion criteria. Table 2 shows the articles that were included and used in this study to discuss findings. Table 2 also depicts the implications of ChatGPT when utilised in teaching and learning.

**Table 2**
Studies included in the discussion of the findings

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Machin et al. (2024)** | The study aimed to evaluate how ChatGPT (versions 3.5 and 4) responds to scenarios assessing psychological literacy compared to responses from subject matter experts (SMEs) in psychology. | ChatGPT's responses demonstrated high levels of psychological literacy for research methods scenarios, but were generally more lenient than SME ratings, and may not perform as well on more complex or ethically nuanced scenarios. | The findings suggested that ChatGPT can serve as a useful tool for the initial training of psychology students, providing personalised tutoring that can support the transfer of learning to practice contexts. |
| **Kohnke et al. (2023)** | The study aimed to explore how ChatGPT can be effectively utilised to support language teaching and learning. | The study found that ChatGPT has significant potential to promote engaging and adaptive language learning, in offering valuable pedagogical benefits while also presenting some key debates and drawbacks. | The implications suggested that language teachers should develop advanced digital competence to leverage AI-driven tools like ChatGPT and navigate their associated risks and drawbacks effectively. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Rasul et al. (2023)** | The purpose of the study was to investigate the potential benefits and challenges of utilising ChatGPT, a generative AI model, in higher education, in relation to the constructivist theory of learning. | Using ChatGPT and other large language models in higher education can potentially enhance students' learning experiences by assisting with various academic tasks, but it also presents challenges related to academic misconduct, bias, falsified information, and assessment design, thus emphasising the need for responsible and ethical use. | The implications suggested that while ChatGPT has the potential to be a valuable tool in higher education, its integration must be approached thoughtfully and responsibly, considering the benefits and challenges to optimise its contribution to students' learning experiences. |
| **Onal & Kulavuz-Onal (2024)** | The study aimed to investigate the use of ChatGPT in designing instructional assessments and tasks in higher education across different disciplines. | The study found that ChatGPT can enhance education by providing personalized, on-demand access to information and resources, and in creating an interactive, adaptive learning environment. | The implications suggested that ChatGPT has the potential to be used effectively in higher education to improve teaching and learning, although ethical considerations regarding academic integrity must be addressed. |
| **Govender (2023)** | The study investigated the transformative role of ChatGPT and similar AI platforms in mathematics education to understand their advantages, limitations, and implications for future pedagogical approaches. | ChatGPT can provide bespoke feedback and real-time responses that facilitate immediate understanding, although its accuracy and efficiency in resolving mathematical queries can vary depending on the problem's complexity, input data precision, and clarity of instructions. | The integration of AI tools like ChatGPT into mathematics pedagogy necessitates a balance between leveraging their benefits and addressing potential challenges such as over-reliance on AI and the need for perpetual refinement to ensure their effectiveness and relevance. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Singh (2023)** | The purpose of the study was to investigate the impact of ChatGPT on plagiarism and scholarly writing in higher education institutions in South Africa. | The study found that while ChatGPT poses potential risks for plagiarism, it also presents opportunities for enhancing academic integrity if properly integrated and utilised in educational settings. | The findings implied that universities need to focus on developing technical skills among lecturers and on teaching students about the ethical navigation of AI tools to maintain academic standards and the integrity of higher education institutions. |
| **Tarisayi (2024)** | This study examined South African academics' responses to ChatGPT through a socio-technical lens to understand its impact on teaching, learning, and academic integrity. | The study revealed that while ChatGPT enhances technical capacities in universities, it also raises significant concerns regarding academic integrity and the potential erosion of critical thinking. | The findings implied that South African higher education institutions need to develop robust, contextually relevant policies and training to ensure that ChatGPT is integrated responsibly and ethically. |
| **Avello-Sáez & Estrada-Palavecino (2023)** | This study aimed to explore the impact of ChatGPT on occupational therapy education, and focuses particularly on the ethical and professional implications of using AI tools in the training and practice of occupational therapists. | The study found that while ChatGPT can be a valuable tool in providing theoretical guidance and structure in content development, its use also poses significant risks for academic dishonesty and requires careful, responsible implementation by educators. | The study implied that occupational therapists must engage in continuous learning and adopt ethical practices when integrating AI tools like ChatGPT into their education and professional practice to ensure the maintenance of academic integrity and the effective development of professional competencies. |
| **Currie et al. (2023)** | The study aimed to evaluate the performance of ChatGPT powered by GPT-3.5 against student cohorts in medical imaging education, focusing on academic integrity and educational outcomes. | ChatGPT performed below the average student in written tasks but better in foundational or general subject exams, with its limitations increasing in more advanced and discipline-specific subjects. | ChatGPT has limited capacity to support student cheating and lacks the depth and appropriateness for professional communication, thus limiting its potential as a learning enhancement tool |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Parker et al. (2024)** | The purpose of the study was to examine the capacity of Graduate Teaching Assistants (GTAs) to identify AI-generated assessments in a cohort of student submissions and to explore the implications of AI-generated work in higher education. | The study found that GTAs were able to identify 50% of the AI-generated assessments, with AI-generated work often receiving higher marks than the average student submissions across various classes and assessment types. | The findings suggested that while AI tools like ChatGPT have potential in undergraduate assessments, there is a need for further research to explore the factors influencing the identification of AI-generated work, such as class size, instructor characteristics, and the use of AI detection tools. |
| **Nikolopoulou (2024)** | The study aimed to investigate the integration of ChatGPT and other generative AI tools in higher education, focusing on their educational and ethical implications, and the necessity of technological literacy and training for effective implementation. | The study found that integrating AI tools like ChatGPT requires significant training and support for both students and educators to ensure technological literacy and ethical use, highlighting that appropriate training can empower users to harness AI's benefits while mitigating its risks. | The findings suggested that universities need to design curricula that balance the use of AI tools with maintaining the integrity of human learning experiences, and provide guidelines to ensure responsible and ethical use of AI in alignment with educational goals. |
| **Rudolph et al. (2023)** | The study aimed to explore the implications and challenges of integrating ChatGPT into higher education, particularly focusing on its potential to alter conventional assessment methods and its effectiveness as an AI-powered writing assistant. | The study found that while ChatGPT can generate text and provide conceptual explanations efficiently, it struggles with content requiring higher-order thinking, and its use raises concerns about academic integrity and the effectiveness of traditional assessment methods. | The implications suggested that educators need to adopt a pragmatic approach to manage the challenges posed by ChatGPT, potentially rethinking assessment methods and focusing on enhancing students' critical thinking and creativity. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Rasul et al. (2023)** | The purpose of the study was to explore the benefits and challenges of ChatGPT for the future of higher education using the constructivist theory of learning as a framework. | The main findings indicated that ChatGPT can enhance student learning through personalised, collaborative, and active learning approaches, but also presents challenges such as potential misuse and the need for responsible integration in educational practices. | The implications of the study suggested that while ChatGPT has significant potential to impact higher education positively, educators and institutions must establish specific guidelines and frameworks to ensure its safe and effective use. |
| **Gamage et al. (2023)** | The purpose of the study was to critically review and analyse published work related to AI and ChatGPT, focusing on its application and impact in higher education assessments and academic integrity. | The main findings highlighted that ChatGPT is gaining significant attention for its capabilities in generating content, enhancing student engagement, and enabling remote learning, but also raises concerns regarding academic integrity and the detectability of AI-generated text. | The implications of the study suggested the need for academic institutions to adapt assessment methods and policies to manage the challenges and opportunities presented by ChatGPT in education. |
| **Huallpa et al. (2023)** | The study aimed to explore the perspectives and opinions of university students regarding the integration of Chat GPT in their educational experiences. | The results indicated that factors such as demographics, social attitudes, opinions, privacy and data security concerns, and institutional guidelines significantly influenced students' perceptions and reliance on AI-driven conversational agents in their education. | The study suggested that institutions should develop clear standards and ethical frameworks for the use of natural language processing (NLP) models, ensuring that they augment human interaction and preserve student privacy, while fostering critical thinking and self-directed learning. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Mlambo (2024)** | This study investigated lecturers' perceptions of ChatGPT, focusing on how its adoption could influence student learning behaviours and engagement in a South African University of Technology. | The study revealed that while lecturers appreciate ChatGPT's user-friendliness and its potential to enrich curriculum planning, they are also concerned that unstructured use by students may lead to over-reliance, thus fostering laziness and undermining critical thinking skills. | The findings suggested that to safeguard and enhance student learning, higher education institutions should develop guided frameworks and training that empower students to use ChatGPT as a complementary tool for critical inquiry and independent learning. |
| **Sullivan et al. (2023)** | The purpose of the study was to examine the challenges and opportunities faced by undergraduate students using ChatGPT for educational purposes, aiming to provide student-centred design ideas to mitigate these issues. | The main findings revealed that while ChatGPT offers usability, user experience, and scalability benefits, it also presents challenges such as reduced social interactions and potential mental health issues because of social isolation. | The implications suggested that to ensure ethical and effective use of ChatGPT in higher education, there must be a focus on enhancing social interaction features, fostering diverse perspectives through prompt suggestions, and involving students in the discourse about AI tool usage to address concerns of academic integrity. |
| **Fauzi et al. (2023)** | The purpose of the study was to analyze the role of ChatGPT in improving the quality of student productivity in higher education. | The main findings indicated that ChatGPT can enhance student productivity by providing useful information and resources, improving language skills, facilitating collaboration, increasing time efficiency, and offering support and motivation. | The implications suggested that integrating ChatGPT into higher education can aid students significantly in overcoming academic challenges and achieving their academic goals. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Baskara & Mukarto (2023)** | The study aimed to explore the potential benefits and challenges of incorporating ChatGPT into language education in higher education. | The study found that while ChatGPT offers significant potential for enhancing personalised instruction and generating authentic language materials, it also raises ethical and social concerns regarding its impact on language teachers and learners. | Future research is necessary to fully understand ChatGPT's role in language education, focusing on its ethical implications, limitations in handling complex language concepts, and the potential for substituting human teachers with AI. |
| **Sobaih et al. (2024)** | This study aimed to understand higher education students' acceptance and usage of ChatGPT for academic reasons, with a particular focus on students in public universities in Saudi Arabia. | The best determinant of ChatGPT use for academic reasons among Saudi Arabian students was found to be social influence, given the collective culture that strongly shapes behavioural intentions through peers, family members, and colleagues. | Higher education institutions should develop mechanisms to encourage the responsible and ethical use of AI tools, including ChatGPT, by providing students with the necessary resources and support to integrate these technologies effectively into their academic pursuits. |
| **Dwivedi et al. (2023)** | The study aimed to explore the impacts of generative AI tools like ChatGPT on various sectors, focusing particularly on its potential for productivity enhancement and the ethical implications of its use. | The study found that ChatGPT can significantly enhance productivity across different sectors by automating repetitive tasks and providing quick access to information, but it also raises ethical concerns regarding responsible use and potential misuse. | The implications suggested that organisations, including educational institutions, need to integrate ChatGPT thoughtfully into their workflows and curricula, ensuring that users are educated on its limitations and ethical considerations while leveraging its productivity benefits |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Mithi et al., (2024)** | The study aimed to explore the implications of using ChatGPT in educational settings and its potential to support both students and educators. | The study found that while ChatGPT can be a powerful educational tool, it also presents challenges related to academic integrity and requires careful implementation to avoid issues such as plagiarism. | The implications suggested that educational institutions should develop guidelines and strategies to integrate ChatGPT ethically and effectively, ensuring that its use enhances learning without compromising academic standards. |
| **Wardat et al. (2023)** | The purpose of this article was to explore the perspectives of different stakeholders (such as students and educators) on using ChatGPT for teaching mathematics. | The study found that ChatGPT is a useful educational tool, but caution is needed when using it, and guidelines for safe usage should be developed. | The study emphasised the need for a new educational philosophy that can evolve with the introduction of chatbots into the classroom and stresses the value of upgrading competencies to improve teachers' and students' proficiency with chatbot technology. |
| **Sallam et al. (2023)** | The purpose of the study was to examine ChatGPT's responses regarding compulsory vaccination and COVID-19 vaccine conspiracies to assess its reliability and accuracy in the context of a paradigm shift in online information search. | The main findings revealed that ChatGPT can provide coherent and contextually relevant responses to questions about compulsory vaccination and COVID-19 vaccine conspiracies, but it also shows variations in the quality and depth of its responses. | The implications suggested that while ChatGPT can be a useful tool for information retrieval on sensitive topics, there is a need for ongoing monitoring and improvements to ensure the accuracy and reliability of its outputs in public health contexts. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Mhlanga (2023)** | The purpose of this study was to investigate the ethical and responsible use of ChatGPT in educational settings, with a particular emphasis on facilitating lifelong learning. | The study found that while ChatGPT offers significant potential benefits for education, including personalised learning and increased accessibility, there are substantial ethical concerns such as privacy, bias, and the digital divide that must be addressed. | The implications of this study were that educational stakeholders must develop comprehensive guidelines and multidisciplinary approaches to ensure the responsible and ethical deployment of ChatGPT in educational environments. |
| **Hong (2023)** | The purpose of the study was to explore the potential and implications of using ChatGPT in educational contexts, particularly its application in teaching and learning. | The main findings suggested that while ChatGPT can significantly aid personalised learning and support teaching by generating educational content and feedback, there are concerns about ethical issues and the impact on teacher professionalism. | The implications indicated that educators and institutions need to adapt their teaching and assessment methods to integrate ChatGPT effectively and ethically, considering its potential to enhance learning and teaching practices. |
| **Javaid et al. (2023)** | The purpose of the study was to investigate the significant applications and potential benefits of integrating ChatGPT into the educational system. | The study found that ChatGPT can enhance critical thinking and communication abilities, provide immediate feedback, automate routine tasks, and support personalised learning for students. | The implications of the study suggested that integrating ChatGPT into education could improve student learning outcomes significantly, save teachers time, and offer new opportunities for personalised and efficient education. |
| **Muñoz et al. (2023)** | The study aimed to investigate the impact of ChatGPT on students' motivation and interest in the English language learning process. | Incorporating ChatGPT into educational programs could increase students' motivation to study independently and under teacher supervision. | The study suggested that incorporating ChatGPT and similar AI tools into schools can enhance conventional teaching methods and improve learning outcomes. |

| Author(s) and publication year | Purpose of the study | Main findings | Implications |
|---|---|---|---|
| **Stahl & Eke (2023)** | The study aimed to explore the ethical implications of ChatGPT by applying existing approaches to the ethics of emerging digital technologies. | The study found that ChatGPT presents significant ethical challenges, such as potential biases and exacerbation of social divides, and potential benefits, such as improved telemedicine and disease surveillance processes. | The study implied that ongoing, detailed research is necessary to understand the evolving ethical impacts of ChatGPT, and that policies promoting diversity, equity, and inclusion in access to generative AI are essential to prevent exacerbating existing divides. |
| **Schönberger (2023)** | The study aimed to evaluate the effectiveness of AI-driven tools, specifically ChatGPT, in enhancing the teaching and learning processes in higher education. | The study found that while ChatGPT offers significant opportunities for personalised and efficient education, it also presents challenges such as potential risks to academic integrity and the need for developing digital literacy among students and educators. | The implications of the study suggested that while ChatGPT can revolutionise educational practices, careful implementation and ongoing research are necessary to address its risks and maximise its benefits. |
| **Chauke et al. (2024)** | In the context of South Africa's historically disadvantaged universities, the study explored how postgraduate students perceive ChatGPT as a tool to enhance research success despite resource and language barriers. | The findings revealed that ChatGPT significantly aids South African postgraduates by refining research topics, improving academic writing through effective paraphrasing and error correction, and expediting literature reviews—thereby directly addressing language barriers and resource constraints common in these settings. | The findings foregrounded the need for South African institutions to develop tailored ethical AI policies that responsibly integrate ChatGPT, ensuring that its benefits are harnessed to overcome the specific educational hurdles of postgraduate students in historically disadvantaged settings. |

## Discussion of findings

*Theme 1: The role of ChatGPT in students' learning*

All 31 scholarly works converge on the notion that ChatGPT serves as a dynamic, on□demand learning tool that enhances student autonomy by providing personalised feedback, facilitating immediate access to information, and fostering interactive, collaborative learning environments (Gamage et al., 2023; Onal & Kulavuz-Onal, 2024;

Rasul et al., 2023). Most studies, whether through qualitative case studies or systematic reviews, underscored ChatGPT's adaptability allowing it to be integrated across diverse disciplinary contexts—from language learning to promoting student engagement and conceptual understanding in South Africa (Baskara & Mukarto, 2023; Kohnke et al., 2023). ChatGPT further supports students' learning of STEM subjects (Govender, 2023) and enhances productivity by refining academic writing and supporting conceptual understanding (Fauzi et al., 2023; Javaid et al., 2023).

However, these works also reveal critical differences. Methodologically, while some studies rely on in-depth interviews and thematic analyses of small samples, for example, Singh (2023) and Onal & Kulavuz-Onal (2024), adopt quantitative surveys to capture broader trends (Sullivan et al., 2023). Contextually, several works addressed the inherent tensions between leveraging ChatGPT for personalised learning and the risk of fostering superficial engagement and academic misconduct. This is particularly notable in studies from South Africa, where resource disparities and varying levels of digital literacy further complicate the ethical usage of ChatGPT by students (Chauke et al., 2024; Singh, 2023).

Key trends across the literature (Govender, 2023; Rasul et al., 2023; Singh, 2023) include an emphasis on the dual role of ChatGPT as an enabler of deep, autonomous learning and as a potential trigger for over-reliance that could undermine critical thinking and integrity. While all studies agreed on its transformative potential for student learning, they diverged on its implementation specifics—ranging from discipline-specific applications to general academic support. The major findings highlight that when ethically integrated and supported by robust institutional frameworks, ChatGPT can enhance learning outcomes substantially, yet its long-term success depends on addressing the digital divide and cultivating comprehensive digital literacy among students especially in South Africa.

*Theme 2: Credibility of ChatGPT in supporting students' learning*

According to several studies (Dwivedi et al., 2023; Govender, 2023; Rasul et al., 2023; Tarisayi, 2023) that have been conducted to establish the trends of the utilisation of ChatGPT in the higher education space, it was found that in general, the results produced by this AI ought to be verified with more reliable, accurate, and credible sources. Dwivedi et al. (2023) proclaimed that ChatGPT information ought to be confirmed because of certain limitations and biases that may exist in this AI that has direct implications for its reliability and credibility.

Moreover, ChatGPT's use in academic research has raised concerns regarding authenticity and reliability given its reliance on learned patterns and associations, resulting potentially in inaccuracies, biases, and misinformation that can damage research credibility (Dwivedi et al., 2023; Govender, 2023; Mithi et al., 2024; Rasul et al., 2023). Additionally, the AI's capacity to generate research output has led to issues of accountability and authorship since researchers and students may claim dishonestly the model's work as their own, thus compromising ethics, trust, and the integrity of the research community (Avello-Sáez & Estrada-Palavecino, 2023; Nikolopoulou, 2024; Singh, 2023). This suggests that while

ChatGPT offers valuable learning support for students, its limitations regarding information credibility present a significant concern. These accuracy constraints can compromise students' learning outcomes by providing them with incorrect or unreliable information, thus potentially undermining their academic progress and understanding.

In addition, ChatGPT's mathematical abilities in higher education have been put to the test ever since it was launched and several studies (Govender, 2023; Parker et al., 2024; Wardat et al., 2023) have established its incapability to solve certain mathematics problems that mathematics students can solve in their first or second year of study. Thus, these findings point to ChatGPT3.5 being unreliable. In addition, Wardat et al. (2023) asserted that while ChatGPT is capable of providing comprehensive instruction for geometry and other areas of mathematics, it is imperative that we be cautious when using this version of ChatGPT3.5 since it lacks deep comprehension of complex mathematical problems and the ability to identify and effectively rectify misconceptions. Thus, they argued that extensive research is required to establish reliable and secure integration of ChatGPT in the field of mathematics education.

In healthcare education, Sallam et al. (2023) cautioned that accredited experts must verify ChatGPT's outputs since its capacity to justify clinical decisions is limited. Likewise, Dave et al. (2023) reported that ChatGPT, akin to other AI tools, raises ethical and legal issues—most notably, potential copyright violations. Several scholars (Sullivan et al., 2023; Rasul et al., 2023) also highlighted recurring challenges related to the reliability, academic integrity, and overall credibility of ChatGPT's information processing. Although these studies acknowledge that ChatGPT can enhance the educational journey when its outputs are rigorously scrutinised, they emphasise that its benefits are undermined by risks of misinformation and unverified content.

Furthermore, Mhlanga (2023) stressed that easy access to open-source AI tools like ChatGPT necessitates the development of robust institutional frameworks. Such frameworks should promote transparent and meaningful engagement with these tools, guiding students toward ethical and informed utilisation of technology in academic contexts while safeguarding the quality and credibility of their work. Ultimately, this transition demands active involvement from all stakeholders in the education sector (Dwivedi et al., 2023) to balance ChatGPT's innovative potential with the imperative to uphold rigorous academic standards.

*Theme 3: Implications of using ChatGPT in higher education*

This theme presents the key findings regarding the implementations of ChatGPT3.5 in the context of higher education. The discussion encompasses two fundamental aspects, including the implications for students' learning, and ethical implications for students utilising ChatGPT3.5. By examining these dimensions, this systematic review aims to shed light on the multifaceted impact of incorporating ChatGPT3.5, an advanced language model, in educational settings. The findings presented herein contribute to a comprehensive understanding of how ChatGPT3.5 is being utilised in higher education and provide insights

into the potential benefits, challenges, and ethical considerations that emerge as this technology continues to shape the learning landscape.

## Implications for students' learning

While ChatGPT's capabilities are being explored increasingly in educational settings, recent findings revealed both positive and negative impacts on student learning. Several studies (Hong, 2023; Javaid et al., 2023; Muñoz et al., 2023; Stahl & Eke, 2023) demonstrated that ChatGPT can enhance students' learning experiences by providing instant feedback and personalised assistance, thereby supporting deeper understanding and independent exploration of course material. However, other research studies such as (Dempere et al., 2023; Schönberger, 2023; Singh, 2023) raised concerns that overreliance on ChatGPT may hinder the development of critical thinking skills and genuine intellectual engagement among students. For instance, Schönberger (2023) warned that excessive dependence on ChatGPT could reduce students' motivation to pursue independent research or participate in meaningful academic discussions. Similarly, Singh (2023) argued that relying on automated responses might stifle creativity and originality in student work, while Dempere et al. (2023) emphasised the risk of creating a passive learning environment in which students become mere consumers of information rather than active, self-directed learners. These findings advocate for a balanced approach to integrating ChatGPT into the learning process—one that maximises its benefits while mitigating potential drawbacks to ensure that students remain active, critical, and creative in their academic pursuits.

## Ethical implications

The implications of these studies underscore collectively the need for higher education institutions to adopt a balanced and ethical approach to integrating ChatGPT into their curricula. ChatGPT demonstrates the considerable potential to enhance learning experiences by offering personalised tutoring and supporting language learning, as well as assisting in the initial training of students in various disciplines like psychology and occupational therapy (Kohnke et al., 2023; Machin et al., 2024). However, the studies also highlight significant risks, including the potential for academic dishonesty, ethical dilemmas, and the necessity for lecturers to develop advanced digital competencies (Baskara & Mukarto, 2023; Kohnke et al., 2023; Machin et al., 2024; Mithi et al., 2024; Sobaih et al., 2024). Institutions must therefore implement proactive strategies to mitigate these risks, such as promoting ethical AI use, developing robust guidelines to prevent cheating, and ensuring that lecturers and students are well-equipped to navigate the challenges and opportunities presented by AI-driven tools (Machin et al., 2024). This balanced approach can help harness the pedagogical benefits of ChatGPT while upholding academic integrity and ethical standards in higher education.

The implications for the ethical use of ChatGPT in higher education, as drawn from the studies, highlight the need for a balanced approach to integrating AI tools in academic settings. ChatGPT's potential to enhance personalised learning and provide immediate feedback must be carefully managed to avoid over-reliance, which can undermine human critical thinking and problem-solving skills (Currie et al., 2023; Parker et al., 2024).

Additionally, the risks of plagiarism and academic dishonesty necessitate the development of robust guidelines and training programs for both students and lecturers to ensure ethical use (Govender, 2023; Parker et al., 2024). The importance of maintaining academic integrity and the authenticity of student work is paramount, and institutions must invest in technological literacy and ethical training (Parker et al., 2024). This holistic approach will enable educators to harness the benefits of AI while addressing its limitations, ultimately fostering an environment that values both innovation and academic honesty (Currie et al., 2023).

## Summary of the major findings

The review reveals a dual narrative regarding ChatGPT's role in higher education. On one hand, its potential to personalise learning, deliver immediate feedback, and boost academic engagement is well documented (Fauzi et al., 2023; Rasul et al., 2023). ChatGPT's capability to customise responses for individual learning needs promotes autonomy and collaborative educational environments (Parker et al., 2024). On the other hand, several studies highlight significant limitations. Dwivedi et al. (2023) and Govender (2023) warned that over-reliance on AI tools like ChatGPT may foster superficial learning and diminish critical thinking and problem-solving skills (Singh, 2023). Furthermore, its dependence on pre-2021 data and learned associations can result in responses that lack depth and nuance (Mithi et al., 2024). These challenges underscore the need for a balanced integration where AI complements, rather than replaces, traditional teaching methods.

Ethical concerns also emerge as a critical issue. The ease with which ChatGPT generates content can facilitate plagiarism and academic dishonesty (Avello-Sáez & Estrada-Palavecino, 2023; Singh, 2023). Although some institutions are adjusting their assessment strategies to counter these risks (Parker et al., 2024), there remains an urgent need for robust guidelines and comprehensive training on responsible AI use. In the South African higher education context, these challenges are further amplified by the digital divide, resource constraints, and varying levels of technological readiness. Chauke et al. (2024) emphasised that unequal access to technology can exacerbate academic integrity issues, making it essential for South African institutions to prioritize digital literacy and tailor guidelines to local challenges while leveraging ChatGPT's benefits.

Moreover, many existing studies rely on small sample sizes or qualitative methods, limiting the generalisability of their findings (Machin et al., 2024). Future large-scale, longitudinal research is critical to understanding the long-term impact of ChatGPT on student learning outcomes, especially in resource-variable environments. Furthermore, some educators cautioned that excessive reliance on AI may stifle independent research and creativity (Mlambo, 2024; Schönberger, 2023). Therefore, curricula must be designed to foster critical engagement and originality. While ChatGPT offers significant opportunities, its integration in South African higher education must be carefully managed to enhance learning while safeguarding academic integrity.

## Conclusion and recommendations

The research findings from the systematic review have shown that literature on using the ChatGPT3.5 tool in higher education still needs to be explored particularly in the South African context. The use of ChatGPT in higher education has emerged as an innovative initiative that seeks to enhance students' learning experiences. The research findings have revealed that the use of ChatGPT in higher education holds significant potential to transform teaching and learning, notably improving students' academic performance. However, challenges such as ensuring proper academic support and preventing misuse—especially plagiarism—must be addressed. In South African higher education, these issues are compounded by resource disparities, digital divide challenges, and varying levels of technological readiness, all of which necessitate tailored strategies. We argue that ethical implementation practices—such as establishing clear guidelines for AI-generated content, mandating ethical AI usage training, and instituting regular oversight and audits of AI-assisted work—are essential to integrate ChatGPT effectively into the curriculum while maintaining academic integrity. Furthermore, more scientific research, including systematic reviews and empirical studies, is needed to explore the impact and benefits of ChatGPT in higher education, with a particular focus on the unique context and challenges faced by South African institutions.

## Limitations of the study

This study was limited to the utilisation of secondary data to inform findings. To ensure validity, we conducted comprehensive literature searches across many databases and search engine—acknowledging that such searches may not capture every relevant study. In addition, only peer-reviewed journal articles were used, with their quality determined by publication in reputable journals and further assessed using validated quality checklists. Despite these limitations, the study offers valuable insights into the key findings regarding students' use of ChatGPT in higher education.

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