



Journal of Innovative Research (JIR)

ISSN: 2837-6706 (ONLINE)

VOLUME 3 ISSUE 3 (2025)

PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

Artificial Intelligence in Education: Insights from Thematic Analysis on Personalization, Engagement, and Academic Performance

Priya katyara^{1*}, Safia Soomro¹, Mahnoor Naich², Naina Devi Harjani³

Article Information

Received: August 08, 2025

Accepted: September 03, 2025

Published: October 08, 2025

Keywords

Academic Performance, AI-Assisted Teaching, Artificial Intelligence in Education, Data Ethics, Digital Divide, Educational Technology, Self-Efficacy, Student Engagement, Thematic Analysis

ABSTRACT

The emerging technology in education has been the current state of Artificial Intelligence (AI) in the education system, which is transforming teaching and learning systems and offering new opportunities of personalised learning, engagement, and achievement of student. This paper discusses how AI-assisted teaching can impact the experiences of students through items including personalization of learning, student engagement, self-efficacy, academic performance, and issues of ethics. Qualitative research design was embraced and data was gathered with the help of 25 participants who were students and educators with hands-on experience of AI in education. To elicit common patterns and themes, thematic analysis using six-volume guide steps according to Braun and Clarke (2006) was used. The results indicated that AI tools have the potential to improve personalization that complements the individual needs design, engagement by using gamification and immediate feedback, and increasing self-efficacy through scaffolding and training in safe-to-fail conditions. Moreover, participants stated that there has been an objective improvement in the academic achievements and the formation of digital literacy skills. Nevertheless, ethical issues, data privacy, algorithm bias, and access gaps were also expressed in concern during the study. The study argues that AI's effectiveness in education is not solely based on its technological efficiency, but also on its ability to collaborate with human teachers, promoting balanced integration, fair access, and ethical protection.

INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has ushered in a transformative era for education, reshaping traditional pedagogical practices and offering innovative pathways for teaching and learning (Yadav, 2025). Across the globe, educators and policymakers are grappling with the profound opportunities and challenges presented by AI-driven systems that promise not only to enhance efficiency but also to fundamentally reimagine how knowledge is delivered, assessed, and internalized (Taheri Hosseinkhani, 2025; Yadav, 2025). Cao and Mai (2025) stated that from intelligent tutoring systems that provide personalized guidance to predictive analytics that identify at-risk students before failure occurs, AI has moved beyond being a futuristic possibility into becoming an integral part of contemporary classrooms.

Previous studies have emphasized the significant potential of AI to improve learning outcomes by facilitating personalization, enhancing feedback mechanisms, and fostering greater student motivation. Tan *et al.* (2025) observed that AI-based adaptive learning platforms can tailor instruction to individual learning needs, thereby enabling students to progress at their own pace. Similarly, Singh *et al.* (2025) highlighted the ability of intelligent tutoring systems to free teachers from repetitive tasks such as grading and attendance, allowing them to focus on higher-order pedagogical functions. Studies by Leong (2025) and Shtayyat and Gawanmeh (2025) further demonstrated that gamification features, such

as digital badges and leaderboards, coupled with real-time feedback, significantly contribute to improved student engagement. Additionally, Chen (2025) provided evidence that AI-assisted teaching can nurture self-efficacy by offering scaffolding, instant feedback, and safe-to-fail learning environments, which in turn foster resilience and confidence. More broadly, Dong *et al.* (2025) found positive correlations between AI integration and academic performance, noting measurable improvements in students' knowledge retention, comprehension, and application of skills. These findings collectively underline that AI not only has the capacity to elevate instructional effectiveness but also to transform the overall student experience.

However, despite the growing body of literature pointing to the benefits of AI integration, scholars have also raised concerns about its limitations and unintended consequences. Navas Bonilla *et al.* (2025) cautioned that excessive reliance on AI might diminish students' ability to self-regulate their learning, while unequal access to digital infrastructure can exacerbate existing educational inequalities. Moreover, the ethical dimensions of AI adoption particularly surrounding data privacy, algorithmic bias, and the risk of dehumanizing education have been recurrent themes in critical debates (Ferhataj *et al.*, 2025). These discussions reveal that while AI can serve as a powerful enabler of personalization, engagement, and improved learning outcomes, its effectiveness is heavily contingent upon thoughtful integration with

¹ The Begum Nusrat Bhutto Women University, Pakistan

² Sukkur IBA University, Pakistan

³ Government Girls Lower Secondary School Channa Muhalla Larkana, Pakistan

* Corresponding author's e-mail: priya.katyara@bnbwu.edu.pk

human teaching practices, adequate institutional support, and policies aimed at ensuring equitable access.

Against this backdrop, the current study seeks to build on existing scholarship by conducting a systematic review that synthesizes empirical evidence on the role of AI-assisted teaching in enhancing student engagement, self-efficacy, and academic performance, while also critically addressing ethical and equity considerations. This study uses a holistic approach to examine the impact of AI in education, identifying five key themes that has included personalization of learning, student engagement enhancement, self-efficacy building, academic performance, and ethical concerns.

This study explores the integration of cognitive, behavioral, and emotional aspects of AI-assisted learning, highlighting gaps in existing literature and concerns about access, privacy, and human-AI balance. It also provides practical implications, emphasizing the need for ethical and inclusive use of AI, such as human empathy and teacher interventions.

This research explores the potential of AI in education, arguing that its true promise lies in augmenting human educators' capacities to foster creativity, critical thinking, and socio-emotional growth. It suggests that AI should be viewed as a collaborator in the teaching-learning process, enhancing personalization, engagement, and performance, but only when implemented thoughtfully, ethically, and inclusively.

LITERATURE REVIEW

AI-Assisted Teaching

Advances in Artificial Intelligence (AI) have changed the face of education with development of intelligent tutoring systems, adaptive learning platforms and automatic feedback systems (Das *et al.*, 2025; Strielkowski *et al.*, 2025). Teaching with the help of AI allows offering personalized learning pathways so that students study at their pace and depending on their needs (T. M. Singh *et al.*, 2025). AI tools can assess the knowledge deficiencies of students, suggest personalized content, and monitor the progression through the analysis of data, which promotes the increased effectiveness in the instructions (John, 2025). Contrary to the traditional teaching methods, the AI-based ones relieve teachers of the load of routine grading, attendance, and formative assessments, etc. and can free up time to become more focused on advisement and higher-level teaching (Mousa, 2025). Besides, natural language processing and chatbots offer continuous support to the student study process since it is the easiest way to get an answer to the questions the students may have 24/7, enhancing accessibility and inclusiveness in education. Nevertheless, issues of privacy of human data, bias of the algorithms, and the excessive dependence on technology are the constantly increasing concerns (Luckin, 2021). Nevertheless, the empirical evidence points to the conclusion that AI-based instruction could promote student's engagement and improved learning outcomes, particularly when combined with traditional classroom

teaching in a blended format (Cao & Phongsatha, 2025; Zhang *et al.*, 2025). The increased collaboration between AI and pedagogy propounds AI-assisted teaching to be a revolutionary tool in enhancing the academic performance of students and instilling the critical thinking and problem-solving capabilities of students.

Student Engagement

Student engagement is a well-established critical factor in regard to learning success and academic achievement. It is envisioned on three levels, behavioral (engagement in academic practices), emotional (interest, motivation, and belongingness), and cognitive (application in deep learning and critical thinking) (Khoso *et al.*, 2025; Miao *et al.*, 2025). The direct implication of IA teaching on engagement was identified in that this form of teaching ensures interactivity, gamification of tasks, and adaptive presentation of contents, which keeps the students engaged and motivated (Banik & Gullapelly, 2025). Also, Princes (2025) stated that gamification features in the form of badges, leaderboards, and tracking the progress generates intrinsic motivation, whereas real-time feedback produces a feeling of accomplishment. In addition, AI analytics has the capability to identify early indicators of disengagement and address the issue with personalized prompts, reminders, or additional learning materials (Minirani *et al.* n.d.). In post-secondary education and learning where students frequently experience a sense of lack of control and self-regulation, technologies that enhance engagement act as a stimulus and helps to monitor the student to be attentive and persistent (Mumcu & Çebi, 2025). Nevertheless, engagement is not only a technology conclusion; there must be inclusive teacher-student relationships, collaborative education and institutional support systems (Martin A & S). Therefore, despite the fact that AI tools can become an effective assistant in engagement, their effectiveness strongly correlates with pedagogical approaches, and the correspondence of AI functionalities to the needs of students (Han *et al.*, 2025). These two aspects of AI and engagement point towards the importance of ensuring that AI systems have the ability to be efficient and student-focused.

Student Self-Efficacy

Self-efficacy means the perceptions that students have their skills of successful academic work and are able to resolve the difficulties (Chen & Zhu, 2025). It is an abstraction within the psychological discipline that highly forecasts motivation, endurance and school achievement. It has been found that AI-assisted teaching can strongly promote self-efficacy to a teacher by providing scaffolding, individualized feedback, and mastery learning (Qiu & Ishak, 2025). When students get instant and specific answers to their questions, they develop more confidence in comprehending hard or tough concepts. Just as adaptive learning systems allow students to succeed at increasingly difficult tasks so that they gain confidence, one of the cardinal rules of a complete changemaker

is to break down any big task to small achievable goals (Shaikh, 2025). Research also indicates that AI-based formative assessment encourages a growth mindset as one does not have to think about grades but rather progress, and, consequently, there is less performance anxiety (Trajkovski & Hayes, 2025). In addition, trainings on virtual labs and AI-powered simulations ensure that students gain positive results without the risk of making mistakes, which fuels their confidence in their skills to implement knowledge into practice (Shelke *et al.*, 2025). But too much dependence on AI and failure to develop own-learning skills can create a long-term problem of lacking self-efficacy. Therefore, it is essential that AI should be well balanced with human support to make sure that the students can attain technological competence as well as gain resilience in learning (Kucuksuleymanoglu, 2025). Finally, the mechanism of mediation, whereby the advanced teaching through the artificial intelligence leads to advancing the academic results, is self-efficacy.

Student Academic Performance

Academic performance is the result of effective teaching and learning processes and it is mostly measured by grades, test scores and the acquisition of knowledge. Numerous studies state the positive correlation between AI-assisted teaching and student results, especially in the improvement of their knowledge comprehending levels, memory, and knowledge application (Zhao, 2024). The personalization tools facilitate in the process of learning ensures that students who are high performers are challenged enough in their learning process whilst struggling students receive the necessary support (Lee *et al.*, 2021). Also, the use of predictive analytics enables educators to determine early whether students are at-risk and offer them timely interventions hence, the dropout rate (Nimy *et al.*, 2023). In addition to cognitive advantages, AI-certified environments are beneficial in teaching these soft skills like problem-solving, collaboration, and digital literacy which would be key to success in academics in the 21st century (Bento *et al.*, 2025). Notably, Pan (2022) the mediators of student engagement and self-efficacy confirm that technological efficiency should not be the only factor contributing to better performance but also psychological and motivational features. Still, inequality in AI accessibility can contribute to increasing the gap in performance levels between the resource-privileged and resource-constrained settings, and the importance of equal implementation initiatives raises (Mekheimer, 2025). To conclude, the existing literature envisions that, with appropriate integration, received support on the part of AI-based teaching can substantially benefit students in academic performance putting emphasis on unique learning requests and facilitating long-lasting energy and trust.

MATERIALS AND METHODS

Research Design

The research design used in this study was a qualitative

study that examined the importance of Artificial Intelligence (AI) in education and the effect it had on the engagement status of students, self-efficacy, academic performance, and morality (Thompson, 2022). Qualitative design was considered a recommended method because it would enable the researcher to receive rich data on the lived experience; perceptions; and reflections of the participants as far as teaching and learning assisted by artificial intelligence is concerned. To identify, analyze and interpret the data pattern, the thematic analysis as defined by Braun and Clarke (2006) was used to complete the process systematically.

Participants

The respondents of the study included 25 people including students and educators with a first-hand experience of using AI-assisted teaching platforms or tools. A purposive sampling approach was used so that the respondents reflected various views of people of different levels of academic prowess and context. Both genders were included in the group, the age range is between 20-45 years, and the level of prior exposure to AI in learning varied. This variety enhanced the dataset because it captured as much of the experiences and perspectives as possible. All the participants gave their consent to participate in the study voluntarily.

Data Collection

Data were gathered using semi-structured interviews, in which interviewees were given the freedom to elaborate on their experience whilst ensuring that the important themes were still brought up during the various interviews. The interview guide was based on the key constructs which were of interest namely: personalization of learning, student engagement, self-efficacy, academic performance and ethical and equity considerations. All the interviews took place either face-to-face or through online communication applications, such as Zoom or Microsoft Teams, in the case of participants, who were not available at the same time or preferred an online setting. All interviews were openly recorded with the consent of participants and then transcribed word to word in order to analyze them.

Data Analysis

The study utilized Braun and Clarke's six-phase framework for thematic analysis, which involved familiarizing with the data, systematically coding key statements, searching for themes, reviewing them, defining and naming them, and producing a report. The findings were based on personalization of learning, student engagement, self-efficacy, academic performance, and ethical and equity considerations, ensuring authentic representation of participants' voices and data-rooted findings.

RESULTS AND DISCUSSION

Results

Personalization of Learning through AI

The AI system changed the level of difficulty in

accordance with my performance. I did not even need to challenge it and instead it sensed when I was ready to switch to something new.

What it would be like to be a student on an AI-powered adaptive learning platform whose content is tailored on the fly to the performance of that individual student. The system is smart in that, it automatically monitors the learner progress and automatically adapts the level of difficulty of the material presented without human input and intervention (Kwa *et al.*, 2025). This is an example of how AI can be used to personalize education in which students are not bogged down with content that is beyond their grasp or stagnated by what they have already mastered. In this case, his ease and surprise (I didn't even have to ask) speak to the fluidity with which AI is incorporated into education, to drive efficiency, engagement, and self-driven learning within a highly personalized learning environment.

It was like there was a personal tutor at hand overtime. The AI would clarify what was being implied in various ways until I really got to understand what had been described.”

The problem-solving and the responsive nature of AI-based intelligent tutoring systems. The student likens the AI services with those of a personal tutor, highlighting the 24-hours attention and customized care that it brings. The fact that the AI can elaborate concepts differently indicates its flexibility to diverse learning styles that is useful in enhancing knowledge and minimizing frustrations (Beale, 2025). The expression of “but until I actually comprehended it” describes just how the learner recognized the endurance and forbearance of the AI as opposed to classrooms where minutes and materials are scarce. In general, the quote shows that AI facilitates understanding by providing constant and personalized learning that helps an individual develop self-learning.

The platform did not make me go through the entire syllabus and instead, it pointed to me on the areas I really needed to put my concentration. It saved me a great deal of time.”

How AI can be used to facilitate the effective, focused learning, by defining and prioritising needs of the learner. The platform does not necessarily need the student to consume all course material but instead, the analysis of performance data allows the highlighted course areas to improve. This selective method enhances efficiency, allowing focusing on the target without any waste of time and processing overloads (Selmes *et al.*, 2025). The fact that the student values this efficiency demonstrates how design can make learning journeys personal and address the needs of the individuals by taking into consideration the time limitations and desired personal outcomes of each person.

What was really helpful was that you would get feedback the following each quiz. It wasn't just telling me I was wrong, it explained to me why, and provided links to improve the topic.

The depth and quality under which the AI-created

feedback assists purposeful learning. It does not merely give the right/wrong answer, but issues explanatory feedback where needed to help the student become aware of their mistakes. This method of diagnosis encourages more thinking and clarity of the concept (Mykytiuk *et al.*, 2025). Additionally, responsibility and mutuality of learning are established by referencing some important revision materials through the AI to help the student learn on his or her accord. Ude (2025) stated that this level of appreciation by the student shows that not only do these feedbacks reduce misconceptions but they also motivate ongoing improvement making learning both more interesting, self-controlled, and effective than a traditional form of assessment that does not provide its recipients with adequate and detailed feedback that can guide them towards further improvement.

Enhancement of Student Engagement

“I didn't think I'd care about digital badges, but seeing my name on the leaderboard pushed me to complete more tasks and beat my personal best.”

The article establishes the effectiveness of gamification in a machine-enhanced learning process. Though the student has estimated the effect of digital rewards too low at first, the presence of a leaderboard has given the sense of a friendly challenge and personal responsibility. The intrinsic motivation realized through the visual recognition of the progress in the form of badges and ranking promoted the student to further immerse into the tasks and accomplish more (Xayrullayevna *et al.*, 2025). The latter shows how when applied sensitively, gamified aspects can encourage behavior engagement through a shift of learning-related routine tasks into goal-oriented endeavors that encourage persistence, accomplishment, and a feeling of completion during the learning task.

“The instant feedback kept me going. Knowing right away whether I was on the right track helped me stay focused and motivated during lessons.”

This relationship is important in helping maintain student engagement and motivation because of the crucial role of real-time feedback. The close feedback of AI-mediated answers gives the learners a chance to understand and correct promptly as well as the sense of confidence. Since there is no time spent on traditional assessment procedure, instant feedback ensures that there is an ongoing cycle of learning that keeps the students more involved and engaged during lessons (Nsabayezu *et al.*, 2025). The sense of being on the right track does not only help motivate and enhanced focus, but it also brings a sense of relief and diminishes feelings of uncertainty and frustrations and encourages a more positive and self-constructive learning experience that supports motivation and commitment to chores in the long-term.

“The simulations made me feel like I was learning by doing, not just watching or reading. It kept me engaged the whole time.”

The value of interactive and immersive learning by using AI simulations. The student develops a change of passive

student to active student, a more engaged student than the traditional methods of instructing. This experiential style boosts the cognitive experience since learners are given the opportunity to use the concepts in real life like ways (Hilman, 2025). The expression that kept me glued throughout is speaking of how AI-enabled simulations can tremendously enhance learning performance, having the learner gripped enduringly and in a profound manner. “I was surprised when the platform sent me a reminder after I missed a few sessions. It actually helped me get back on track before I fell behind.”

The facilitating role of AI in tracking engagement and delivering interventions to the students timely. The student is surprised how the platform could identify the patterns that indicate the student is not engaged, like not attending the sessions, and react to the scenery by sending a personalized notification. The proactive nature illustrates how AI analytics can serve as an early warning system, which enables the students to be re-engaged before students lose academic performance. The quote is also relevant illustrating how small-scale, automated nudges can also make self-directed learning more accountable and consistent drugs by ensuring that small slip ups do not become drawn-out derailments (Bland, 2025). It displays the way AI can encourage both behavioural and emotional involvement with a friendly, data-driven direction.

Academic Performance and Learning Outcomes

“I noticed my test scores improving after using the AI platform. It pinpointed exactly what I needed to work on, which made my study time more effective.”

Explaining the academic achievement of AI-powered personalized learning that has a positive effect. The student attributes the better test performance to the precision of the AI platform to zero in on certain gaps in his learning. By self-identifying areas of weakness, the system helped to streamline study efforts, and the student could focus on what really mattered (instead of having to review something superfluous (Bognár & Khine, 2025). We found that this effective data-driven method made study sessions significantly more effective, and yielded quantifiably positive academic results. The quote shows that AI is not only in support of content mastery, but also in optimization of learning time, which eventually increases student’s confidence and academic performance due to the implementation of an intervention which is both specific and personal.

“I was falling behind without even realizing it, but the system flagged it early. My tutor reached out, and I got the help I needed before it got worse.”

The potential of AI in early detection and intervention of students at risk. The learner admits that he does not have self-awareness that would help him understand that there is a problem with his academic achievements. The warning issued in time allowed a human tutor to intervene and similar to act in time, the necessary support was alleviated thereby preventing setbacks (Leong, 2025).

This proactive makes it clear how AI can serve as a safety net to fill the gaps associated with self-monitoring and minimizes dropout risks. An AI-educator feedback loop will provide a flexible guiding system helping students to remain on track and have a consistent level of academic development.

“The AI gave me real-world problems to solve, not just textbook stuff. It pushed me to think critically and come up with my own solutions.”

The fact that AI as a means of learning encourages the teaching of superior thinking skills, especially problem solving and critical thinking is one of its highlights. The student likes the change of theory-oriented, textbook-based learning towards its real life application in the various problems presented by the AI system (Oluseyi-Sowunmi & Samuel, 2025). By using real-life situations, the learner will be motivated to analyze, critique, and transfer knowledge on his own, which are the main features of deep learning. This does not only improve the quality of the academic performance but also develops skills that are pertinent in the contemporary workplace. The focus on self-generated solutions is a demonstration of increased learner autonomy and intellectual confidence and a reason why AI can be of value as a means of promoting the sense of meaningful, application-oriented learning.

“Using the AI tools daily improved not just my subject knowledge, but also my tech skills. I feel more prepared for digital tasks at work and school.”

AI in education helps with learning and digital literacy. The student observes that regular interaction with AI technologies increased subject knowledge and, at the same time, enhanced technological skills (Yaseen *et al.*, 2025). The twofold advantage points at the use of AI in equipping students to face the world beyond the classroom that is modern and digitally intensive. The increased confidence and projected readiness to approach academic and professional tasks are evident in a sense that AI can not only enhance the acquisition of knowledge but also develop important skills that are needed in the 21st century.

“It was impressive how the system predicted I might struggle with a topic before I even started it. That early warning gave me a head start.”

The accuracy of AI to diagnose potential learning issues prior to its occurrences. The student is impressed with the system strategies of predicting the challenges and is very strategic in ensuring academic achievements. The forewarned aspect of the AI also enables learners to get an early alert and prepare themselves to anticipate issues, refer to related resources, and with less anxiety address challenging subject matter (Lim, 2023). This advanced instruction reduces the negative effects and optimizes time efficiency and students are found ahead of their studies. The quote explains why predictions in education have the potential to change education by turning it to proactive personalized academic guidance instead of the current reactive problem solving method.

Ethical and Equity Considerations in AI Integration

“I sometimes worry about how much data the system collects about me—what if it’s used in ways I don’t know or understand?”

Rising questions on data privacy in AI-enhanced learning. The student is concerned about the scope of personal information retrieved by the system and states that there is no transparency regarding storage, sharing, and use of the information. The uncertainty (what-if it is used in ways undreamt by me) is well suited to the fear of hidden hazards (the possibilities of miss usage, eavesdropping, or privacy intrusions) (Lim, 2023). This issue highlights the need to license institutions and developers with moral and fiduciary duty to provide slightest possible communication, informed consent, and are provided ample safety nets (Lim, 2023). Lack of trust in the way data is handled might cause students to have a negative attitude towards fully using AI technologies in education. “The AI tools were great, but some of my classmates couldn’t use them because they didn’t have reliable internet or the right devices.”

The problem of digital inequity in education that uses AI. Although the student as an individual was able to take advantage of the tools, it was evident that the students without stable access to the internet and appropriate gadgets were left behind. This demonstrates the risks and pitfalls that technological innovations hold and the potential threat of magnifying the divide between resource-privileged and disadvantaged students (Ng *et al.*, 2022). The discrepancy does not only restrict even access to learning opportunities but also has the possibility of solidifying structural inequalities. The message implies the significance of inclusive policies, infrastructure construction, and institutional support to make sure that the integration of AI would not widen the social and educational gap between students but instead of it improve the situation.

“I find myself depending too much on the AI for answers. I worry I’m not building the ability to solve problems on my own.”

Overdependence on AI and its lack of contribution to the independent learning process. The student recognizes that having instant answers is convenient but believes that this dependency can make him/her loses his/her critical thinking and problem-solving abilities (Lim, 2023). The concern is that although the AI has the potential of improving efficiency, they may accidentally squash the desire to stick through tasks and a strong sense of commitment. This underlines the idea that AI should be used as an aide and not as a prop where learners still need to hone their resilience, creativity and independence, which are important in both academic and troubleshooting life.

“The AI support was helpful, but nothing can replace a teacher’s empathy and understanding. I think the best learning happens when both are combined.”

The student emphasizes the importance of human-AI balance in education, acknowledging its practicality

and efficiency, but highlighting that human traits like empathy, emotional support, and implicit knowledge are unique. To the statement this can be said that AI is the most useful when not replacing the traditional teaching obsolete but is complementing it (Louis & ElAzab, 2023). By integrating AI personalization and efficiency with human instructional relational and emotional nature, students will have access to a more inclusive and caring learning experience. This view reminds us that AI should be introduced to improve the human aspect of education and not to take its place.

Discussion

The results of the present study add important information to the available knowledge on the transformational benefits of AI-guided teaching in education in terms of its advantages and disadvantages. Based on the thematic analysis of the interviews of the participants, five themes have been identified- personalization of learning, enhancing student engagement, developing self-efficacy, academic performance, and ethical and equity considerations (Samala *et al.*, 2025). Together, these findings can be interpreted as supporting established literature on AI as a potent pedagogical power and extending current arguments in the field to include the student voice on the question of access, trust, and the appropriate balance between the human and technological input.

And, one, the paper recognizes the importance of individualized student learning experiences that arise when students interact with AI systems that has included adaptive platforms and intelligent tutoring systems. The participants also found that AI instruments were able to recognize their strengths and weaknesses, make appropriate resource recommendations, and provide them with sustained feedback in order to improve their learning. This corresponds to Thornby *et al.* (2023) as these studies also revealed the possibility to personalize the content based on the particular needs of students, with a simultaneous decrease of the teacher workload. The practical outcome of this personalization is that learning is made more efficient, targeted and student-centered such that both the struggling and advanced learners benefit (Chen *et al.*, 2023). Still, the issue of overdependence also emerges in the discussion as students can be too dependent on algorithms when it comes to learning pathways, which creates resonance with that raised by Seo *et al.* (2025) about neglecting autonomy. Second, the student engagement shows the capability of AI to promote behavioral, emotional, and cognitive engagement in the educational process (Huang, 2025). Gamification, instant feedback, and immersive sims are just some of the features participants appreciated because it encouraged them and kept them at the forefront. These results are aligned with Bryndin (2025) who indicated that AI can enhance the motivation by means of interactive and adaptive designs. Action items Critically, the gamification element was not entirely extrinsically motivated, like in the form of leaderboards

but also placed an emphasis on intrinsic motivation, including instantaneous feedback along with the ability to engage in active problem-solving (Park & Kim, 2021). Nevertheless, the participants noted that engagement cannot be seen as entirely a technological phenomenon as it is based on favorable teacher-student interaction as well as institution culture (John *et al.*, 2023). Therefore, AI is not used as a substitute to human interaction but as an engagement booster.

Student self-efficacy became the third theme that mediated the role of AI in learning outcomes and was deemed as a critical difference. Participants told about the advantages of instant feedback, mastery-based goal setting, and safe-to-fail simulations and how they made participants feel more confident when approaching difficult concepts. This reflects on Zainuddin *et al.* (2024) who states that self-efficacy supports motivation and resilience, and was also in conjunction with who quote that AI scaffolding fosters persistence. It is important to note that participants stated that AI feedback regularly eliminates a performance anxiety, which is in line with Pei *et al.* (2024) who have found AI-based formative assessment that creates a growth mindset. Yet, it has been suggested that without AI, there is a risk of losing the capacity to regulate intellectually oneself and therefore special attention should be given to the pedagogical integration of AI in the form of well-considered approaches.

Regarding academic outcomes, the participants admitted to significant gains in test results, information memorisation, and problem-solving skills when using AI tools (Yilmaz & Yilmaz, 2023). Predictive analytics was also useful in early detection of learning problems to provide early interventions that did not cause academic decline, a factor that resonates with results by (Ravichandran *et al.*, 2023). More so, the participants mentioned that AI not only made cognitive learning more effective but also helped in developing soft skills, including digital literacy, collaboration, and critical thinking, the points that align with (Pandit *et al.*, 2025). Though AI can facilitate differentiated education, the participants noted the need to ensure equal access to reduce the further emergence of educational inequality, especially among the students of under-resourced settings.

Lastly, ethical and equity considerations as a theme revealed continuing issues of implementing AI. Participants also had concerns with data privacy, transparency related to the use of personal information, and the danger of algorithmic bias, which echo (Zharova, 2023). Also, the problem of the lack of equal access to technology appeared, as the participants highlighted that not all students had an opportunity to maintain consistent internet access and possession of devices, worsening the digital divide. Such reflections echo the case that without planning, issues of AI adoption can easily replicate existing disparities (Lartey & Law, 2025). A further important issue, mentioned by the participants, was the need to strike the right balance between human

and artificial interaction- although the AI was appreciated due to its efficiency, the participants pointed out the indispensable nature of teacher empathy, guidance, and relationships. This aligns with (Ahmed, 2023) who mean that AI is supposed to supplement but not to substitute people in education.

Altogether, their contribution to contemporary debates is that they bring the opinions of students which underline the potential of AI-assisted education and its constraints. They propose that AI can best serve as an augmentative tool to the individual and, increase the level of personalization, engagement and overall performance but, should not be allowed to replace human engagement and ethical protection (Egunjobi & Adeyeye, 2024). In practice, this implies that the institutions need to establish their policies with an eye to fair access, clear data usage, and proper teacher preparation in order to use AI in a responsible way. To theory, the results provide support to models of learning, where engagement and self-efficacy are regarded as mediators between teaching innovations and academic outcomes, and these can be generalized to the AI (Meng & Zhang, 2023). On policy, the study provides that there is an immediate need to bridge the digital divide and that the adoption of AI should be considered with inclusiveness or efficiency only.

Although it is a great study, it is not without its limitations. The fact that the sample size is small (n=25) with thematic analysis also means that it is likely to provide limited generalizability. This can also be biased since the perceptions given by the students do not fully identify with the objective performance. Future studies can overcome these limitations by taking a mixed methods approach, use longitudinal data, and involve cross-cultural comparisons to identify how the contextual factors mediate AI effect on education.

The paper confirms that AI can transform education and revolutionize it yet it cannot bring success unless implemented in a rather thoughtful manner that is focused on a reasonable combination of innovation, ethical soundness, and anthropocentric teaching and learning (George, 2023). AI can provide a boost to more interactive and individual and successful learning when combined inclusively and responsibly; however, it should be supported by policies and practices that preserve equity, privacy, and student agency.

Practical Implication

- To educators, AI tools should not be used as an alternative to but as a supplement to instruction; they can be manipulated to enable classrooms to personalize, plan student interaction and track, and offer scaffolder support, as well as focus on personal and emotional parts of learning.

- The schools/Universities will need to also invest in digital infrastructure and give equal access to AI tools to ensure that educational disparities do not become more pronounced. Ethical and effective training of AI should also be provided to people making education as well as the teachers.

- Guidelines and regulations must establish that data collection, and the computational procedures are transparent. Digital divide policies should also support learners who are under-resourced, as well as be equitable in terms of the use of AI.

- Crossing the borders of time: Future research should conduct research in longitudinal and mixed-method design and determine the long-term effects of AI on learning and engagement and well-being of students, as well as examine cross-cultural differences.

CONCLUSION

This research endeavored to examine the role AI-aided instructing plays on student learning according to the opinions of 25 respondents. Based on a thematic analysis provided by Braun and Clarke (2006) five interrelated themes have been identified and they include: Personalization of learning, making learning more engaging, developing self-efficacy, academic performance, and issues of ethical and equity aspects. The identified findings reaffirm the potential of AI to transform learning process and provide learners with more personalized learning experiences, real-time feedback, a sense of motivation, and measurable academic and soft skills improvements. Learners emphasized the importance of adaptive platforms, intelligent tutoring systems, and predictive analytics to their learning experience, as it helped them become more efficient and gain deeper insight. Simultaneously, the research illuminates the drawbacks of being overly dependent on technology, access to digital technologies not being equal, and ethical problems related to privacy and bias. The study has three contributions as follows- To begin with, it offers empirical data that AI will not only lead to positive results in academic performance but also on psychological variables like confidence, persistence, and motivation. Second, it highlights the mediating status of engagement and self-efficacy to transform AI interventions to better outcomes. Third, it puts into the forefront the necessity to attend to issues of ethics and equity, as technological innovation needs to be complemented by inclusivity and equity. In general, this study gives a clue that AI must be treated as an extension to human instructing and not an alternative to it, the most effective results can be obtained when the technological-driven efficiency is combined with the human understanding and the pedagogical knowhow.

REFERENCES

Ahmed, M. A. (2023). ChatGPT and the EFL classroom: Supplement or substitute in Saudi Arabia's eastern region. *Information Sciences Letters*, 12(7), 2727-2734.

Banik, B. G., & Gullapelly, A. (2025). AI-Powered gamification and interactive learning tools for enhancing student engagement. In *Driving Quality Education Through AI and Data Science* (pp. 283-310). IGI Global Scientific Publishing.

Beale, R. (2025). The Revolution Has Arrived: What the Current State of Large Language Models in

Education Implies for the Future. *arXiv preprint arXiv:2507.02180*.

Bento, A. C., Silva, J. R., Barretto, M. R. P., Camacho-León, S., & Torres-Torres, E. Y. (2025). *Leveraging AI Tools in Engineering Education: Promise and Pitfalls of AI in Software Development*. Authorea Preprints.

Bland, T. (2025). Enhancing medical student engagement through cinematic clinical narratives: multimodal generative AI-based mixed methods study. *JMIR Medical Education*, 11(1), e63865.

Bognár, L., & Khine, M. S. (2025). The shifting landscape of student engagement: A pre-post semester analysis in AI-enhanced classrooms. *Computers and Education: Artificial Intelligence*, 8, 100395.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.

Bryndin, E. (2025). Formation of Motivated Adaptive Artificial Intelligence for Digital Generation of Information and Technological Actions. *Research on Intelligent Manufacturing and Assembly*, 4(1), 192-199.

Cao, S., & Phongsatha, S. (2025). An empirical study of the AI-driven platform in blended learning for Business English performance and student engagement. *Language Testing in Asia*, 15(1), 39.

Cao, W., & Mai, N. (2025). Predictive Analytics for Student Success: AI-Driven Early Warning Systems and Intervention Strategies for Educational Risk Management. *Educational Research and Human Development*, 2(2), 36-48.

Chen, A. M., Brown, S., Mark, K., & McBane, S. (2023). An overview of instructional approaches and decision-making strategies to curtail curricular overload. *American Journal of Pharmaceutical Education*, 87(8), 100013.

Chen, J., & Zhu, Q. (2025). Exploring first-year Chinese doctoral students' metacognitive awareness and self-efficacy in an L2 genre-based academic writing course. *Journal of English for Academic Purposes*, 75, 101515.

Chen, S. (2025). Perceived teacher support on international students' engagement and psychological well-being in AI-based learning: The mediating role of motivation through the lens of self-determination theory. *Learning and Motivation*, 91, 102165.

Das, S., Mutsuddi, I., & Ray, N. (2025). Artificial intelligence in adaptive education: A transformative approach. In *Advancing adaptive education: Technological innovations for disability support* (pp. 21-50). IGI Global Scientific Publishing.

Dong, L., Tang, X., & Wang, X. (2025). Examining the effect of artificial intelligence in relation to students' academic achievement in classroom: A meta-analysis. *Computers and Education: Artificial Intelligence*, 6, 100400.

Egunjobi, D., & Adeyeye, O. J. (2024, October). Revolutionizing learning: The impact of augmented reality (AR) and artificial intelligence (AI) on education. *ResearchGate*.

Ferhataj, A., Memaj, F., Sahatcija, R., Ora, A., & Koka, E.

- (2025). Ethical concerns in AI development: analyzing students' perspectives on robotics and society. *Journal of Information, Communication and Ethics in Society*, 23(2), 165-187.
- George, A. S. (2023). Preparing students for an AI-driven world: Rethinking curriculum and pedagogy in the age of artificial intelligence. *Partners Universal Innovative Research Publication*, 1(2), 112-136.
- Han, J., Liu, G., & Xiang, S. (2025). To engage with AI or not: learning engagement among rural junior high school students in an AI-powered adaptive learning environment. *Humanities and Social Sciences Communications*, 12(1), 1-17.
- Hilman, C. (2025). Digital-based Islamic religious education: a new orientation in enhancing student engagement and spiritual understanding. *The Journal of Academic Science*, 2(1), 53-65.
- Huang, M. (2025). Student engagement and speaking performance in AI-assisted learning environments: A mixed-methods study from Chinese middle schools. *Education and Information Technologies*, 30(6), 7143-7165.
- John, B. (2025). Personalized learning through software design critiquing tools: Tailoring feedback to individual student needs.
- John, D., Hussin, N., Zaini, M. K., Ametefe, D. S., Aliu, A. A., & Caliskan, A. (2023). Gamification equilibrium: the fulcrum for balanced intrinsic motivation and extrinsic rewards in learning systems: immersive gamification in Muhamad Khairulnizam Zaini Learning system. *International Journal of Serious Games*, 10(3), 83-116.
- Khoso, A. K., Honggang, W., & Darazi, M. A. (2025). Empowering creativity and engagement: The impact of generative artificial intelligence usage on Chinese EFL students' language learning experience. *Computers in Human Behavior Reports*, 18, 100627.
- Küçüksüleymanoğlu, R. (2025). *Resilience in lifelong learning for individuals*. In *Resilience, adaptability, and cultural awareness within the educational landscape* (pp. 69–96). IGI Global Scientific Publishing.
- Kwa, T., West, B., Becker, J., Deng, A., Garcia, K., Hasin, M., Jawhar, S., Kinniment, M., Rush, N., & Von Arx, S. (2025). Measuring ai ability to complete long tasks. *arXiv preprint arXiv:2503.14499*.
- Lartey, D., & Law, K. M. (2025). Artificial intelligence adoption in urban planning governance: A systematic review of advancements in decision-making, and policy making. *Landscape and Urban Planning*, 258, 105337.
- Lee, D., Huh, Y., Lin, C.-Y., Reigeluth, C. M., & Lee, E. (2021). Differences in personalized learning practice and technology use in high-and low-performing learner-centered schools in the United States. *Educational Technology Research and Development*, 69(2), 1221-1245.
- Leong, W. Y. (2025). Beyond the screen: Enhancing student engagement in virtual classrooms using gamification. *2025 14th International Conference on Educational and Information Technology (ICEIT)*. IEEE.
- Lim, E. M. (2023). The effects of pre-service early childhood teachers' digital literacy and self-efficacy on their perception of AI education for young children. *Education and Information Technologies*, 28(10), 12969–12995.
- Louis, M., & ElAzab, M. (2023). Will AI replace teacher? *International Journal of Internet Education*, 22(2), 9-21.
- Martin A. J., & S. A. P. R. (2025). Empowering inclusive education through tech-driven cooperative learning and reverse mentoring. *E-Learning and Digital Media*. Advance online publication. <https://doi.org/10.1177/20427530251348597>
- Mekheimer, M. (2025). Technological self-efficacy, motivation, and contextual factors in advanced EFL e-learning: a mixed-methods study of strategy use and satisfaction. *Humanities and Social Sciences Communications*, 12(1), 1-18.
- Meng, Q., & Zhang, Q. (2023). The influence of academic self-efficacy on university students' academic performance: The mediating effect of academic engagement. *Sustainability*, 15(7), 5767.
- Miao, H., Guo, R., & Li, M. (2025). The influence of research self-efficacy and learning engagement on Ed. D students' academic achievement. *Frontiers in psychology*, 16, 1562354.
- Minirani, S., Adithya, P., & Shukla, M. (2021). Role of artificial intelligence and machine learning in evaluation and assessment. In S. Shukla & J. K. S. Tiwari (Eds.), *Society 5.0* (pp. 40–62). CRC Press.
- Mousa, M. (2025). AI-Supported Formative Assessments: Enhancing Student-Centered Learning and Teacher Perceptions. *Journal of Pedagogy and Education Science*, 4(02), 127-141.
- Mumcu, B. B., & Çebi, A. (2025). You have a notification: the role of push notifications in shaping students' engagement, self-regulation and academic procrastination. *International Journal of Educational Technology in Higher Education*, 22(1), 36.
- Mykytiuk, S., Lysytska, O., Chastnyk, O., & Mykytiuk, S. (2025). Educational Potential of Student-Generated Visuals for Learning English as a Second Language in the Age of Artificial Intelligence. *IAFOR Journal of Education*, 13(1), 241-269.
- Navas Bonilla, C. d. R., Viñan Carrasco, L. M., Gaibor Pupiales, J. C., & Murillo Noriega, D. E. (2025). The Future of Education: A Systematic Literature Review of Self-Directed Learning with AI. *Future Internet*, 17(8), 366.
- Ng, D. T. K., Luo, W., Chan, H. M. Y., & Chu, S. K. W. (2022). Using digital story writing as a pedagogy to develop AI literacy among primary students. *Computers and Education: Artificial Intelligence*, 3, 100054.
- Nimy, E., Mosia, M., & Chibaya, C. (2023). Identifying at-risk students for early intervention—a probabilistic machine learning approach. *Applied Sciences*, 13(6), 3869.
- Nsabayezu, E., Habimana, O., Nzabalarwa, W., &

- Niyonzima, F. N. (2025). Leveraging multimedia-supported flipped classrooms approach to modernize organic chemistry instruction: Exploring students' engagement and motivation. *Education for Chemical Engineers*.
- Oluseyi-Sowunmi, O. S., & Samuel, R. E. (2025). Online Learning Innovations in Accounting Education: A Study of Students' Engagement and Learning Outcome. *WSEAS Transactions on Computer Research*, 13, 103-115.
- Pan, X. (2022). Exploring the multidimensional relationships between educational situation perception, teacher support, online learning engagement, and academic self-efficacy in technology-based language learning. *Frontiers in psychology*, 13, 1000069.
- Pandit, S., Sarkar, S. K., Barik, S., & Sahu, S. (2025). AI in Skill Development, Critical Thinking, Digital Literacy, and AI-Driven Job Preparation. In *Impacts of AI on Students and Teachers in Education 5.0* (pp. 23-76). IGI Global Scientific Publishing.
- Park, S., & Kim, S. (2021). Leaderboard design principles to enhance learning and motivation in a gamified educational environment: Development study. *JMIR serious games*, 9(2), e14746.
- Pei, J., Wang, H., Peng, Q., & Liu, S. (2024). Saving face: Leveraging artificial intelligence-based negative feedback to enhance employee job performance. *Human Resource Management*, 63(5), 775-790.
- Princes, J. (2025). Gamification in Digital Product Roadmapping. *International Journal of Emerging Research in Engineering and Technology*, 337-351.
- Qiu, Y., & Ishak, N. A. (2025). AI-Assisting Technology and Social Support in Enhancing Deep Learning and Self-Efficacy among Primary School Students in Mathematics in China. *IJLTER. ORG*, 24(2), 21-37.
- Ravichandran, K., Virgin, B. A., Tiwari, A., Javheri, S., Fatma, G., & Lourens, M. (2023). Predictive analysis in education: Using artificial intelligence models to identify learning difficulties early. In *2023 10th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)* (pp. 1-6). IEEE.
- Samala, A. D., Rawas, S., Wang, T., Reed, J. M., Kim, J., Howard, N.-J., & Ertz, M. (2025). Unveiling the landscape of generative artificial intelligence in education: a comprehensive taxonomy of applications, challenges, and future prospects. *Education and Information Technologies*, 30(3), 3239-3278.
- Selmes, I., Sinclair, D., Smith, E. R., & Richardson, K. (2025). 50 years of Teaching Geography: editors' picks from the archive. *Teaching Geography*, 50(2), 53-55.
- Seo, K., Yoo, M., Dodson, S., & Jin, S.-H. (2025). Augmented teachers: K-12 teachers' needs for artificial intelligence's complementary role in personalized learning. *Journal of Research on Technology in Education*, 57(4), 876-893.
- Shaikh, F. (2025). *The artificial intelligence-powered evolution of human resources: Transforming workplaces for the future* [Doctoral dissertation, SSBM Geneva]. Digital Repository of Theses – SSBM Geneva.
- Shelke, M., Wamane, S. A., Madhusudhana, K., Kore, S., & Gawade, U. (2025). AI-driven nursing education: Transforming training and skill development. *AIP Conference Proceedings*.
- Shtayyat, A., & Gawanmeh, A. (2025). Gamification and AI for enhanced student engagement and automated assessment in higher education Moodle E-Learning. In *2025 16th International Conference on Information and Communication Systems (ICICS)*.
- Singh, B., Kaunert, C., Lal, S., & Arora, M. K. (2025). Enhancing AI-Augmented Classrooms: Teacher-Centric Integration of Intelligent Tutoring Systems and Adaptive Learning Environments. In *Fostering Inclusive Education With AI and Emerging Technologies* (pp. 99-130). IGI Global.
- Singh, T. M., Reddy, C. K. K., Murthy, B. R., Nag, A., & Doss, S. (2025). Ai and education: Bridging the gap to personalized, efficient, and accessible learning. In *Internet of behavior-based computational intelligence for smart education systems* (pp. 131-160). IGI Global.
- Strielkowsky, W., Grebennikova, V., Lisovskiy, A., Rakhimova, G., & Vasileva, T. (2025). AI-driven adaptive learning for sustainable educational transformation. *Sustainable Development*, 33(2), 1921-1947.
- Taheri Hosseinkhani, N. (2025). Evaluating the Economic Impact, Equity Implications, and Long-Term Prospects of AI-Powered Personalized Learning in Education by Mid-Century.
- Tan, L. Y., Hu, S., Yeo, D. J., & Cheong, K. H. (2025). Artificial Intelligence-Enabled Adaptive Learning Platforms: A Review. *Computers and Education: Artificial Intelligence*, 100429.
- Thompson, J. (2022). A guide to abductive thematic analysis. *The Qualitative Report*, 27(5), 1410-1421.
- Thornby, K.-A., Brazeau, G. A., & Chen, A. M. (2023). Reducing student workload through curricular efficiency. *American Journal of Pharmaceutical Education*, 87(8), 100015.
- Trajkovski, G., & Hayes, H. (2025). AI-Assisted Formative Assessment and Feedback. In *AI-Assisted Assessment in Education: Transforming Assessment and Measuring Learning* (pp. 283-312). Springer.
- Ude, J. (2025). Analyzing conflict resolution strategies in residential life as tools for student affairs leadership development and campus harmony. *International Journal of Research and Publications Review*, 6(7), 4761-4779.
- Yayrullayevna, X. I., Furkat, A. F., Norimon, S. N., & Dilshod, R. S. d. (2025). Impact of Innovative Pedagogical Approaches on Student Engagement and Performance: A Comparative Study of Flipped Classrooms, Gamification, and Technology-Enhanced Learning. *Indonesian Journal of Multidisciplinary Research*, 5(2), 247-254.

- Yadav, S. (2025). Reimagining education with advanced technologies: transformative pedagogical shifts driven by artificial intelligence. In *Impacts of Generative AI on the Future of Research and Education* (pp. 1-26). IGI Global.
- Yaseen, H., Mohammad, A. S., Ashal, N., Abusaimh, H., Ali, A., & Sharabati, A.-A. A. (2025). The impact of adaptive learning technologies, personalized feedback, and interactive AI tools on student engagement: The moderating role of digital literacy. *Sustainability*, 17(3), 1133.
- Yilmaz, R., & Yilmaz, F. G. K. (2023). The effect of generative artificial intelligence (AI)-based tool use on students' computational thinking skills, programming self-efficacy and motivation. *Computers and Education: Artificial Intelligence*, 4, 100147.
- Zainuddin, Z., Chu, S. K. W., & Perera, C. J. (2024). Gamification in the flipped classroom. In *Gamification in a Flipped Classroom: Pedagogical Methods and Best Practices* (pp. 115-165). Springer.
- Zhang, F., Subagia, I. W., Artini, L. P., & Wahyuni, D. S. (2025). Optimizing blended learning through AI-powered analytics in digital education platforms: an empirical framework. *Future Technology*, 4(4), 173-184.
- Zhao, C. (2024). AI-assisted assessment in higher education: A systematic review. *Journal of Educational Technology and Innovation*, 6(4).
- Zharova, A. K. (2023). Achieving algorithmic transparency and managing risks of data security when making decisions without human interference: legal approaches. *Journal of Digital Technologies and Law*, 1(4), 973-993.