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Student Teachers' Narratives on Artificial Intelligence (AI)-Personalised Learning in Geography and Social Sciences Teaching at a South African University

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Abstract: This study investigates student experiences and perceptions of AI-personalised learning in Geography and Social Sciences teaching at a South African university in the Eastern Cape province. Within an interpretivist paradigm, the research adopted a qualitative approach with an explanatory case study design. Data were collected via open-ended questionnaires from a purposive sample of 15 undergraduate students who had direct experience with AI-personalised learning tools in their Geography and Social Sciences teaching modules. Thematic analysis revealed four themes: enhanced understanding and simplification of concepts; personalised support and learning autonomy; accessibility and contextual gaps; and real-world application and engagement. Students perceived AI tools as personalised tutors that aided comprehension and fostered self-directed learning. However, the study also identified significant challenges, particularly the digital divide and limited technology access, which risk exacerbating existing inequalities. The study contributes to the literature on student narratives from the Global South and emphasises the need for contextually relevant and inclusive approaches to AI integration in higher education.

Keywords: Student teachers, AI-personalised learning, Geography, Social sciences teaching, digital pedagogy, technology in education.

1. Introduction

The prompt integration of Artificial Intelligence (AI) into educational environments has ushered in transformative opportunities for teaching and learning across disciplines. In particular, AI-personalised learning, defined as the utilisation of artificial intelligence technologies to tailor educational content, pacing, and feedback to individual learner needs, has gained momentum as a tool for enhancing learner autonomy, engagement, and academic performance (Holmes et al., 2019). Within the South African higher education context, where issues of educational inequality, overcrowded classrooms, and diverse learner needs are prevalent, AI-personalised learning presents both an opportunity and a challenge (Cross & Feldman, 2025). In the fields of Geography and Social Sciences education, where understanding abstract concepts, spatial thinking, and social processes is central, personalised digital learning could potentially bridge pedagogical gaps and support differentiated teaching (Ngary & Twum-Darko, 2024). Student teachers are undergraduate students enrolled in a Bachelor of Education programme at a South African university who are training to become future educators. By investigating their experiences with AI-personalised learning, there will be a better understanding of how their formative encounters with these technologies will influence their future pedagogical practices and attitudes towards technology integration in their classrooms. By studying this group, the research directly contributes to preparing future educators who are equipped to navigate the complexities and opportunities of digital pedagogy in the Global South.

While AI-enhanced education has garnered significant global interest, fewer studies have centred on student perspectives, particularly in South Africa, to understand how AI-personalised learning is practically experienced. Existing research often prioritises technological or institutional viewpoints,

leaving gaps in nuanced, learner-centred analyses (Maphalala et al., 2025; Saal et al., 2024; Mulaudzi & Hamilton, 2024). Most existing literature focuses on technological implementation or theoretical benefits, with limited attention to how students interpret, engage with, and are affected by AI-driven educational interventions (Adewale et al., 2024). Furthermore, critical voices caution against a one-size-fits-all application of AI tools, noting ethical concerns, algorithmic biases, and digital access issues (Al-Zahrani, 2024). In South Africa, these concerns are intensified by socio-economic disparities, infrastructural limitations, and variable levels of digital literacy among students and lecturers (Reddy & Naidoo, 2022). This paper addresses these gaps by focusing on student narratives as a lens to understand the pedagogical value and lived experience of AI-personalised learning in university-level Geography and Social Sciences teaching.

The limited understanding of how university students experience and perceive AI-personalised learning within the context of Geography and Social Sciences education constitutes a significant problem. While AI has the potential to support inclusive and student-centred pedagogy, its impact can only be fully understood through the voices of those most directly affected: the students themselves. This is especially critical in disciplines such as Geography and Social Sciences, which require not only content mastery but also critical thinking, contextual understanding, and socio-spatial awareness.

Accordingly, the aim of this study is to explore student experiences, perceptions, and interpretations of AI-personalised learning in Geography and Social Sciences teaching. The following research question will guide the study:

- How do student teachers experience AI-personalised learning in Geography and Social Sciences teaching?
- In what ways does AI-personalised learning influence students' retention, engagement and motivation in Geography and Social Sciences learning?
- How do students describe the benefits and challenges of using AI-personalised learning in their coursework?
- What role does AI-personalised learning play in shaping students' sense of self-sufficiency and ownership over their learning processes?

In pursuing these questions, the study seeks to uncover both the affordances and constraints of AI-based learning from the student teachers' perspective, thereby contributing to the growing field of AI in education with context-specific insights.

2. Literature Review

Artificial Intelligence (AI) has become increasingly integrated into higher education, providing transformative pathways for personalised learning experiences. AI-personalised learning refers to the utilisation of algorithms and machine learning techniques to tailor teaching content, pacing, feedback, and assessment based on individual learner data (Holmes et al., 2019). AI offers significant support through adaptive tools and formative feedback mechanisms in content-rich and interpretive domains such as Geography and Social Sciences, where students are expected to interpret, critique, and apply information across diverse contexts (Zawacki-Richter et al., 2019). These tools encompass interactive maps, simulations, and AI writing assistants that enhance student agency and comprehension. In the South African university context, AI-personalised learning remains in an emergent and uneven state, stemming from disparities in infrastructure, digital literacy, and institutional readiness (Mpungose, 2020). Nevertheless, as more students engage with AI tools, their narratives provide valuable insights into how they perceive the practical value, limitations, and pedagogical implications of personalised learning within their disciplines (Opesemowo & Adekomaya, 2024).

Students have increasingly reported that AI-personalised learning enhances their motivation and engagement by providing tailored resources and timely feedback. Lin and Chen (2024) found that

learners tend to exhibit greater confidence and interest when AI platforms adapt to students' pace and comprehension levels. In the field of Geography, adaptive tools such as GIS applications or scaffolded map work enable learners to visualise abstract phenomena more concretely. In Social Sciences, AI facilitates the simplification of complex theories and the contextualisation of socio-political dynamics, thereby fostering improved retention and understanding (Luckin & Holmes, 2016). Furthermore, AI supports a transition from passive to active learning, allowing students to revisit complex topics, explore new areas of interest, and monitor their progress. This aligns with Self-Determination Theory (Deci & Ryan, 2000), which emphasises the motivational significance of autonomy, competence, and relatedness. When learning environments fulfil these psychological needs, students are more likely to engage meaningfully and sustain their academic efforts.

While the benefits of AI-personalised learning include increased autonomy, tailored support, and improved engagement, students also report several limitations. Commonly cited challenges include algorithmic bias, lack of contextual relevance, and perceived impersonality in AI-generated feedback (Williamson & Eynon, 2020). Some students experience anxiety from continuous monitoring, while others feel that AI responses do not always align with local educational contexts. In South Africa, infrastructural limitations pose additional barriers. Many students from under-resourced institutions lack reliable access to the internet, smart devices, or digital literacy training. This digital divide leads to unequal experiences and may widen existing educational inequalities (Mpungose, 2020; Merriam & Tisdell, 2016). Furthermore, ethical concerns surrounding data privacy and AI transparency are increasingly being raised by both students and scholars (Zawacki-Richter et al., 2019).

AI-personalised learning empowers students to become self-directed learners by enabling them to take control of their academic journey. Rather than relying solely on traditional instruction, learners utilise AI tools to assess their weaknesses, revisit materials at their own pace, and engage with resources that suit their learning styles. This sense of control supports intrinsic motivation and academic self-efficacy, as described by Deci and Ryan's (2000) Self-Determination Theory. Tools such as adaptive quizzes, writing aids, and visualisation technologies promote students' sense of competence and autonomy. This is particularly valuable in disciplines such as Geography and Social Sciences, which require the integration of theoretical knowledge with real-world issues. Through AI, students are better equipped to bridge this gap, ultimately increasing their sense of self-sufficiency.

2.1 Theoretical framework

This study draws on a multi-theoretical framework that combines the Technological Pedagogical Content Knowledge (TPACK) model, the Technology Acceptance Model (TAM), and Self-Determination Theory (SDT). These theories offer complementary perspectives on how technology is implemented by teachers, accepted by students, and experienced at both motivational and cognitive levels.

The TPACK framework, developed by Mishra and Koehler (2006), emphasises the need for teachers to integrate technology, pedagogy, and content knowledge skillfully. This study evaluates whether the use of AI technologies is pedagogically sound and subject-relevant from the students' perspectives. TPACK is particularly relevant as it guides the design of effective AI-integrated lessons, ensuring that technological tools enhance, rather than detract from, the pedagogical goals and content mastery in Geography and Social Sciences. For instance, studies by Zawacki-Richter et al. (2019) and Holmes et al. (2019) have extensively demonstrated how TPACK can be used to analyse and improve technology integration in various disciplines, including Geography (e.g., using AI for GIS analysis) and Social Sciences (e.g., AI for historical document analysis). This framework ensures that our understanding of student experiences is grounded in sound pedagogical practice, considering whether AI effectively supports the specific learning objectives of these subjects.

The Technology Acceptance Model (TAM), formulated by Davis (1989), concerns how students come to accept and use technology. It focuses on two primary factors, Perceived Usefulness and Perceived Ease of Use, which significantly influence user attitudes and intentions. TAM provides a structure to explore students' acceptance and usage patterns of AI-personalised learning tools. The model helps explain how technological features such as recommendation engines, adaptive feedback, and automated assessments contribute to student satisfaction and engagement. TAM complements TPACK by explaining why students might adopt or reject AI tools, even when these tools are pedagogically sound. While TPACK addresses how teachers design technology-enhanced lessons, TAM delves into students' perceptions and intentions regarding the use of that technology. For instance, studies by Schorr (2023) have frequently employed TAM to understand user adoption of new educational technologies, showing that perceived usefulness and ease of use are critical factors. Student narratives indicate that AI "simplifies context and content" and provides "straight information," which aligns directly with the concept of perceived usefulness, influencing their acceptance and continued engagement with the technology in their Geography and Social Sciences coursework.

Self-Determination Theory (SDT), developed by Deci and Ryan (2000), explains how motivation influences learning, emphasising the importance of autonomy, competence, and relatedness. AI-personalised learning systems can foster autonomy by allowing students to choose their learning paths, support competence through adaptive scaffolding and timely feedback, and promote relatedness when collaborative tools or peer interaction features are embedded. SDT is particularly useful for understanding the deeper psychological impact of AI-based learning environments on students' intrinsic motivation and academic engagement. By interpreting student narratives through the lens of SDT, the study identifies whether these platforms empower or alienate student teachers in their educational journeys. SDT further enriches the framework by focusing on students' intrinsic motivation to use AI, going beyond mere acceptance (Technology Acceptance Model - TAM) and teaching design (Technological Pedagogical Content Knowledge - TPACK). It explores the 'why' behind their engagement. Research by Lin and Chen (2024) highlights how supporting autonomy and competence can enhance engagement and learning outcomes. Similarly, studies in educational technology by Kamalov et al. (2023) have successfully applied SDT to understand how adaptive learning systems influence students' feelings of control, mastery, and connection to their learning, demonstrating its relevance for AI-personalised learning. This theory helps to understand if the AI tools truly empower students to "understand the lesson in my way" and foster a sense of self-sufficiency, addressing the motivational dimension that TAM and TPACK might not fully capture.

Integrating TPACK, TAM, and SDT offers a holistic framework for analysing student experiences with AI-personalised learning. These three theories are not used in isolation but rather synergistically, providing a comprehensive lens to examine the multifaceted issue of AI integration in Geography and Social Sciences teacher education. TPACK informs the pedagogical appropriateness and content relevance of AI tools as perceived by students; TAM explains their willingness and actual usage based on utility and ease; and SDT unpacks the motivational and psychological effects on their learning autonomy and competence. For instance, an AI tool might be well-designed (TPACK-informed), but if students do not perceive it as helpful or easy to use (low TAM), or if it undermines their sense of autonomy (low SDT), its integration will be ineffective. Conversely, a tool that is easy to use (high TAM) and fosters independence (high SDT) but lacks pedagogical soundness (low TPACK) will also fail to optimise learning outcomes. By combining these, the study can provide a nuanced understanding of how teaching design, user perception, and motivational factors influence student teachers' narratives on AI-personalised learning in specific subject domains. This multi-theoretical framework creates a comprehensive foundation for exploring how students experience AI-personalised learning in a university setting.

3. Research Methodology

This study employed an interpretivist paradigm to understand the subjective experiences of student teachers with AI-personalised learning in Geography and Social Sciences. This paradigm was chosen because it is best suited for uncovering the complexities, perceptions, and interpretations that students attach to their interactions with AI-driven learning platforms, focusing on the meaning they ascribe to their lived experiences (Omodan, 2022). By prioritising the participants' subjective realities, this paradigm moves beyond a simple cause-and-effect analysis to explore the nuanced social and cognitive processes at play. This approach allows the study to provide a rich, detailed understanding of how student teachers comprehend and navigate the new technological landscape in their education.

Following a qualitative research approach, the study sought to provide a comprehensive and contextualised understanding of the phenomenon from the participants' perspective. This approach enabled the researcher to collect rich, descriptive accounts of students' experiences with AI-personalised learning. The qualitative nature of the study was crucial for capturing the depth and complexity of student narratives, which would not be attainable through quantitative methods. This approach facilitates a holistic exploration of the "what," "how," and "why" underlying student experiences (Merriam & Tisdell, 2016).

The study utilised an explanatory case study design to provide a deep, contextualised understanding of the phenomenon within a specific South African university context (Saunders et al., 2019). The case study focused on the cohort of undergraduate student teachers enrolled in Geography and Social Sciences teaching modules who had experience with AI-personalised learning tools. This design was chosen to allow for a focused investigation of a particular phenomenon within its real-world setting, providing a detailed understanding of the students' experiences with AI. It is particularly valuable for exploring the "how" and "why" questions central to this research, offering a nuanced view of the interplay between technology and pedagogy.

The research population comprised undergraduate students enrolled in the Bachelor of Education in Geography and Social Sciences teaching modules. A purposive sample of 15 participants was selected from this population. The decision to use purposive sampling was a deliberate strategy, as it enabled the researcher to intentionally select participants who possessed direct, first-hand experience with AI-personalised learning systems in their Geography and Social Sciences modules. This was a critical requirement for the study, as it ensured that the data collected was relevant and addressed the research questions. The sample size of 15 was appropriate for a qualitative study of this nature, allowing for in-depth data collection and rich thematic analysis while remaining manageable. This intentional selection process ensured the sample was information-rich, maximising the study's potential for generating meaningful insights (Saunders et al., 2019).

Data was collected using open-ended questionnaires, which allowed participants to provide detailed, written reflections on their experiences with AI tools, their perceptions of usefulness and motivation, and how these technologies influenced their learning (Merriam & Tisdell, 2016). The questions centred on students' experiences with AI tools, their views on the usefulness of these tools, their levels of motivation, and the impact of these technologies on their learning in Geography and Social Sciences. This method was chosen because it gave participants a flexible and non-intrusive way to reflect on their experiences at their own pace, ensuring detailed and thoughtful responses. The open-ended format was crucial for capturing the depth and nuance of student teachers' perspectives without imposing researcher bias through predefined response options.

The collected qualitative data was analysed using a thematic analysis approach, as outlined by Braun & Clarke (2006). This process involved constructing themes inductively from the participants' narratives, which were then interpreted through the multi-theoretical framework of TPACK, TAM,

and SDT to provide a comprehensive and nuanced understanding of the findings. The analysis proceeded in six phases: familiarising oneself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This systematic approach ensured that the interpretation of the findings was grounded in the data and rigorously structured.

3.1 Data quality and ethical considerations

To ensure data quality and trustworthiness, the study implemented several measures, including rich, descriptive open-ended questions and a rigorous analysis process. The interpretation of themes was triangulated through the application of three theoretical lenses, which provided multiple analytical perspectives. This approach enhanced the credibility and dependability of the study's findings by validating them from various theoretical standpoints. Peer debriefing during the analysis phase further contributed to trustworthiness by challenging interpretations and ensuring the consistency of the coding process.

The data for this study were collected as part of a routine, voluntary module evaluation survey. Since the data were collected through this existing institutional process, formal ethics clearance from a university committee was not required. However, the study adhered to key ethical principles to ensure the protection and well-being of the participants. Anonymity was maintained throughout the process, as all responses were de-identified and could not be traced back to individual students. Participation in the survey was entirely voluntary, and students were informed that their decision to participate would not affect their academic standing. The collected data were used for research purposes only, with all information treated as confidential and stored securely to ensure participant privacy. All identifying information has been anonymised to ensure confidentiality, and student teachers are referred to using pseudonyms ST1 to ST15.

4. Presentation of Findings

This section presents the findings of the study, derived from a thematic analysis of student responses to open-ended questionnaires. The thematic analysis revealed four dominant themes: enhanced understanding and simplification of concepts; personalised support and learning autonomy; accessibility and contextual gaps; and real-world application and engagement.

4.1 Theme 1: Enhanced understanding and simplification of concepts

Many students emphasised how AI-personalised learning tools enhanced their understanding of challenging concepts in Geography and Social Sciences.

> *ST 1: "It makes Geography/Social sciences easy to understand and more interesting"*
> *ST 3: "It simplifies context and content"*
> *ST 4: "give more insight on certain topics"*
> *ST 7: "straight information," "more information about what you want to know," and "easy examples"*

This reflects a broader sentiment that AI can make learning more engaging by presenting complex ideas in simpler, more digestible forms and highlighting the power of AI to break down information and emphasise key concepts. These findings are consistent with existing literature, which suggests that AI tools, through their ability to provide visual aids, interactive activities, and real-time feedback, contribute to deeper comprehension and retention (Zawacki-Richter et al., 2019). The ability of AI tools to provide deeper insights was also noted. As one participant, ST 4, suggested, students are gaining foundational understanding and analytical perspectives on the subject matter. AI platforms can tailor lessons to students' specific areas of weakness or curiosity, facilitating richer learning experiences. This personalisation allows students to go beyond memorisation and build

more meaningful connections between theory and real-world application. Some students highlighted the role of AI in making learning more accessible. As ST 7 indicated, AI tools were seen to provide direct information with additional details about what they want to know and simple examples that aided comprehension. The accessibility of information through AI tools appears to contribute to a better grasp of the subject matter.

The perceived ease of understanding through AI tools aligns with the Technology Acceptance Model (TAM), where perceived usefulness is a key determinant of technology adoption (Davis, 1989). This theme confirms that when students perceive AI as a tool that simplifies complex content and enhances their understanding, their willingness to adopt it increases. This also links to the TPACK model (Mishra & Koehler, 2006), suggesting that when AI is used in a pedagogically sound manner to support the specific content of Geography and Social Sciences, students experience a more effective and engaging learning process, confirming the symbiotic relationship between technology, content, and pedagogy. These findings corroborate other studies that have shown a positive relationship between the perceived usefulness of educational technology and student engagement (Lin & Chen, 2024), underscoring that the successful implementation of AI in education depends on its perceived utility and pedagogical soundness.

4.2 Theme 2: Personalised support and learning autonomy

A key benefit of AI-personalised tools, as reported by students, is the autonomy they grant them to control their educational journey.

> *ST 1: " AI can improve my understanding in such a way that I am able to go through topics I do not understand more than once"*
> *ST 9: "It helps with understanding my pace of study"*
> *ST 10: "ChatGPT improved my under to a greater extent because it helped me to know the structures of how to answer questions and assignments."*
> *ST 14: "It helps me as a student to understand the lesson in my own way"*

Highlighting the self-paced nature of AI-assisted learning, unlike traditional classroom settings, where time constraints and fixed syllabi may hinder in-depth learning, AI tools allow students to review content as needed, thus promoting mastery over performance. This flexibility reduces stress and encourages a growth mindset among students. Additionally, AI empowers students to take charge of their learning styles. ST 14 showcased how AI adapts to individual preferences, whether visual, auditory, or kinaesthetic. Such adaptability is particularly useful in disciplines like Geography and Social Sciences, where students interpret maps, case studies, and theoretical frameworks differently. Personalised support from AI systems fosters self-confidence, improves academic performance, and helps students feel more seen and supported within the educational environment.

Many responses emphasise the personalised nature of AI-based learning tools, with students noting that AI adapts to their learning styles and needs. This personalisation supports autonomy, which, according to Self-Determination Theory (SDT), is a key factor in motivating students (Deci & Ryan, 2000). The findings here strongly resonate with the principles of SDT, specifically the need for autonomy and competence. Student narratives show that by providing them with control over their pace and learning method, AI tools fulfil their need for autonomy; e.g., ST 1, ST 9, and ST 10 are direct evidence of this. This is consistent with studies by Cavalcanti et al. (2021) and Sun et al. (2023), who found that adaptive learning systems that provide scaffolding and timely feedback can enhance students' feelings of competence, thereby increasing their intrinsic motivation and engagement. These findings confirm the established link between technology that supports learner control and higher levels of intrinsic motivation.

4.3 Theme 3: Accessibility and contextual gaps

While many responses were positive, a notable theme was that some students lacked access to or experience with AI-personalised learning tools. Student teachers' responses

> *ST 11: "I've never used it, so I don't know."*
> *ST 13: "To a greater extent because AI give me straight information"*
> *ST 15: "It has improved my understanding to a great extent because it is easy to get information on this tool."*

ST 1 indicates a disparity in access that may stem from socio-economic factors, digital infrastructure gaps, or insufficient institutional support. In South Africa, digital inequality remains a persistent challenge, particularly for students from rural or under-resourced backgrounds (Mpungose, 2020). Without equitable access, the transformative potential of AI remains limited and may even exacerbate existing inequalities in higher education. This finding confirms the existing literature on the digital divide in developing countries, where access to technology is a significant barrier to educational equity (Merriam & Tisdell, 2016). Moreover, the unfamiliarity expressed by some students points to a broader issue surrounding communication and training. If students are unaware of the tools available or do not receive adequate orientation, even the most advanced AI systems will fail to achieve their intended impact. Universities must therefore prioritise not only the implementation of AI tools but also the digital literacy of their student bodies. Awareness campaigns, introductory workshops, and continued technical support could bridge these gaps and ensure all students benefit from AI-enhanced learning.

The ease with which students can access information using AI tools was identified as a significant benefit. Participants emphasised that AI provides quick, straightforward answers, facilitating efficient information retrieval. ST 13 and ST 15 also noted that this accessibility factor supports the tenets of Universal Design for Learning (UDL), which emphasises providing multiple means of representation to cater to diverse learner needs. By offering easy access to information, AI tools may enhance learning opportunities for students with varying learning styles and needs. This theme highlights a critical contradiction: AI tools are lauded for their ease of use (a key tenet of TAM) and their ability to simplify content (linking to TPACK). However, these benefits are only accessible to students with the necessary infrastructure and training. This limitation, which is well-documented in the literature on technology adoption in developing contexts (Mpungose, 2020), shows that the promise of AI-personalised learning is constrained by persistent equity issues, thus limiting its reach and perpetuating existing inequalities.

4.4 Theme 4: Real-world application and engagement

Another strong theme in the narratives is that AI tools assist students in correlating theoretical knowledge with real-world applications. Several students highlighted that AI tools enhance their ability to integrate real-world data and engage with subjects more directly and meaningfully. This theme connects to the idea of situated learning, where knowledge is best acquired when embedded in authentic contexts.

> *ST 2: "AI can improve my understanding in such a way that I can be able to integrate real-world data, such as live migration trends or economic changes, making these subjects more relevant and engaging."*
> *ST 12: "Helps with knowing more about what is happening around the world including climate change and ways to socialise, also adapting to new thing"*
> *ST 6: "Virtual Field trip helping me to explore and interact with virtual environments"*

ST 2 and ST 12 highlight the importance of understanding the world around us, particularly powerful in Geography and Social Sciences. Moreover, ST 6 describes how AI can enrich curriculum content with contemporary, relevant examples.

In Geography and Social Sciences, where societal trends, environmental issues, and human behaviours constantly evolve, AI can update and contextualise learning material in real-time, keeping education relevant and dynamic. Using AI to explore virtual environments, access live data, and visualise complex concepts enhances student engagement and promotes a deeper understanding of the relevance of geography and social sciences in their lives. Students also agreed that AI-based platforms allow them to personally explore complex global issues. By curating case studies, data sets, or simulations related to environmental challenges or socio-political dynamics, AI tools help students connect academic content to practical scenarios. This fosters a deeper level of engagement and critical thinking, encouraging students to become problem-solvers rather than passive receivers of information—an essential quality for cultivating civic-minded and globally aware graduates.

These findings are supported by the TPACK framework (Mishra & Koehler, 2006), which highlights the importance of using technology to enhance content knowledge. By using AI to facilitate virtual field trips or integrate live data, educators can create pedagogically sound learning experiences that make abstract concepts tangible, a point confirmed by existing literature on technology-enhanced learning (Zawacki-Richter et al., 2019). This theme also links back to SDT's concept of relatedness. When students see how the content is relevant to their lives and the world, their sense of relatedness to the subject matter and their learning environment is strengthened. The engagement fostered by seeing "maps, pictures, and videos to explain topics" makes the learning process more meaningful and intrinsically motivating, as the technology directly connects the classroom to real-world contexts—a key element of effective pedagogy in the modern era.

This thematic analysis reveals a complex but generally optimistic view of AI-personalised learning among Geography and Social Sciences students at a South African university. While many students found these tools helpful in improving comprehension and enabling self-directed learning, concerns remain about accessibility and the depth of student engagement with the technology. The results suggest that for AI tools to be most effective, institutions must address infrastructure challenges, support digital literacy, and actively involve students in the design and implementation process. Ultimately, AI-personalised learning holds tremendous promise for higher education in South Africa, especially in fostering equity, flexibility, and academic success. However, realising this potential requires a deliberate, inclusive approach that centres on student experience. By listening to student narratives and addressing their needs, universities can create learning environments where every learner feels confident.

5. Discussion of Findings

This section discusses the study's major findings by cross-examining them with existing literature and the multi-theoretical framework of TPACK, TAM, and SDT. The discussion is structured around the four dominant themes identified in the previous section.

5.1 Enhanced understanding and simplification of concepts

The study found that students overwhelmingly perceived AI-personalised learning tools as effective in simplifying complex concepts and enhancing their understanding of Geography and Social Sciences. ST 1 commented, "It makes Geography/Social Sciences easy to understand and more interesting," while ST 3 noted that "it simplifies context and content," highlighting this benefit. This finding is strongly supported by the Technology Acceptance Model (TAM), which posits that a technology's perceived usefulness is a key determinant of its adoption (Davis, 1989). When students find that AI tools help them grasp complex concepts, their willingness to use and accept the technology increases. This finding also aligns with the TPACK model, as the students' experiences

suggest that the AI tools were used in a pedagogically sound manner to support content knowledge. The interaction between technology, pedagogy, and content is a core principle of TPACK. These findings corroborate other studies that have shown a positive relationship between the perceived usefulness of educational technology and student engagement (Lin & Chen, 2024; Zawacki-Richter et al., 2019), underscoring that the successful implementation of AI in education depends on its perceived utility and pedagogical soundness.

5.2 Personalised support and learning autonomy

A second significant finding is that AI-personalised learning fosters a strong sense of autonomy and self-directed learning among students. This is a crucial element of Self-Determination Theory (SDT), which highlights autonomy as a key factor in motivating students (Deci & Ryan, 2000). ST 1's statement, "AI can improve my understanding in such a way that I am able to go through topics I do not understand more than once," directly reflects this autonomy. The self-paced nature of AI tools empowers students to take control of their educational journey, enhancing their sense of competence, another vital component of SDT. Student narratives, such as ST 14's assertion that the tool "helps me as a student to understand the lesson in my own way," provide direct evidence that AI adapts to individual learning styles and needs. These findings are consistent with studies by Cavalcanti et al.(2021) and Sun et al. (2023), which found that adaptive learning systems providing scaffolding and timely feedback can enhance students' feelings of competence, thereby increasing their intrinsic motivation and engagement.

5.3 Accessibility and contextual gaps

Despite the positive perceptions, the study's third finding reveals a significant challenge: a digital divide that limits access to AI-personalised learning tools for some students. ST 11's blunt statement, "I've never used it, so I don't know," clearly indicates this disparity. This finding resonates strongly with existing literature on digital inequality in the Global South (Mpungose, 2020), where socio-economic factors and infrastructural limitations remain major barriers to equitable education. While students with access praise the tools for their ease of use and ability to provide "straight information" (ST 13), this theme highlights a critical contradiction. The promise of AI tools—lauded for their ease of use (a key tenet of TAM) and ability to simplify content (linking to TPACK)—is constrained by persistent equity issues. This finding challenges the universal application of TAM by demonstrating that external factors, such as socio-economic conditions and digital infrastructure, can heavily moderate the relationship between perceived usefulness and actual usage, thus limiting the reach of these benefits and perpetuating existing inequalities.

5.4 Real-world application and engagement

The final key finding is that AI tools assist students in correlating theoretical knowledge with real-world applications, thereby increasing engagement. ST 2's narrative, "AI can improve my understanding in such a way that I can integrate real-world data, such as live migration trends or economic changes, making these subjects more relevant and engaging," demonstrates how AI facilitates situated learning. This is particularly powerful in Geography and Social Sciences, which are inherently about understanding the world. This finding is supported by the TPACK framework, which highlights the importance of using technology to enhance content knowledge. Educators can use AI to facilitate virtual field trips or integrate live data to create pedagogically sound learning experiences that make abstract concepts tangible (Zawacki-Richter et al., 2019). Furthermore, this theme also links back to SDT's concept of relatedness. When students see how the content is relevant to their lives and the world, their sense of relatedness to the subject matter and their learning environment is strengthened. The engagement fostered by these tools makes the learning process more meaningful and intrinsically motivating, as the technology directly connects the classroom to real-world contexts, a key element of effective pedagogy.

6. Limitations of the Study

This study has several limitations. As a qualitative case study, its findings are specific to a single university context in South Africa and may not be generalisable to other institutions, countries, or disciplines. The design of the study, which focused on a single institution, makes its findings difficult to generalise to other universities, students, or fields of study. The specific emphasis on Geography and Social Sciences teaching modules means the results may not be applicable to other subject areas, as the curriculum and pedagogical approaches within these modules are unique to this context. Additionally, the reliance on open-ended questionnaires limited the ability to conduct in-depth probing, while the cross-sectional design prevents the establishment of long-term trends or causal relationships.

7. Conclusions and Recommendations

This study investigates the experiences of undergraduate students with AI-personalised learning technologies in Geography and Social Sciences teaching modules. Through the integration of Technological Pedagogical Content Knowledge (TPACK), the Technology Acceptance Model (TAM), and Self-Determination Theory (SDT), the research offers a nuanced, theory-informed interpretation of student narratives collected through interviews and open-ended questionnaires. The findings indicate that students generally regard AI-personalised learning tools as advantageous for enhancing autonomy, improving conceptual understanding, and delivering tailored feedback that supports their academic development. The congruence between AI tools and module content emerged as a critical factor influencing students' acceptance and ongoing utilisation of these technologies. While many participants acknowledged the adaptive and interactive characteristics of AI platforms, concerns were expressed regarding the digital divide, inconsistent access to technology, and the necessity for educator support to facilitate effective integration.

Students' narratives emphasised that AI-personalised learning is most effective when embedded in thoughtful pedagogical practices and when it supports, rather than replaces, human teaching. Furthermore, the motivational aspects highlighted by SDT underscore the need for learning environments that nurture a sense of agency, competence, and relatedness, even when mediated by technology. Ultimately, this study affirms the value of AI-personalised learning in enhancing the teaching and learning of Geography and Social Sciences in higher education. However, it also calls for a balanced and inclusive approach that considers the infrastructural, pedagogical, and emotional dimensions of learning in a digitally evolving educational landscape.

Based on the conclusion, the study recommends several actions to enhance the effective integration of AI-personalised learning in higher education. First, students should be provided with reliable access to devices and internet connectivity in order to reduce digital inequality. Lecturers also need to be equipped with TPACK-based training so they can integrate AI tools effectively with pedagogy and content. Furthermore, AI platforms should be designed to support autonomy, competence, and relatedness, thereby fostering greater student engagement. The study also highlights the importance of combining AI tools with traditional teaching methods in ways that are inclusive and sensitive to specific contexts. Finally, it calls for continuous evaluation and research to assess the long-term impact of AI-personalised learning on teaching and learning in higher education.

9. Declarations

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