Postgraduate students' understanding of Artificial Intelligence (AI): Perspectives from selected universities in South Africa

The use of artificial intelligence (AI) in educational practices has increased. However, a practical application of AI in education depends on a person's understanding of its meaning and function. Thus, in this study, we explored the understanding of postgraduate students regarding AI at South African public universities. Twenty-four postgraduate students participated in the study, and their levels of study ranged from postgraduate diplomas to doctoral degrees. An open-ended questionnaire was administered to postgraduate students through various platforms. The data were thematically analysed. The findings revealed that 45% of participants had an intermediate understanding of AI, while 38% and 17% had basic and advanced understanding, respectively. The findings contribute to the existing body of knowledge by expanding the scope of understanding of how AI is conceptualised across various disciplines, highlighting the opportunities and issues related to AI. The practical implications entail the need for multidisciplinary collaboration among educators, technologists, and policymakers to provide training for AI users, enhancing its effective and ethical application, as well as offering proper guidance with a clear understanding of the possibilities and limitations related to its practical adoption.

Keywords: *Artificial intelligence; postgraduate; South Africa; technology; university*

Introduction

One of the most critical concerns in the educational setting now is digital transformation (Egloffstein & Ifenthaler, 2021; Iivari et al., 2020). Teachers have begun incorporating technology into their lessons more regularly as new educational tools have evolved and become more accessible (EU European Commission, 2013; European Commission, 2019; Schmitz et al., 2022). Digital technologies have a significant impact on education, making learning more accessible and influencing pedagogical methods of instruction (Deepika et al., 2021). The degree to which the use of technologies enhances students' cognitive results is determined by the pedagogical approach and instructional tactics that teachers must adapt when integrating technologies into the classroom (OECD, 2019). The use of digital technologies to cognitively stimulate and engage students in learning activities is what determines the digital technologies' potential for teaching and learning, not the kind of technology or how often it is used (Chien et al., 2016; OECD, 2015; Tamim et al., 2011; Wekerle et al., 2020). Several digital technologies have been adopted in education, including AI.

There is an increased use of AI in teaching and learning, including research, and universities are at the forefront of using AI. Therefore, this study sought to explore postgraduate students' understanding of AI. Broadly speaking, AI is a

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field of study and type of technology characterised by the development and use of machines that can perform tasks that would usually require human intelligence (World Economic Forum, 2023). Other scholars define artificial intelligence as the machines' ability "to adapt to new situations, deal with emerging situations, solve problems, answer questions, devise plans, and perform various other functions that require some level of intelligence typically evident in human beings" (Chen, Zou, Xie, Cheng & Liu, 2022, p. 75265).In line with Chen et al. (2022), Chassignol, Khoroshavin, Klimova and Bilyatdinova (2018) provide a two-faceted definition of AI. Chassignol et al. define AI as both a field of study and a theory. The scholars define AI as a field in computer science that aims to solve cognitive problems associated with human intelligence. On the other hand, they define AI as a theoretical framework that guides "the development and use of computer systems with the capabilities of human beings, more particularly, intelligence and the ability to perform tasks that require human intelligence, including visual perception, speech recognition, decision-making, and translation between languages" (Chassignol et al, 2018, p. 17).

Several studies have been conducted in South Africa regarding the application of AI in education (Chauke, Mkhize, Methi, & Dlamini, 2024; Funda, 2023; Lubinga, Maramura, & Masiya, 2023). However, some gaps exist in the aspects covered in the cited studies leading to the suggestion for further research in such areas as the integration of AI tools into research practices with ethical considerations, targeting postgraduate students at disadvantaged universities (Mkhize et al., 2024), intelligent systems applications in higher education institutions (Funda, 2023), and examination of information technology (IT) adoption and movement in South Africa (SA), (Lubinga et al., 2023). Therefore, given that AI integration, especially at the postgraduate level, IT adoption, and movement in SA are all areas of interest, as seen in the studies cited above, the current study explores explicitly postgraduate students' understanding of AI in selected South African universities. Thus, the study addresses the question, *What is postgraduate students' understanding of AI at selected SA universities*? It is believed that the first step in AI integration and adoption at any given level begins with understanding that technology. Hence, the findings of this study contribute to the existing body of knowledge by expanding the understanding of AI across various disciplines, particularly at the postgraduate level.

Literature Review

This section presents an overview on the review of related literature and theoretical framework underpinning the study.

Artificial Intelligence in Education

AI has revolutionised education by personalising learning experiences, automating administrative tasks, and delivering real-time feedback, thereby

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encouraging a more inclusive and effective learning environment (Kamalov et al., 2023). AI in education has three paradigms. Paradigm One: AI-directed, learner-as-recipient (Abulibdeh et al., 2024; Ouyang & Jiao, 2021). A typical implementation of Paradigm One is the earlier work in Intelligent Tutoring Systems (ITSs). To address the shortfalls of Paradigm One, Paradigm Two is characterised by AI as a supporting tool (Ouyang & Jiao, 2021). The learner is a collaborator who works with the system, focusing on individual learning processes (Harry & Sayudin, 2023). Paradigm Three is characterised as "AI-empowered, learner-as-leader, which holds learner agency as the core of AIEd" (Ouyang & Jiao, 2021, p. 3). AI is viewed as a tool to augment human intelligence (Nguyen, 2023).

AI's diverse applications include intelligent tutors for content delivery, feedback provision, and progress supervision (Chen, Zou, Xie, Cheng, & Liu, 2022). The release of ChatGPT in November 2022 marked a significant turning point in the adoption of AI. However, the education sector has raised alarm bells that ChatGPT could be used as a tool for academic dishonesty, and teachers at secondary schools and universities have called for its restrictions (Kamalov et al., 2023). A strength of AI is that it solves problems that teachers face when teaching diverse students. Mondal (2019) posits that AI can understand the individual needs of learners and provide personalised learning experiences for each learner. Chassignol et al. (2018) state that personalised learning "tailors educational content to the unique needs of individual students" and assists in designing teaching and learning content for students' diverse needs, thereby enhancing efficient and effective teaching and learning. Additionally, AI-empowered learning management systems (LMSs) can be used to analyse student participation in the LMS, which helps identify at-risk students, allowing for timely intervention.

AI can be used as an assessment tool to grade assessments such as essays and multiple-choice tests, thereby freeing up teachers' time (Gocen & Aydemir, 2021). Additionally, Ahmad et al. (2022) opine that computer vision and natural language processing systems can be combined to automatically grade homework, quizzes, and examinations. If the burden of marking is reduced, teachers can spend more time with students and provide more support for their learning. Furthermore, AI allows learning analytics, which is "the measurement, collection, analysis, and reporting of data about learners and their contexts, to understand and optimise learning and the environments in which it occurs" (Ahmad et al., 2022, p. 5). For instance, learning analytics in the classroom provides information about a student's interests, social networks, intelligence levels, and grades.

Al also presents pitfalls. AI applications, such as personalised learning, require students' personal information, allowing AI to select an appropriate approach and customise its content. Issues of concern are data privacy and security, as well as discrimination (Kamalov et al., 2023). Anonymising student data can alleviate some privacy concerns. The discussed literature indicates that AI in Education has received growing attention because of its capacity to disrupt traditional teaching and learning methodologies. Existing literature focuses on

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the technical and pedagogical aspects of literature, including teacher-student concerns, data privacy, and AI-generated content (Abulibdeh et al., 2024). The literature overlooks students' understanding of AI, yet the depth of students' understanding of AI in education impacts their use of the technology. Limna et al. (2022) suggest that further research on AI in education is needed to better understand its role in the digital era. However, Demaidi (2023) argue that there is a low awareness of AI across sectors, including the education sector. Students' awareness of technology could inform their perceptions and potential concerns about its usage (Baidoo-Anu et al., 2024). Thus, this study explored postgraduate students' perceptions of AI at higher institutions of learning and teaching in South Africa.

Theoretical framework

In framing this study, a search for the most suitable framework highlighted several theories namely, social constructivism, technological determinism, actor-network theory, posthumanism (Mauthner & Kazimierczak, 2019), human-computer interaction (HCI) and critical theory (Obrist & Fuchs, 2010), connectivism (Siemens, 2005), and diffusion of innovations (DoI) (Rogers, 2003), among others. However, while these theories may be suitable for the current study, there are inherent limitations associated with their usage, except for Connectivism. The limitation of constructivism is its inability to address the unique challenges posed by AI. At the same time, technological determinism overlooks the active role of users (learners), while ANT focuses more on non-human actors, and posthumanism adopts a philosophical approach to technology (Mauthner & Kazimierczak, 2019). HCI emphasises the design and usability of technology, while critical theory focuses on the societal impact of AI (Obrist & Fuchs, 2010). In contrast, DoI concentrates on the spread of technology (Rogers, 2003). However, connectivism is deemed suitable for the current study because it focuses on networked learning in a digital age that bears more relevance to AI and its applications in addressing the complexities of instruction in a digital and knowledge-rich environment.

Connectivism is a theory, popularised by George Siemens, who described it as a learning theory for the digital age (Siemens, 2004). Learning is a process whose occurrence is hinged on a variety of continuously changing elements. Learning occurs in a cycle and takes place through network connections (Siemens, 2004). It is first initiated and commences when an individual feeds information into a network, which in turn feeds back to the individual, who then feeds the information back into the network as part of a cycle (Siemens, 2004). Moreover, knowledge is derived from a person's learning network, which recognises the relationships between ideas, viewpoints, and concepts that can be accessed via internet technologies such as electronic databases, web search engines, and online information resources (Dunaway, 2011). The implication is that the individuals or persons who create these learning networks are referred to as nodes, while the channels through which they connect are referred to as links (Siemens, 2008). These nodes require a series of network connections to

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facilitate real-time and offline learning (Dunaway, 2011). As averred by these scholars, connectivism shifts the learning space from the traditional classroom to one that is no longer an internal or individualistic activity, but resides on databases, open-access communication, scholarly publications, and other library sources, among others (Dunaway, 2011; Siemens, 2005).

The rationale for applying the connectivist theory in this study is that it is a learning theory well-suited for the digital age, as exemplified in the studies cited above (Alam, 2023). Thus, it is employed to explore postgraduate students' understanding of artificial intelligence (AI). Although connectivism emphasises the application of technology in learning, it, however, does not provide any explanation of how an individual who is considered a node in the series of connections understands the technology through which learning is processed.

Methodology

This qualitative case study, grounded in the interpretive paradigm, examines the understanding of postgraduate students regarding AI. A case study is deemed necessary for the current study because it aims to address the 'how', 'why', and 'what' questions, and generate an in-depth understanding of a contemporary phenomenon within a bounded system that interests the researcher (Coombs, 2022; Yin, 2018). Additionally, a case study justifies the examination of a single person or a group of individuals within each system (Yin, 2017), which in this case are postgraduate students at selected universities in South Africa. The sample for the study comprised 24 postgraduate students in different fields of study, selected through snowball and purposive sampling, representing nine (9) of the twenty-six (26) universities in South Africa. Thus, the recruitment of the study sample commenced with a few participants from the researchers' institutions, who referred and recommended other postgraduate students to participate in the study. Participants from different levels and areas of specialisation were represented in the study. The levels of study covered include PGCE, postgraduate diploma, honours, master's, and doctorate, while the area of specialisation cuts across African languages: criminal justice; cyber security; education; geography; linguistics and literature in English; physical science; political and international relations; public health; and social science. A total of nine (9) higher education institutions participated in the study: two from the Eastern Cape, one from the Free State, two from Gauteng, one from KwaZulu-Natal, one from Mpumalanga, and two from the Western Cape provinces.

Data for the study were generated online using an open-ended questionnaire designed on Google Forms. The Google Forms were shared with students from September 26, 2023, to April 23, 2024. The rationale for using Google Forms was based on its ease of use and sharing, cost-effectiveness, especially in reaching a wider audience, and the ability to allow for customisation, among others. The questions asked covered the following areas: biographical information, level and field of postgraduate study, understanding of artificial intelligence, artificial intelligence research writing tools and applications,

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improvements brought about by AI in research writing, advantages and disadvantages of AI tools in research writing, and AI policies in place at their various institutions.

Data analysis for this study was conducted in two phases: a biographical (numerical) phase and a textual phase. The demographic data, which includes gender, race, age, level of study, and field of study, were analysed using descriptive statistics. Descriptive statistics is "the kind of information presented in just a few words to describe the basic features of the data in a study" (Mishra et al., 2019). The thematic approach was used to analyse the data generated from the Google Form. Thematic analysis is "a method for analysing qualitative data that entails searching across a data set to identify, analyse, and report repeated patterns"(Kiger & Varpio, 2020). Researchers of this study familiarised themselves with the data gathered. They then generated codes from the data and searched for themes. The identified themes were reviewed, and names were given in relation to the study. Trustworthiness in the study was achieved through data triangulation, which increased the credibility and validity of the research (Noble & Heale, 2019). Hence, for this study, information generated from participants in one institution was triangulated with that from other universities from different provinces in South Africa.

The study followed strict ethical protocols. Before the commencement of data collection, an application for ethical clearance was filed with the university's Research Ethics Committee, which was subsequently approved with reference number FEDREC15-06-23-3. Additionally, participants in the study were recruited through informed consent, which ensured their anonymity and confidentiality, with the provision that they could withdraw at any time. The 24 participants in the study were assigned codes P1 to P24, which were used to identify comments from their respective respondents.

Results

This section presents the results of the study. It is divided into two phases, namely the preliminary and main findings. The preliminary phase presents findings on demographic data, including gender, race, age, level, and fields of study of participants, represented in various Tables. The second phase presents the findings from individual respondents concerning the research question guiding the study.

Phase 1: Demographic Data

This section presents findings on participants' gender, race, age, level, and fields of study. The gender of participants is presented in Table 1, while race, age, level, and field of study are presented in Tables 2.

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Table 1. *Gender of participants*

Gender	No. of participants	Percentage (%)
Male	12	50
Female	12	50
Total	**24**	**100**

Table 2. *Race of participants*

Race	No. of participants	Percentage (%)
Black African	23	96
White	1	4
Total	**24**	**100**

Table 3. *Age of participants*

Age range	*No. of participants*	*Percentage (%)*
20-24	5	21
25-29	7	29
30-34	5	21
35-39	4	17
40-44	1	4
45 and above	2	8
Total	**24**	**100**

Tables 1, 2, and 3 above present the biographical data of the respondents, namely gender, race, and age. For gender, the analysis reveals equal responses from both males and females, with 12 respondents from each group, representing 50% of the total. The analysis of race reveals that 23 respondents identify as black Africans, while one respondent represents the white race, with a percentage ratio of 96% to 4%. In terms of age groups, the 25-29 age group recorded the most responses, with seven (7) respondents, accounting for 29%, whereas the 40-44 age group recorded the fewest, with only one respondent, accounting for 4%. This section of Phase 1 is followed by an analysis of the level and field of study, as presented in Tables 4 and 5, respectively.

Table 4. *Levels of study*

Level of postgraduate study	**No. of participants**	**Percentage** (%)
PGCE	1	4
PGDip	1	4
Honours	10	42
Masters	7	29
PhD	5	21
Total	**24**	**100**

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Table 5. *Fields of study*

Field of study	No. of Participants	Percentage (%)
Cyber security	1	4
African languages	1	4
Criminal justice	1	4
Education	14	58
Geography	1	4
Linguistics & Literature in English	1	4
Physical science	1	4
Political & international relations	1	4
Public health	1	4
Social science	2	8
Total	**24**	**100**

Tables 4 and 5 above show an analysis of the participants' levels and fields of study. According to Table 4 above, the highest number of participants was recorded at two different levels, namely PGCE and PGDip, with one (1) participant each, while the highest was noted with the Honours category—ten (10) respondents, both representing 42% and 4%, respectively. On the other hand, the field of study displays a cross-section of different areas of specialisation. The highest number of participants was recorded in the field of Education, with a number of fourteen (14) participants, while the lowest of one (1) respondent is in Cyber security, African languages, Criminal Justice, Geography, Linguistics and Literature in English, Physical science, Political & international relations, Public health showing corresponding percentages of 58 and 4, respectively.

Phase 2: Postgraduate students' understanding of AI

This section presents the understanding of postgraduate students regarding AI. Their understanding of AI is measured by how well they can describe its meaning and functions. For this section, three themes emerged: basic, intermediate, and advanced understanding of AI.

Table 6 in *Appendix A* presents the various themes and corresponding quotations from the participants. In the following section, the analysis of the quotations is presented. The analysis is presented according to the themes, namely, fundamental understanding, followed by intermediate and advanced understanding, respectively.

Basic Understanding of AI

About 38% (9/24) of the participants had a basic understanding of AI, as

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indicated in Table 6 above. This level of understanding is often vague, providing a general definition of AI with simple examples, but lacking technical details or nuance. Participants from various disciplines in this study demonstrated a wide range of understanding of AI.

Accordingly, participant 1 (Bed Honours student) suggests a transformative impact of AI by arguing that AI is central to "The future of everything." Concurring with P1 is P5 (Honours Social Sciences), which states that AI plays a significant role in developing our lives as human beings. Another social sciences student, P18, echoes this definition by opining that AI is a technological innovation that equips people. A specific definition of AI was postulated by P2 (a master's in education student), who defines AI as a "robot that assists with information," highlighting a narrow view of AI as an information management tool. A PhD (Education student) brings in a technical definition of AI and describes it as "machines or software intelligence, not human or animal intelligence." Similarly, P15 (Honours Education) defines AI as "robotic" and closely tied to automation within the Fourth Industrial Revolution (4IR).

The functional benefits of AI were used to describe its meaning by a PhD (African Languages), P23, who said that AI is an improving technology that makes life across domains easier, from academic to business. For instance, AI assists with tasks such as essay and proposal writing, thus easing the burden on human beings. In line with this view is P12 (Masters Education), which argues that AI is "programs that are designed to complete tasks that humans can do, appearing to be intelligent." Lastly, P7 (a master's in public health) defines AI as "human intelligence processed by computer systems," emphasising the human cognition behind AI. These definitions of AI reveal the multifaceted nature of AI. Some participants view AI as transformative, and others focus on its practical applications. The participants' definitions reflect their varying familiarity with AI and its present and future impact.

Intermediate Understanding of AI

The intermediate understanding of AI focuses on specific examples and use cases, along with aspects of application, and recognises the role of AI in diverse industries and jobs. Forty-five per cent (11/24) of the participants shared this level of understanding, as shown in Table 6 above.

The understanding of participants in this theme revealed diverse perspectives on AI. From Table 6 above, participant 6, an Honours student specialising in Linguistics and Literature, opined that AI is a technological software that mimics human intelligence to carry out tasks. In line with P6 is P21, an Education Master's student whose understanding of AI encompasses both cognitive and behavioural aspects of AI. P21 stated that AI machines think and behave like humans, with a focus on problem-solving and decision-making. Aligning with P21's definition is P10, another master's in education student, who highlights AI as human intelligence programmed into machines for problem-solving. An in-depth definition of AI was highlighted by P9, a PGCE student, who posited that AI involves computers performing cognitive tasks that are

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considered intelligent. Thus, this response focuses on the intellectual capabilities of AI. Agreeing with P9 is P11 (PhD Physical Science), which describes AI as robots or computers performing tasks usually done by humans. P18 (Honours Geography) highlighted a functional definition of AI, which stated that AI is software that generates information or performs specialised tasks. P13 (master's in education) defines AI by exemplifying it with ChatGPT. The participant stated that AI is a tool that can quickly replicate human tasks. Thus, emphasising AI's efficiency and performance. The informational aspect of AI was highlighted by P4 (Honours Education), who states that AI is computer-generated knowledge and functions. The idea of AI as a web-based innovation and the role of data in its operation was introduced by P20 (Masters Education), who argues that AI performs tasks based on accumulated information through human interaction. P3 (Master's Education) presents an inclusive definition of AI, positing that it encompasses the intelligence of machines, technological portals, and robots. These findings revealed that the participants had a shared understanding of AI, namely that it is a digital tool that mimics human intelligence, encompassing cognitive functions for specialised tasks.

Advanced Understanding of AI

This level of understanding demonstrates a more profound conceptual knowledge that hypothetically reveals how AI works, its capabilities, constraints, and broader impact on society, ethics, or future implications. Approximately 17% (4/24) of the participants demonstrated a varied level of advanced understanding of AI across different academic disciplines, as shown in Table 6 above. According to P16 (PGCE Education), AI is the ability of machines to mimic human intelligence. The participant further highlighted the ability of AI to undertake tasks that are typically performed by humans, such as language understanding, pattern recognition, and decision-making. Furthermore, the examples provided by participants from various fields of application, including healthcare, finance, and entertainment, demonstrate the diverse range of applications. Correspondingly, AI was defined as systems that execute tasks requiring human intelligence, with examples such as Quilbot, ChatGPT, and Siri, emphasising the accessibility of AI in everyday technology (PG Diploma Cyber Security, P19). On the other hand, Honours Political and International Relations (P8) points to AI as utility software integrated into digital equipment such as computers, smartphones, and TVs. Projecting AI as e-editors that improve the quality of writing and aid in access to research information. This view typically portrays AI as a practical educational aid. Conclusively, the excerpt by the PhD Education (P22) participant sheds more insight into a broad and functional view of AI as a computerised tool designed to reduce time across a range of tasks. In general, the various perspectives illustrate a spectrum of AI perceptions ranging from a conceptual understanding to practical applications.

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Discussion

This section presents the findings based on the analysis of the study. Three themes emerge: basic, intermediate and advanced understanding of AI. In the following paragraph, the discussion on understanding AI is presented on a continuum, ranging from basic to advanced understanding.

Basic understanding of AI

As previously mentioned, this study aimed to explore the understanding of artificial intelligence among postgraduate students. Findings from the first theme that emerged from the analysis revealed a limited or partial understanding of AI. Excerpt from nine (9) participants, who represent 38% of the total participants, support this finding. For instance, P1 indicated that AI is the future of everything. This corroborates the fundamental basis of connectivism, which posits that learning is dynamic and evolving, which implies that the art of learning is continuous and the expansion of information networks (Siemens, 2005). Participant 5, on the other hand, stated that AI is here to enhance our lives, but did not elaborate on their statement. A limited definition of AI is also stated by P18, who writes that AI is a technological innovation to equip people. These descriptions of AI did not include most of the aspects captured by the World Economic Forum (2023) and scholars such as Song and Lee (2025), Chen et al. (2022), Chassignol et al. (2018), and Yufeia et al. (2020). This implies that participants with limited knowledge of AI might not benefit from the opportunities offered by AI. This corroborates Chan's (2023) work, which advocates for AI literacy interventions as a key to unlocking the benefits of AI for students.

Intermediate Understanding of AI

Findings from the second theme that emerged from the analysis revealed that 12 out of 24 (50%) of the participants demonstrated an average level of understanding of AI. Participant 21's description of AI indicates an understanding of AI, which is in line with scholars such as Joshi, Rambola and Churi (2021), who posit that AI has a programme, an intelligent system tutor, that answers students' questions and gives feedback. Similarly, Chen et al. (2022) suggest that AI has diverse applications, including intelligent tutors for content delivery, providing feedback, and monitoring progress. This clearly aligns with the connectivism theory, which posits that learning is not only acquired from textbooks or lectures but can also be achieved through online communities, social media, and other technological platforms (Alam, 2023). Some participants highlighted the applications of AI in education, including searching for information, drafting business proposals, and composing essays. Essay writing is an activity that previously relied solely on human effort; however, according to Chassignol et al. (2018), AI can now perform tasks that require human intelligence. These functions of AI are captured in Chen et al.'s

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(2022) definition of AI. This also aligns with one of the eight principles of connectivism, as outlined by Siemens (2005), which posits that learning may reside in non-human appliances, as observed in the study.

Furthermore, participants with an in-depth understanding of AI demonstrated its applications in various sectors of the economy, including education. Furthermore, participants' ability to identify examples of AI tools, such as ChatGPT, Quillbot, and Grammarly, used in education suggests that these students also utilise AI in their postgraduate studies and daily lives. Connectivism emphasises the importance of efficient information connection. These examples, which are non-human appliances deemed to carry out tasks originally performed by humans, especially in education, also corroborate the proposition of connectivism, which describes the role of technology in learning (Siemens, 2005). For instance, P23 provided a tangible example of AI's use, such as writing business proposals for business professionals. In line with the connectivism theory, these tools, which act as nodes within the learning network, enable students to process information at a rapid rate, thereby extending their cognitive capabilities (Siemens, 2005)

Advanced Understanding of AI

Findings revealed that students' descriptions of AI, based on the third theme, are like those of the World Economic Forum (2023) and other scholars, such as Chen, Zou, Xie, Cheng, and Liu (2022), who portray AI as a transformative technology with huge potential to impact human endeavours. Although the participants focused solely on the positive aspects of AI and did not address the ethical concerns highlighted by the World Economic Forum (2023), the findings suggest that a few (4 participants, 17% of the participants) had an advanced understanding of AI and, as such, are the most likely to use AI to augment human intelligence in their studies. The findings further show that the participants' explanation of AI aligns with Bennett and Abusalem (2024) and Chassignol et al.'s (2018) two-faceted definition of AI, which favours the connectivity ideology of collaborating with machine intelligence to access dynamic knowledge. In other words, participants' descriptions of AI in this theme extend beyond what Abulibdeh et al. (2024) and Ouyang & Jiao (2021) referred to as mere recipients of AI services, which is considered in this study as the first paradigm. In line with connectivism, P16's comment on machines undertaking human tasks depicts the provision of intelligence that is separated from that of humans, and this invariably expands the network of information assimilation, leading to the creation of avenues of knowledge acquisition (Siemens, 2005). Additionally, achieving efficiency in learning, as triggered by AI, is linked to the comment of P19, which stresses that AI reduces the time needed to complete a given task, thereby corroborating the principles of connectivism.

Implications

The study's findings have significant implications for policy, practice, and

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research. Policy implications underscore the need for higher education systems in South Africa to implement policies on the integration and application of AI at various levels of the teaching and learning process, ensuring that students, lecturers, and other stakeholders can leverage the affordances offered by this technology. Additionally, considering the wide range of AI tools and their various applications as revealed in the study, there is a need for the introduction of policies on ethical regulation of usage, especially in academic and professional settings. Besides, there is a need to educate the populace through education campaigns to address misconceptions about AI assuming human tasks or acting in isolation without human input. The practical implications, as deduced from the findings, entail the need to provide concerned stakeholders in higher education with the necessary training to enhance the practical and ethical application of AI. Furthermore, due to the misuse or resistance of AI technologies stemming from a misunderstanding of AI as a replacement for human tasks, there is a need for proper guidance with a clear understanding of the possibilities and limitations of AI in the practical adoption of such applications. Furthermore, the multiplicity and variability in definitions and understanding among participants suggest the need for multidisciplinary collaboration among educators, technologists, and policymakers.

Implications for research from the dimensions of diversity in the responses suggest the need for further study at various levels of AI understanding, as this may impact how the applications are adopted and applied in different disciplines. The study's findings, which largely hinge on varied opinions, further suggest how the concept of artificial intelligence is taught and understood in educational programmes, and this may point to gaps in the current curriculum, thereby necessitating studies on effective AI education methodologies. Furthermore, with a sample size of 24 participants representing nine out of the twenty-six (26) public universities in South Africa, which inevitably limits the generalizability of the findings, the results may not apply to other institutions. Therefore, it is recommended that further research be conducted across a wide range of samples, utilising designs other than those employed in this study.

Conclusions

The study, grounded in qualitative case study research design, employed the Connectivist Learning Theory (CLT) to determine postgraduate students' understanding of AI. The findings revealed that a greater number of participants had an intermediate understanding of AI, followed by those with basic and advanced levels of understanding. Therefore, based on these findings, the study concludes that there is a general awareness of AI as a powerful technological tool that mimics human intelligence, with significant implications for diverse spheres, including education, healthcare, and business, among others. However, with the varied levels of understanding recorded, it is recommended that higher education institutions and other stakeholders concerned prioritise equipping students with the requisite knowledge and skills so that they can maximise the

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opportunities and affordances offered by AI.

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Appendix A

THEMES	BASIC UNDERSTANDING OF AI	INTERMEDIATE UNDERSTANDING OF AI	ADVANCED UNDERSTANDING OF AI
QUOTATION	The future of everything" **(BEd Honours) P1**	"Artificial intelligence is the intelligence of technological software and applications which mimics human intelligence in solving or carrying out curated tasks." **(Honours Linguistics and Literature) P6**	My understanding of artificial intelligence (AI) is that it is the ability of machines to mimic human intelligence. AI systems can perform tasks that typically require human intelligence, such as understanding language, recognising patterns, and making informed decisions. Some examples of AI include chatbots, self-driving cars, and recommendation systems. AI has many applications in areas such as healthcare, finance, manufacturing, and entertainment." **(PGCE Education) P16**
	Here to develop our lives" **(Social Sciences Honours) P5**	"Artificial intelligence is the use of computers and machines that think and behave like human beings to mimic problem-solving and decision-making. These machines are believed to have human minds." **(Masters Education) P21**	An AI is a development of computer systems to perform tasks that typically need human Intelligence. Moreover, Most Common AI tools are Quilbot, Chatgbt, Grammarly, Siri, etc." **(PG Diploma Cyber Security) P19**
	Technological innovation to equip people" **(Social Sciences Honours) P18**	AI is the human intelligence being programmed into machines, such as robots and computers, and they solve a problem." **(Masters Education) P10**	It is the use of software installed in digital artefacts, such as computers, Cell Phones, Desktops, and TVs. They are often used to improve the quality of poorly edited work or enhance one's writing skills. They're e-editors if I might use that to clarify further. They equally bring answers to a lot of questions where one would have struggled to access papers or information that talks to the subject or topic being researched." **(Honours Political and international relations) P8**
	It's a robot that assists with information" **(Masters Education) P2**	My understanding of artificial intelligence is that computers can do things that would normally be done by humans that are	It is a computerized tool that can be used for almost anything to minimize time." **(PhD Education) P22**

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	considered smart such as cognitive thinking." **(PGCE) P9**
Machines or software intelligence, not human or animal intelligence" **(PhD Education) P14**	When a computer or a robot begins to display human intelligence by doing tasks that humans ordinarily do." **(PhD Physical Science) P11**
AI is robotic. As we are in the 4IR of the 21st century, let's talk about automation. AI is the replacement of human beings" (**Honours Education) P15**	When a computer or a robot begins to display human intelligence by doing tasks that humans ordinarily do." **(PhD Physical Science) P11**
Improved technologies that assist people with whatever they need to make their lives easy, be it academically or in business. It can write an essay for a student or help structure it; it can draft a proposal for a businessman, etc." **(PhD African languages) P23**	It is computer software that is programmed to generate information from already available information on the internet or perform tasks that it is specialised or programmed to do." **(Honours Geography) P18**
Programs that are designed to complete tasks that humans can do. Appearing to be intelligent" **(Masters Education) P12**	The ability of a computer or robot to do what used to be done by humans at a very high speed. For example, ChatGPT." **(Masters Education) P13**
Human intelligence processed by computer systems" **(Masters Public Health) P7**	Knowledge and functions that are computer-generated." **(Honours Education) P4**
	The web-based innovation that is used to undertake tasks with prompts using pre-loaded or information accumulated through interactions with human beings."

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(Masters Education)
P20
Artificial intelligence refers to the intelligence of machines, Technological Portals, and robots that have been programmed."
(Masters Education)
P3

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