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Student perspectives on optimising AI tools to enhance personalised learning in higher education

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Abstract

This explanatory qualitative paper discusses students' recommendations on how AI tools can be optimised to enhance personalised learning in higher education. The effective adoption and implementation of AI technologies face several challenges, particularly in user acceptance and the balance between AI-assisted and traditional learning methods. The paper adopts the Technology Acceptance Model as a theoretical framework for understanding users' technology acceptance and usage. It posits that perceived usefulness and perceived ease of use are primary factors influencing users' technology adoption, which can guide the development of strategies to improve the implementation and effectiveness of AI technologies in personalised learning. The method used is a qualitative explanatory case study where open-ended questionnaires were administered to 40 students from various faculties at the University of the Free State. The findings reveal that students and lecturers need to be trained in using AI tools and that there should be a balance between using AI tools and traditional teaching methods to enhance personalised learning in higher education. Considering the findings, the study suggests that institutions and lecturers need to address the challenges posed by AI tools immediately, and leverage AI to its full potential in creating an effective and personalised learning environment.

Keywords: artificial intelligence, personalised learning, technology acceptance model, perceived usefulness, perceived ease of use

Introduction

The adoption of artificial intelligence (AI) into higher education has created opportunities for major shifts, particularly in terms of personalised learning. Personalised learning, which tailors educational experiences to individual student needs, is widely regarded as an important technique for improving engagement, learning results, and overall educational quality. However, the difficulties of various student demands, technological hurdles, and pedagogical alignment continue to make effective implementation complex.

AI's ability to handle an immense amount of data, construct adaptive learning pathways, and provide real-time feedback makes it a promising solution to these difficulties. Previous research has highlighted AI's potential to transform learning environments by increasing productivity, fostering creativity, and improving linguistic capacities (Zhou et al., 2024; Hasibuan & Azizah, 2023). However, the practical deployment of these technologies in higher education frequently falls short owing to challenges of accessibility, ethical concerns, and poor alignment with student requirements.

This study seeks to contribute to the conversations by investigating student perspectives on how AI tools might be streamlined to promote personalised learning in higher education. The research done in this study, which focuses on actionable recommendations, aims to bridge the gap between AI's theoretical potential and how it works in practice. By focusing on the voices of students from various educational fields, the study helps to establish inclusive and effective strategies for harnessing AI in higher education.

Literature review

Personalised learning has emerged as a crucial component in the evolution of higher education. Because higher education is constantly evolving, incorporating advances in technology into the teaching and learning process can considerably improve the overall experience (Islam & Islam, 2024).

By tailoring educational experiences to individual student needs, personalised learning aims to enhance engagement, improve learning outcomes, and provide a more effective educational journey (Ouyang et al., 2022; Sadiku et al., 2022). However, despite its potential, implementing personalised learning faces significant challenges. At this point in the evolution of the global educational environment, the use of virtual learning university programmes for export is no longer an additional server for the development of a specific institution of higher education but a separate significant constituent of the content development of the provided educational programmes, university management, and various aspects of the learning process itself (Barakina et al., 2021). One promising solution is integrating AI to refine and enhance personalised learning (Shabbir et al., 2024; Zhou et al., 2024).

Various studies have been conducted on the role of personalised learning and AI in higher education (Smith et al., 2024). Zhou et al. (2024) noted how students employ AI tools and their perceived benefits and drawbacks of AI usage in entrepreneurship education in a

business school. The findings reveal diverse AI applications, highlighting benefits such as increased productivity, personalised learning, and enhanced linguistic capability, further supported by results from a study done by Malik et al. (2023). However, concerns regarding academic integrity, over-reliance on AI, and the need for clear usage guidelines have also been identified. Their findings underscore the importance of balanced, informed, and ethical use of AI tools in higher education. However, this study lacks in that it only covered students in a business school in the context of entrepreneurship.

Similarly, Hasibuan and Azizah (2023) argued that AI enhances the relevance of learning by prioritising students' needs and fostering the development of creativity. Students have high involvement and enthusiasm, and are afforded additional opportunities for exploration and innovative thought. They suggested that it is crucial to maintain a harmonious equilibrium between the influence of technology and the significance of teachers, who continue to be essential in offering direction and motivation to pupils. However, this study lacks in the sense that it was a systematic literature review with no participants. Another study by Kasneci et al. (2023) highlighted the current state of large language models and their applications. They highlighted how these models can be used to create educational content, improve student engagement and interaction, and personalise learning experiences. This statement is supported by another study done by Xiao and Zhi (2023) in which the researchers indicated that large language models, like ChatGPT, have the possibility of becoming a learning partner. Benvenuti et al. (2023) contributed to the discussion by stating that AI can help educators in schools and educational settings cultivate creativity, critical thinking, and problem-solving skills.

Regarding challenges, Kasneci et al. (2023) argued that large language models in education require teachers and learners to develop sets of competencies and literacies necessary to understand the technology and their limitations and the unexpected brittleness of such systems. They suggested that a clear strategy and pedagogical approach are needed to integrate large language models effectively in education. Challenges include potential bias, human oversight, and misuse. However, these can provide insights into societal biases and risks if handled sensibly. Recommendations include responsible and ethical use of AI models. However, this paper is a commentary paper with no study participants and only focused on ChatGPT as a large language model.

Problem overview

While the above studies have contributed significantly to understanding how AI can be enhanced in higher education for personalised learning, none has focused on detailed recommendations from students under diverse educational circumstances. Xiao & Zhi (2023) highlighted that exploring students' views will contribute empirically grounded evidence to the ongoing conversations. Thus, our study is unique because it argues for a student-centred approach to enhancing personalised learning through AI tools. Considering this, the study aims to explore student perspectives on how AI can be optimised to improve personalised learning, and to suggest actionable recommendations for lecturers and higher institutions.

The paper is arranged as follows: first, the theoretical framework. Next is the methodology. The findings and discussions follow them, and finally, the conclusion.

Theoretical framework

The lens we used to guide the study is the Technology Acceptance Model (TAM) to analyse the recommendations suggested by students for optimising AI tools to enhance personalised learning in higher education. TAM was developed by Davis (1989). TAM is a well-established framework for understanding users' technology acceptance and usage. The major assumptions of the theory are perceived usefulness (PU) and perceived ease of use (PEoU). It posits that PU and PEoU influence users to accept or reject technology (Davis, 1989). PU suggests that people tend to use or not use an application to the extent they believe it will help them perform their jobs better (Davis, 1989). PEoU suggests that even if potential users believe that a given application is useful, they may, at the same time, believe that the system is too hard to use and that the performance benefits of usage are out-weighed by the effort of using the application (Davis, 1989).

In the context of our study concerning the use of AI tools in higher education, there is a need for actionable insights that will advocate for leveraging AI to its full potential in creating an effective and personalised learning environment. TAM will help understand the factors that influence the acceptance and effective use of AI tools, ensuring that the implementation of AI in higher education is effective and well received. Our study is couched in TAM because we view it as a relevant theory to explore the students' recommendations of optimising AI tools to enhance personalised learning in higher education.

Methodology

We adopt an interpretivist paradigm, which aligns with the qualitative approach and explanatory case study design. The interpretivist paradigm is appropriate because it focuses on understanding the subjective experiences and meanings that students and lecturers attach to AI tools in personalised learning (Brown & Dueñas, 2020; Merriam & Tisdell, 2015). This paradigm facilitates in-depth exploration of participants' perspectives, making it suitable for investigating how AI can be optimised to enhance personalised learning. The research approach is qualitative, using an explanatory case study design. This design allows for a detailed examination of the phenomenon within its real-life context (Creswell & Creswell, 2018; Saunders et al., 2019; Yin, 2009). The case study focuses on the University of the Free State, involving nine faculties.

A total of 40 students from nine faculties at the University of the Free State participated in the study. Participants were selected purposively to ensure a diverse representation of faculties and experiences with AI in education (Palinkas et al., 2015). In addition, the snowball method was used to recruit participants, whereby students were requested to identify other possible students who could provide useful data for the study and share the link

to the questionnaire via WhatsApp (Onwuegbuzie, 2007). The student's distribution and characteristics of those who participated are displayed in Figure 1 and Figure 2.

Figure 1
Distribution of participants based on student study level

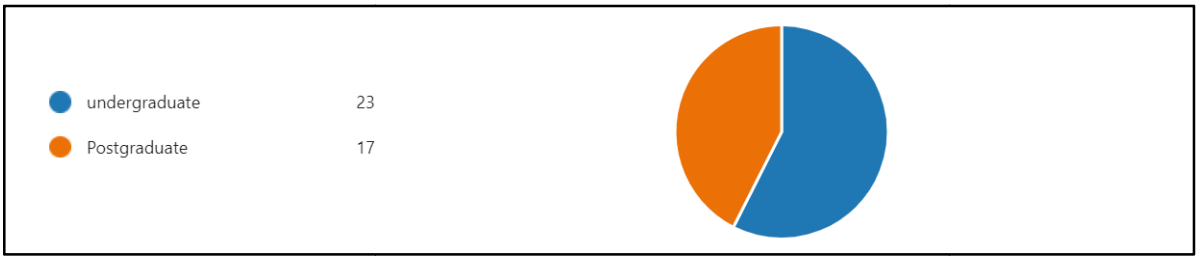
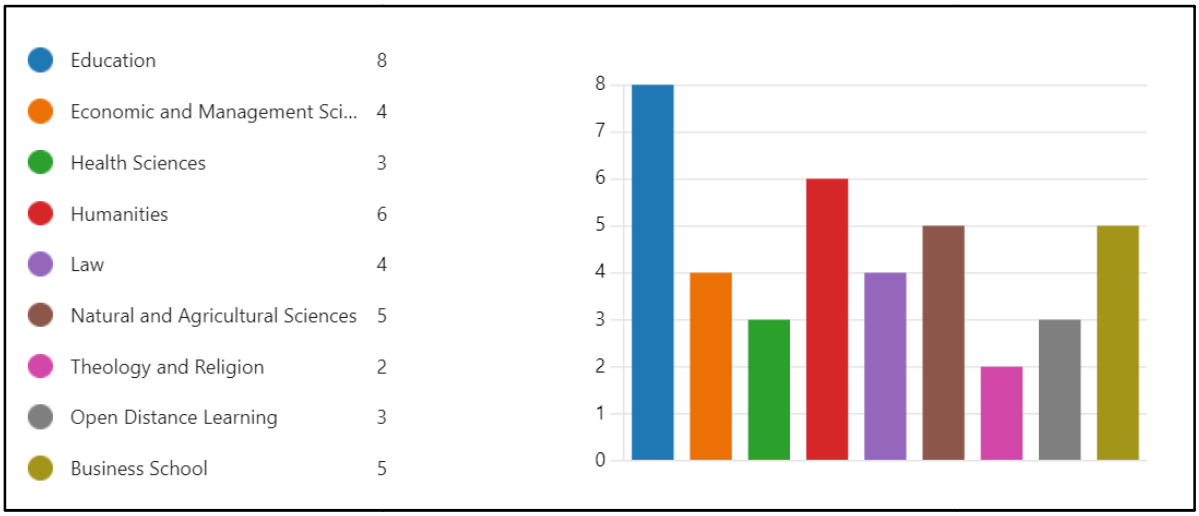


Figure 2
Distribution of participants based on the faculty



The primary research question guiding this study was: "How can AI tools be optimised to enhance personalised learning in higher education?" A pilot study was conducted with three students, where semi-structured interviews were conducted. However, students were not comfortable participating and were not free to express their views. We therefore decided to develop open-ended questions and, when looking at the responses provided, we concluded that students are comfortable with this data collection technique, hence, we decided to utilise it. Thus, data were collected using open-ended questionnaires developed using Microsoft Forms, which is AI-powered and assists in developing questionnaires, quizzes, and polls. Once the questionnaire was developed, a link was generated and distributed to students via the UFS email communication platform and WhatsApp over six weeks. This method aligns with the interpretivist paradigm, allowing participants to express their views in their own words, providing deep insights into their recommendations regarding AI in education (Brown & Dueñas, 2020; Creswell & Poth, 2016).

Ethical approval and gatekeepers were obtained from the University of the Free State (UFS-HSD2023/1674). Participants were assured of anonymity, and no personal identifiers such as names, emails, or phone numbers were collected. This ensured the confidentiality and privacy

of participants, adhering to ethical research standards (British Educational Research Association, 2018). The data were analysed thematically using Braun and Clarke's (2006) six-step approach to thematic analysis. The six steps involved in our study are discussed below.

Step 1: Familiarising with the data

We read through the responses from all 40 participants multiple times. Notes and initial ideas were recorded during this phase to capture emerging thoughts on how AI tools were perceived and recommended for enhancing personalised learning.

Step 2: Generating initial codes

We systematically worked through each questionnaire response, coding relevant text segments. Codes such as "user-friendly," "technical support," "maintain balance," and "training needs" were assigned to chunks of data that pertained to these concepts. Coding was done manually without the aid of qualitative data analysis software.

Step 3: Searching for themes

We organised the initial codes into potential themes by grouping similar codes. For example, codes related to "technical issues" and "technical support" were collated under a broader theme of "addressing technical issues." This step involved the creation of initial thematic maps to visualise the relationships between codes and potential themes.

Step 4: Reviewing themes

We reviewed the thematic maps and checked the coherence of the themes against the coded data extracts and the entire dataset. This iterative process ensured that each theme accurately reflected the data. For example, the theme "user-friendliness and accessibility" was refined to include specific sub-themes such as "ease of use" and "accessibility for all students."

Step 5: Defining and naming themes

We wrote detailed descriptions for each theme, explaining what each theme covered and how it related to the research questions. For instance, the theme "balancing AI and traditional methods" was defined as strategies and perceptions related to integrating AI with existing teaching practices. Clear and descriptive names were assigned to each theme to capture the essence of the data.

Step 6: Produce the report

Finally, we compiled the final thematic analysis report, which included detailed descriptions of each theme, illustrative quotes from participants, and interpretations. This report aimed to provide a comprehensive understanding of how AI tools can be optimised to enhance personalised learning, as perceived by the participants. The findings were contextualised

within the TAM framework to highlight the factors influencing the acceptance and use of AI tools.

Thematic analysis is well suited for identifying patterns and themes within qualitative data, providing a detailed and nuanced understanding of the student's recommendations. We employed three strategies to ensure credibility and trustworthiness: triangulation, a thick description of the data, and audit trail (Lincoln & Guba, 1985). Triangulation was achieved by comparing findings across nine different faculties and participants to capture diverse perspectives, enhancing the robustness of the findings. Detailed descriptions of the data and the context were provided to enable readers to understand the findings and assess their transferability to similar contexts. In addition, a detailed record of the data collection and analysis process was maintained to ensure transparency and replicability.

Findings and discussion

This section presents and analyses the data collected from the open-ended questionnaires filled out by 40 students across nine faculties at the University of the Free State. The students answered the question: "How can AI tools be optimised to enhance personalised learning in higher education?" This section is structured around the key themes and sub-themes identified during the thematic analysis, focusing specifically on strategies for enhancing personalised learning through AI tools. Combining the findings and discussion into one section is based on the nature of qualitative research, where the interpretation and contextualisation of data are intertwined with the presentation of the data itself. This approach allows for a more coherent and integrated narrative that facilitates a deeper understanding of the participants' perspectives.

Training and professional development

There is a need for comprehensive training programmes for lecturers to use AI tools effectively. Furthermore, the importance of providing students with training on AI tools lies in the need to maximise their benefits for personalised learning.

Lecturer and student training

Many participants emphasised the necessity of thorough and ongoing training programmes for lecturers to enhance their competence and confidence in AI tools. This is supported by Farias and Resende (2020), who argued that training can significantly influence the PEoU and usefulness of new technologies, increasing their acceptance and utilisation. Participants stressed that students also need proper training to use AI tools effectively. This training is essential for students to fully leverage the benefits of AI for personalised learning, which can enhance their learning experiences and outcomes (Rakya, 2023). Davis (1989) highlighted that PU and ease of use are critical for technology acceptance, which can be enhanced through adequate training. Participant (36) indicated that higher education institutions should:

> Embrace AI and train lectures to design assessments that require students to apply knowledge and skills gained from the assignment or module content rather than simply regurgitating information.

Participant (4) also indicated that:

> We live in a digital world and lecturers need to acknowledge the fact that students will make sure of AI tools however, they just need to teach students to use it at a certain extent and to rely heavily on it.

Participant (39) echoed similar sentiments and highlighted that in order to embrace the use of AI in the evolving digital world, it is important institutions:

> Train teachers to use AI in the modules so they can have more knowledge and proper control over it; as it stands, students are more knowledgeable than them, making them despise its use.

Participant (32) concurred and shared that institutions should

> train members and students. Encourage students to share their perspectives and experiences and discuss strategies for using AI responsibly.

In addition, Participant (9) added that it is important that:

> the lectures and the university must engage with us to find solution to implement AI as this cannot be ignored. Adjusting to the use of AI is a need in the 4IR world and we must be equipped to compete with the peer in more advanced countries.

Farias and Resende (2020) supported the idea that effective training programmes can enhance technology's PEoU and usefulness, leading to greater acceptance and implementation. Similarly, Davis (1989) believed proper training enhances PU and ease of use, leading to higher acceptance and effective use of technology. On the other hand, Georgina and Olson (2008) and Oigara (2013) argued that the focus should not solely be on training but also on redesigning educational practices to integrate technology more holistically. Ertmer and Ottenbreit-Leftwich (2010) and Meisuri et al. (2023) attested that intrinsic motivation and prior experience with technology also play significant roles, and should be considered in training programmes.

However, we are of the view that the statements highlight a significant gap in the training provided to lecturers on AI tools, which impacts their ability to integrate these technologies effectively into their teaching. Similarly, they indicate a need for structured training programmes for students to help them utilise AI tools effectively in their learning processes. This indicates that the success of AI implementation in education heavily depends on the preparedness and proficiency of lecturers. Without adequate training, the potential benefits of AI for personalised learning cannot be fully realised. Furthermore, this underscores the

importance of equipping students with the necessary skills and knowledge to use AI tools, which is vital for the success of personalised learning initiatives in higher education.

TAM suggests that training can directly affect PEoU and PU, which are critical for the acceptance of AI technologies (Davis, 1989). Enhanced training programmes can improve lecturers' skills and confidence, increasing their willingness to adopt and utilise AI tools effectively. In addition, adequate training can improve students' PEoU and PU of AI tools, which are critical for their acceptance and effective use. Enhancing these perceptions makes students more likely to embrace and benefit from AI technologies.

We, therefore, argue that the need for comprehensive training programmes for lecturers is crucial for the successful integration of AI in higher education. These programmes should focus on the technical aspects and pedagogical strategies to leverage AI effectively. This aligns with the TAM, which underscores the importance of PEoU and PU in technology adoption (Davis, 1989). Furthermore, we argue that providing students with comprehensive training on AI tools is essential for maximising the benefits of personalised learning. Such training should cover both the technical functionalities and practical applications of AI in their studies.

User-friendliness and accessibility

AI tools must be user-friendly and accessible to all students, including those with disabilities, to enhance personalised learning.

Ease of use and accessibility

Participants highlighted that the effectiveness of AI tools in education heavily relies on their ease of use and accessibility. This is supported by McInnes et al. (2023), who argued that Gen-AI has the potential to reshape digital pedagogy with its low cost, accessibility, and ease of adoption. In addition, it is supported by the TAM, which posited that PEoU significantly influences technology acceptance and utilisation (Davis, 1989). Participant (25) suggested that in order to make AI tools accessible to all students, institutions should " buy licenses to gain access to more accurate information similar to other tools that the university purchases" At the same time, Participant (20) expressed that: " AI [should] accommodate us as introverts who are embarrassed to ask questions to lecturers" hence, Participant (37) supported Participant (25) by echoing that it is important for institutions to "secure paid premium version and give students equal access."

Training should be provided to students and lecturers to leverage the full benefits of AI as previously discussed. In that case, it is, therefore, imperative that institutions "regulate the use of AI at university so we can use it well and legally and find ways to be inclusive," according to Participant (10). Accessibility features are crucial. AI tools should be designed to accommodate students with various disabilities to ensure inclusivity. Thus, Participant (19) supported purchasing AI tool licenses and regulating its use for usage because "AI has the

potential to bridge gaps in education accessibility, especially for students with invisible disabilities such as being slow."

Participant (28) further suggested that to have proper control over the AI tools and fair access, it is important that "institutions should invest in buying licenses for AI that tailor the module's content to our individual needs as students in different modules or courses." In addition, AI tools must be intuitive and easy to navigate so that students and lecturers can adopt them effectively. Furthermore, user-friendly interfaces can significantly reduce the learning curve and encourage more students to use AI tools for their studies. Hence, Participant (15) indicated that institutions should "Give really good training on AI tools, make sure they're easy to use, and add them carefully into the lessons to work alongside regular teaching methods." And, Participant (13) suggested that

> lecturers and universities should ensure that AI tools are integrated in our learning and ensure that it is user-friendly. Universities can provide training for both students and lectures.

The participant's statement above emphasises the importance of designing AI tools that are easy to use and accessible to all students, including those with disabilities. This ensures that these tools can be effectively adopted and utilised in educational settings. This highlights a critical requirement for the successful implementation of AI in education. If AI tools are not user-friendly and accessible, their potential benefits for personalised learning cannot be fully realised, leading to underutilisation and possible exclusion of students with disabilities. McInnes et al. (2023), Joo et al. (2014), and Panda and Kaur (2023) agreed that ease of use and accessibility are crucial factors in the acceptance and effective use of technology. They argued that user-friendly interfaces and inclusive designs can significantly enhance the adoption of educational technologies.

In contrast, Festus et al. (2024) argued that focusing solely on ease of use and accessibility might overlook other critical factors, such as the pedagogical integration of AI tools and the broader sociocultural context of technology use in education such as ethical considerations. However, we are of the opinion that emphasis on user-friendliness and accessibility is crucial for the successful integration of AI tools in higher education. By designing AI technologies that are intuitive and inclusive, educational institutions can enhance the PEoU and usefulness of these tools, thereby promoting their adoption and effective utilisation.

This approach aligns with the TAM, which underscores the importance of PEOU and PU in technology acceptance (Davis, 1989). Thus, ensuring that AI tools are user-friendly and accessible directly enhances PEOU, which can lead to higher adoption rates and more effective use of these tools in personalised learning. Additionally, ensuring accessibility supports the principle of inclusivity in education, enabling all students to benefit from personalised learning through AI.

Balancing AI and traditional methods

Balancing AI tools with traditional teaching methods is important to enhance the overall learning experience. In addition, it is necessary to maintain human interaction in the learning process alongside AI tools.

Integration with traditional methods

AI should be used to complement, not replace, traditional teaching methods (Hasibuan & Azizah, 2023). This balanced approach can leverage the strengths of both AI and conventional pedagogical practices to improve educational outcomes. This perspective is supported by Wark and Ally (2020), who argued for integrating new technologies with existing educational frameworks to enhance learning experiences. Furthermore, strategies that ensure AI tools enhance, rather than diminish, human connections in education are important. Combining both can offer a more comprehensive learning experience. Hence, Participant (14) suggested that lecturers:

> Integrate AI tools into the curriculum thoughtfully, ensuring they supplement human feedback and creativity. Yes, things like combining AI feedback with personalised feedback from lecturers can ensures that students benefit from the efficiency of AI while still receiving the nuanced insights that only human teachers can provide. Regular check-ins and discussions between students and lecturers can help maintain this balance of using the teacher and AI simultaneous.

Participant (24) attested that institutions must "maintain a balance between AI and traditional learning and not replace teachers with AI." A balanced approach where AI supports and enhances traditional teaching can improve educational outcomes. Hence, according to Participant (23), "it is important to maintain a balance to foster independent critical thinking skills." Additionally, Using AI tools alongside traditional methods is essential to ensure that students get the best of both worlds. Thus, Participant (31) highlighted that institutions should "use AI as a guiding tool, not a replacer of your skills." Participant (16) agreed that lecturers should "carefully blend educational tech into the lessons to make learning more personal." Additionally, Participant (15) thought that:

> AI has lots of potential, but it's important to balance using it for learning with keeping our critical thinking skills sharp. It's important that we use both and not replace the one with the other both are important.

The statements emphasise the necessity of integrating AI tools with traditional teaching methods rather than substituting one for the other. This suggests that a hybrid approach can maximise the benefits of AI and traditional methods, addressing various learning styles and needs. It also implies that educational institutions should focus on creating a synergy between AI and conventional pedagogical practices. Wark and Ally (2020) supported integrating technology with traditional methods, arguing that this combination can enhance learning by leveraging the unique strengths of each approach. Duncan and Larson (2012) also found that

blended learning (combining traditional and digital methods) can be more effective than traditional or digital learning. Siregar et al. (2019) argued that media does not influence learning outcomes—the content and instructional strategies are what matter, suggesting that the focus should be on effective pedagogy rather than the tools used.

However, we believe that a balanced approach that integrates AI with traditional teaching methods is essential for maximising both benefits. This synergy can cater to diverse learning preferences and needs, enhancing educational outcomes. By combining the innovative capabilities of AI with the proven effectiveness of traditional methods, educational institutions can create a more comprehensive and inclusive learning environment. This approach aligns with the TAM, which emphasises the importance of PU and ease of use in technology adoption (Davis, 1989), where PU and PEoU are enhanced by leveraging the strengths of AI and traditional methods. This approach can increase AI tools' overall effectiveness and acceptance in education.

Maintaining human interaction

It is important to ensure that AI tools supplement traditional learning methods and maintain a balance between an AI tool and lectures. This viewpoint is supported by Joy and Garcia (2019), who argued for the importance of interpersonal interaction in effective communication and learning. Furthermore, they indicated that technology-based and conventional delivery media do not significantly influence learning effectiveness because effective pedagogical practices matter more. Hence, AI tools should enhance human interaction, not replace it. Personal interaction is crucial for a holistic learning experience. Hence, Participant (13) agreed:

> Yes, it is important to maintain a balance between AI-driven learning and traditional teaching methods. Therefore, collaboration is important between the AI and the lecturer. Yes, AI offers many benefits, but the lecturers as humans and mentors cannot be replaceable.

Furthermore, maintaining a human touch in education is essential. AI should be used to support, not substitute, personal interactions. Thus, Participant (17) was of the view that students could:

> Use AI tools to help with research, but don't rely on them completely. It's important to keep using traditional research methods too. It's really important to balance using AI tools with sticking to traditional ways of doing research, especially in humanities studies. This helps keep our research deep and allows for creative exploration.

Participant (2) also agreed: "To enhance personalised learning, educators should embrace diverse teaching methods." This leads us to the suggestion made by Participant (19), who indicated that lecturers "should also equally incorporate AI and old teaching ways for AI to be fully beneficial."

In addition, institutions need to ensure that AI tools don't lead to less face-to-face interaction because personal connections are vital for effective learning. Hence, for Participant (3), lecturers and institutions must "Ensure that students use it efficiently and try to keep relations with their students." In support of this argument, Participant (12) offered a suggestion that:

> AI must be integrated in learning and teaching by using multiple models, teacher can use Ai and themselves. Teachers should be facilitators of AI to properly control its use and guide student towards personalised learning by offering additional support where necessary.

The statements highlight the critical role of human interaction in education and the need to preserve it even with the increasing use of AI tools. This indicates that while AI can offer significant benefits, it should not come at the expense of reducing human interactions, which are fundamental to learning. It suggests that educational strategies should focus on integrating AI in ways that enhance rather than diminish personal connections.

Joy and Garcia (2019) supported maintaining interpersonal interactions for effective communication and learning. Additionally, Sickel (2019) argued that social presence and AI tools are crucial for creating a meaningful and engaging educational experience, highlighting the need for teachers as a critical variable in instructional success. Bakti et al. (2023) agreed, and argued that AI can improve the efficiency and effectiveness of learning by providing personalised guidance, support, or feedback to students. Still, it is not a substitute for teachers. In addition, McInnes et al. (2023) suggested that GenAI-human partnerships can yield results that surpass the creativity, originality, and efficiency of individual efforts in course design and development, enhancing the quality of courses. Similarly, we concur that it is crucial to maintain human interaction in the learning process while integrating AI tools.

Personal connections and interactions are fundamental to creating a supportive and effective educational environment. AI should be used to enhance and ease these interactions, not replace them. From the perspective of TAM, the statement reinforces the idea that AI in education should be designed to enhance and support human interactions, making them more effective and easier to manage. This approach aligns with the principles of PU and ease of use, which are critical for accepting and adopting new technologies (Davis, 1989). By focusing on these aspects, educational institutions can foster an environment where AI is seen as a valuable and accessible tool, leading to greater integration and positive outcomes in the educational process.

Addressing technical issues and reliability of AI tools

Robust technical support is important for effectively implementing AI tools in higher education and ensuring the reliability of AI tools to sustain their PU and ease of use. Immediate and reliable technical assistance is crucial for mitigating frustration and enhancing user confidence in AI tools. This notion is supported by Tomsett et al. (2020), who argued that rapid trust calibration through interpretable and uncertainty-aware AI can help decision-makers understand the AI system's limitations and likely failures, enhancing user confidence

and mitigating frustration. In addition, technical disruptions and unreliable performance can undermine the PU of AI tools, which is critical for their sustained use in education. This perspective is supported by Davis (1989), who emphasised the significance of reliability in the PU and ease of use of new technologies.

Immediate technical support is essential. Without it, students and lecturers can get frustrated and may stop using AI tools altogether. Knowing that reliable technical assistance is available gives us confidence to use and experiment with AI technologies in our studies. Technical issues are inevitable, but having a robust support system can make a big difference in how we perceive and use these AI tools. Hence, Participant (39) emphasised that it is crucial for institutions to "ensure support is available." Furthermore, Participant (26) supported that to ensure that technical support is available to lecturers and students, it is important that institutions:

> Buy licenses or some sort of ownership to make sure all learners have access and that there is a central point to deal with or address technical issues promptly.

AI tools need to be reliable. If they keep malfunctioning and providing incorrect or misleading information, it becomes difficult to trust and rely on them for learning. Consistent performance of AI tools is key. Misleading information can cause significant setbacks in the learning process. Furthermore, ensuring that AI tools work reliably can enhance confidence and willingness to use them regularly. Thus, Participant (25) believed that institutes should "buy licenses to gain access to more accurate information similar to other tools that the university purchases" to avoid frequent inaccuracies of free versions of AI tools. Participant (22) added to this notion by indicating that students and lecturers are advised to take "time to ensure the content and information supplied is accurate and relevant as sometimes it's wrong." In addition, Participant (11) indicated, "I recommend that they recommend and allow the learners to use AI in their studies, recommending the authentic ones."

The statements emphasise the importance of having reliable technical support to ensure the effective use of AI tools and prevent frustration. The critical need for AI tools is to be reliable and consistent in their performance to maintain user trust and encourage regular use. This suggests that the presence of technical support is a critical factor in the successful implementation of AI technologies in education. Without adequate support, technical issues might discourage users, leading to decreased adoption and utilisation of AI tools. In addition, this underscores the importance of reliability when implementing AI technologies in education. Unreliable AI tools can lead to frustration, decreased trust, and ultimately, lower adoption rates, hindering the potential benefits of AI in personalised learning.

Biundo-Stephan et al. (2011) supported the idea of reliability by noting advanced user assistance based on AI planning and highlighting hybrid planning as a method that combines procedural knowledge and causalities to provide user-centred assistance, improving user confidence and decreasing frustration. Similarly, Schmidt et al. (2020) attested that transparency in AI decisions can harm trust, affecting user confidence in decision-making tools. In addition, Davis (1989) supported the idea that reliability is a key factor in

technology's PU and ease of use. His TAM posited that reliable performance is essential for user acceptance and sustained use.

The provision of robust technical support is essential for the successful implementation of AI tools in higher education. By ensuring that users can access immediate and reliable assistance, educational institutions can mitigate frustration and enhance user confidence, thereby promoting the acceptance and effective use of AI technologies. This approach aligns with the TAM, highlighting the importance of PEoU and usefulness in technology adoption (Davis, 1989). Ensuring the reliability and consistency of AI tools is crucial for their successful integration into higher education. Reliable AI technologies can maintain user trust and encourage regular use, maximising their potential benefits for personalised learning. Additionally, focusing on reliability can mitigate the risk of misleading information, which can negatively impact the learning process.

Conclusion

This study explored the integration of AI tools in higher education, focusing on the need for robust technical support and reliable AI technologies to enhance personalised learning. The findings indicate that immediate and reliable technical assistance is essential for mitigating user frustration and enhancing confidence in AI tools. Additionally, ensuring the reliability and consistency of AI tools is critical for maintaining trust and encouraging their regular use.

Participants across various faculties at the University of the Free State highlighted that AI should complement, not replace, traditional teaching methods and that maintaining human interaction in the learning process is crucial. The study underscores the importance of a balanced approach where AI enhances rather than diminishes personal connections and supports existing educational frameworks. This integration can create a more comprehensive and inclusive learning environment, catering to diverse learning preferences and needs. In addition, we recommend that institutions conduct ongoing research and evaluation to assess the impact of AI tools on personalised learning. Feedback from students and lecturers should be regularly collected and used to make improvements. This continuous evaluation will help identify best practices and address any challenges.

We argue that educational institutions must prioritise these elements—reliable technical support, consistent performance of AI tools, balanced integration with traditional methods, and the preservation of human interaction—to optimise the full potential of AI in personalised learning. By doing so, institutions can create a more adaptive, inclusive, and effective learning environment that responds to students' individual needs, thereby transforming the landscape of higher education. This argument aligns with the TAM principles, underscoring the significance of PEoU and usefulness in technology adoption. By addressing these critical factors, educational institutions can foster greater acceptance and more effective use of AI tools, ultimately enhancing the overall educational experience.

Limitations and suggestions for future research

One of the primary limitations of this study is its reliance on qualitative data collected through open-ended questionnaires. While this approach provides in-depth insights into participants' experiences and perceptions, it may not capture the full range of perspectives across a broader population. Additionally, the study's sample was limited to 40 students from nine faculties at the University of the Free State, which may not represent students' experiences in other universities or educational contexts. Another limitation is the potential for self-selection bias given that participants who chose to respond to the questionnaire may have had a particularly strong interest or experience with AI tools, skewing the results. Moreover, the study's six weeks may not have been sufficient to observe AI tools' long-term impacts and effectiveness in education. The study also focused primarily on the perceptions and experiences of students, with less emphasis on the perspectives of lecturers and institutional administrators. This limited scope may overlook important factors related to the implementation and support of AI tools from an administrative or instructional standpoint.

In response to the study's limitations, we suggest that future research should address these limitations by incorporating a larger and more diverse sample of participants from multiple educational institutions. This broader approach would provide a more comprehensive understanding of the impacts and challenges of integrating AI tools in higher education. Additionally, future studies could adopt a mixed-methods approach, combining qualitative insights with quantitative data to validate and expand upon the findings. This approach could include surveys with larger sample sizes, experimental designs to measure the effectiveness of AI tools, and longitudinal studies to assess the long-term impacts on personalised learning outcomes.

Research should also explore the perspectives of lecturers and institutional administrators to gain a more holistic view of the implementation process. Understanding the challenges and support needs from the instructional and administrative perspectives can inform more effective strategies for integrating AI tools in education. Furthermore, future studies could investigate the specific types of AI tools and technologies that most effectively enhance personalised learning. Comparative studies examining different AI applications and their impacts on various aspects of learning, such as engagement, retention, and academic performance, would provide valuable insights into best practices for AI integration. Finally, exploring the ethical implications and data privacy concerns related to the use of AI in education is crucial. Future research should examine how these issues affect the acceptance and effectiveness of AI tools, develop guidelines to address ethical considerations and ensure the responsible use of AI technologies in educational settings.

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