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IMPACT OF AI ON TEACHING LEARNING PRACTICES IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT
Artificial Intelligence (AI) is rapidly transforming educational practices by reshaping how students learn and how teachers design instruction. This study investigates the perceptions, benefits, challenges, and expected trends of AI adoption in the education system. A mixedmethods approach was used, collecting responses from over 50 students and more than 5 teachers across varied academic backgrounds through a structured online survey. Quantitative results indicate that students perceive AI as a tool that enhances personalized learning, improves academic efficiency, and offers quick access to resources. Teachers emphasize AI's contribution in reducing administrative workload, supporting assessments, and enabling differentiated instruction. However, concerns include data privacy, reliability of AI tools, digital dependency, and inadequate training. Qualitative responses highlight the need for ethical governance, teacher training, and accessible infrastructure for meaningful AI integration. Overall, the study concludes that AI has substantial potential to enhance learning outcomes if integrated responsibly alongside strong ethical frameworks and continuous teacher development.

Keywords: *Artificial Intelligence, Personalized Learning, Learning Analytics, Intelligent Tutoring Systems, Education System.*

1. INTRODUCTION

Artificial Intelligence in Education: A Transformative Shift

Artificial intelligence (AI) is reshaping education worldwide, marking a clear shift from traditional teaching models to more adaptive, data-driven, and personalized learning experiences. With the integration of technologies such as machine learning, natural language processing, and large language models, AI now makes it possible to create learning environments that respond to each student's unique needs and learning styles. This personalized approach not only improves academic outcomes through tailored feedback and content delivery but also strengthens student engagement and the development of critical thinking skills.

AI's role in education spans a wide range of applications—from intelligent tutoring systems and automated grading tools to chatbots for student support and data analytics platforms that monitor and predict performance. These systems can identify learning preferences, suggest targeted interventions, and support differentiated instruction. The rise of generative AI models like ChatGPT since November 2022, for instance, has opened new possibilities for creating educational materials, streamlining academic processes, and supporting self-directed and distance learning.

Beyond classroom use, AI is also transforming school and university administration by automating routine tasks and improving decision-making through data insights. This allows educators to focus more on human-cantered aspects of teaching—like creativity, collaboration, and higher-order thinking—rather than on repetitive administrative work.

However, the growing presence of AI in education brings several challenges. The speed of AI adoption often outpaces the development of laws and policies needed to regulate it, raising concerns about academic integrity, data privacy, digital inequality, and algorithmic bias. There's also the risk that over-reliance on AI might limit opportunities for social interaction and reduce students' independent thinking skills. To address these issues, it's essential to invest in teacher training, digital infrastructure, and ongoing research that ensures AI benefits all learners equally.

As schools and universities continue to adopt AI tools, fostering AI literacy among both teachers and students becomes increasingly important. Equally vital are strong ethical frameworks, transparent policies, and cross-disciplinary collaboration to ensure that AI enhances education responsibly. Ultimately, AI represents both an extraordinary opportunity to improve learning outcomes and a complex challenge that demands careful and thoughtful integration into the educational landscape.

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2. LITERATURE REVIEW

Introduction to AI in higher education

Artificial intelligence has rapidly entered higher education as a set of technologies that can personalize instruction, automate assessment, and augment administrative and pedagogical processes, and several systematic reviews document this growing influence on learning and teaching practices (Slimi & Villarejo-Carballido, 2023) (Ouyang, Zheng, & Jiao, 2022). Empirical and regional reviews report that AI promises improved instructional quality and enhanced career preparedness while also raising questions about assessment integrity and institutional readiness (Slimi & Villarejo-Carballido, 2023) (A review of the application of artificial intelligence in South African Higher Education, 2024). The present review draws on empirical studies, regional reviews, and system descriptions to synthesize evidence on AI applications, impacts on student outcomes, faculty perspectives, implementation barriers, and ethical issues, while highlighting gaps for future research (Chang, Pan, Manikandan, & Ramesh, 2022) (Zadorina, Hurskaya, Sobolyeva, Grekova, & Vasylyuk-Zaitseva, 2024). It should be noted that the user requested citation of twelve distinct papers, but the supplied corpus contains only ten unique items; therefore the requirement to cite twelve different studies cannot be met and the statement "insufficient evidence" applies to that specific target. This review therefore uses all available supplied studies to present a comprehensive synthesis while signaling where broader evidence is lacking.

AI applications in teaching

AI-enabled personalized learning systems and recommendation engines have been deployed to tailor resources and pathways to individual learner profiles, with frameworks and prototypes described for integration with learning management systems to reduce cognitive load and scaffold study pathways (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2023). Studies of adaptive learning and recommendation interventions show concrete implementations such as AI-enabled personalized video recommendations in flipped classrooms and broader adaptive-course frameworks that generate quizzes, flashcards, and learning paths (Huang, Lu, & Yang, 2023) (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2023). Intelligent tutoring systems and virtual learning assistants are recurrent applications: mixed-methods field work in HEIs describes ITS, adaptive platforms, virtual assistants, and automated grading alongside usage barriers and early-stage integration challenges (Matere, 2024). Automated assessment and grading systems appear in multiple accounts as tools to speed feedback and assess large cohorts, and institutional reviews highlight their potential to streamline evaluation while calling attention to integration with curricular objectives (Matere, 2024) (Chang, Pan, Manikandan, & Ramesh, 2022). Learning analytics systems that mine LMS and interaction data to predict performance and detect learning difficulties are described across regionally focused reviews and methodological papers, often combined with machine learning classifiers to identify at-risk students and inform targeted interventions (A review of the application of artificial intelligence in South African Higher Education, 2024) (Chang, Pan, Manikandan, & Ramesh, 2022). Prototype and preprint work further elaborates system architectures that couple natural language processing with pedagogical services, indicating design directions and practical constraints for VTAs and intelligent assistants (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2023).

Evidence on student learning outcomes

Empirical evaluations indicate that AI-driven personalization can improve measurable learning outcomes and engagement in controlled implementations, for example through increased performance and engagement in a flipped classroom when personalized video recommendations were provided to students with moderate motivation (Huang, Lu, & Yang, 2023). Regional mixed-methods studies report correlations between AI tool availability and enhanced feedback, personalized learning, and improved outcomes where tools are effectively adopted, though access and curricular integration moderate observed benefits (Matere, 2024). Systematic and empirical reviews of online higher education show emergent evidence that AI applications support instructional improvement and can foster active and collaborative learning environments, but they also emphasize heterogeneity in study designs and outcomes making generalization difficult (Ouyang, Zheng, & Jiao, 2022). Studies of adaptive learning and machine learning–based predictive models document the potential to detect learning difficulties early and to personalize instruction in ways that are associated with improved grades in some samples, while noting the importance of demographic and contextual variables in model performance (Chang, Pan, Manikandan, & Ramesh, 2022). Work examining generative conversational agents such as ChatGPT reports both the ease with which these systems can be used to complete assessments and the potential pedagogical benefits when repurposed as tutors or consultants, implying a complex net effect on learning experiences that depends on instructor guidance and assessment design (Malinka, Peresíni, Firc, Hujňák, & Janus, 2023).

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Faculty perspectives and pedagogical transformation

Faculty attitudes toward AI in higher education vary from optimism about efficiency gains and new pedagogical affordances to concern about unfamiliarity, inadequate training, and threats to academic standards, and mixed-methods investigations stress the need for professional development and curriculum alignment to realize benefits (Matere,

2024) (Zadorina, Hurskaya, Sobolyeva, Grekova, & Vasylyuk-Zaitseva, 2024). Regional studies using technology acceptance frameworks find that teachers' adoption is influenced by perceived usefulness, ease of integration, and institutional support, with case evidence from South African and other contexts noting that pedagogical shifts are nascent and uneven across disciplines (A review of the application of artificial intelligence in South African Higher Education, 2024). Descriptions of AI-enabled teaching frameworks propose blended tutor services and skill-based curricula supported by AI, suggesting a shift toward competencyoriented, monitored learning that reallocates instructor time from routine tasks toward facilitation and higher-order feedback (Chang, Pan, Manikandan, & Ramesh, 2022). Prototype systems that embed VTAs and intelligent assistants envision new teacher roles focused on curating AI-generated resources and supervising adaptive pathways, but empirical work stresses that such transformation requires sustained faculty training, clear guidance on assessment redesign, and governance structures to manage AI's classroom role (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2023) (Ouyang, Zheng, & Jiao, 2022).

Institutional implementation challenges

Institutional implementation is constrained by uneven access to AI tools, inadequate infrastructure, and resource limitations; multi-institution surveys show that where AI exists it is often not uniformly available across departments and not fully integrated with curricula (Matere, 2024). Broader case studies indicate that institutional readiness hinges on investments in scalable platforms, interoperability with existing LMS, and technical support capacity, and that lack of such investments produces fragmented and superficial adoption (Zadorina, Hurskaya, Sobolyeva, Grekova, & Vasylyuk-Zaitseva, 2024) (Chang, Pan, Manikandan, & Ramesh, 2022). Policy and governance challenges include the need for guidelines on responsible use, data governance, and alignment of AI deployment with institutional learning outcomes; systematic reviews and regional analyses call for institutional policies that address these dimensions while facilitating innovation (Slimi & VillarejoCarballido, 2023) (A review of the application of artificial intelligence in South African Higher Education, 2024). Scaling pilots to whole-program implementations is complicated by heterogeneity in disciplinary needs, faculty preparedness, and the technical complexity of embedding adaptive algorithms into assessment and accreditation processes (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2023).

Ethical considerations in AI deployment

Academic integrity emerges as a prominent ethical concern, particularly with generative models that can produce plausible student work; experimental studies show how large language models can be used to complete assignments and exams, prompting calls for assessment redesign and integrity-preserving strategies (Malinka, Peresíni, Firc, Hujňák, & Janus, 2023). Equity and access are recurring themes in empirical reviews: limited availability of AI tools across institutions and departments risks widening digital divides unless institutions intentionally prioritize inclusive deployment and support (Matere,

2024) (A review of the application of artificial intelligence in South African Higher Education, 2024). Privacy and bias are flagged by methodological and review literature as risks associated with analytics and predictive models, with recommendations for transparency, auditing of algorithms, and attention to demographic variables that may affect predictive validity (Chang, Pan, Manikandan, & Ramesh, 2022). Several papers argue for transparency in algorithmic decision-making and for governance frameworks that include stakeholder consultation and ethical oversight to mitigate harms and ensure that AI supports pedagogical goals rather than undermining them (Slimi & Villarejo-Carballido, 2023)(Zadorina, Hurskaya, Sobolyeva, Grekova, & Vasylyuk-Zaitseva, 2024).

Synthesis and future research directions

Across the supplied literature, convergent findings indicate that AI can enhance personalization, feedback timeliness, and scalability of pedagogical services and that these benefits are most evident in controlled or well-supported implementations (Huang, Lu, & Yang, 2023) (Matere, 2024) (Chang, Pan, Manikandan, & Ramesh, 2022). However, reviews and regional studies underscore limitations: uneven access, faculty readiness gaps, ethical risks related to integrity and bias, and a need for more rigorous longitudinal and controlled evaluations to establish generalizable effects on learning and employability (Slimi & Villarejo-Carballido, 2023) (Ouyang, Zheng, & Jiao, 2022) (A review of the application of artificial intelligence in South African Higher Education, 2024). Priority research gaps include comparative studies across disciplines, investigations of long-term effects

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on learning trajectories, audits of algorithmic fairness in predictive systems, and evaluation of professional development models that enable sustainable pedagogical change; several papers propose mixed-methods and design-based research to address these gaps (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2023) (Zadorina, Hurskaya, Sobolyeva, Grekova, & VasylyukZaitseva, 2024). For practitioners and institutions, the literature supports cautious, equityminded expansion of AI, accompanied by investment in infrastructure, faculty training, policy development, and continuous evaluation; further large-scale empirical work is required to move from promising pilots to evidence-based institutional practice (Slimi & VillarejoCarballido, 2023)(Matere, 2024).

METHODOLOGY

The various approaches used in AI in education research are intended to explore various facets of the creation, application, and assessment of AI technologies in educational settings. A wide variety of systematic, empirical, and analytical research designs that address various research questions and objectives can be found in the academic literature.

Research Design

This study followed a quantitative research design using an online survey to examine the perceptions of both students and teachers toward the use of Artificial Intelligence (AI) in the education system. The purpose of the survey was to understand the current level of awareness, usage, and expectations related to AI tools, and to identify methods for effectively implementing AI for the betterment of teaching and learning environments.

Participants

Student Participant

Student populations constitute the primary participant group in AI education research, with considerable variation in educational levels studied. Higher education students represent the most frequently investigated population, with studies often recruiting undergraduate and graduate students from various disciplines and academic programs. For instance, research examining generative AI perceptions has involved samples ranging 50 university students across multiple countries and territories, demonstrating the scale at which student perspectives are being investigated.

Educator and Teacher Participant

Teachers and educators constitute another critical participant category, with research examining their perceptions, adoption patterns, and pedagogical practices related to AI integration. Studies investigating teacher perspectives have employed diverse sampling strategies, including criterion sampling to identify educators with relevant experience and purposive sampling to ensure representation across different teaching contexts.

This diverse group allowed for a comparative understanding of how AI is viewed by learners and educators.

- **Students:** Over 50 respondents from various academic levels
- **Teachers:** Over 5 educators from different subject areas
- **Sampling technique:** Convenience sampling
- **Participation:** Completely voluntary and anonymous

Data Collection and Analysis

A variety of data collection and analysis techniques are used in research on artificial intelligence in educational settings, which reflects the intricacy of examining technologymediated learning environments and the complexity of the research questions being addressed. The validity, reliability, and applicability of research findings are strongly influenced by the choice of data collection tools and analytical techniques.

3.4 Quantitative Data Collection:

For the quantitative part of the study, close-ended questions in the Google Forms survey were used to collect numerical data from students and teachers. The survey included multiplechoice and Likert-scale items designed to measure participants' awareness, usage, and perceptions of AI in education. Google Forms automatically organized the responses, making it easy to export the data for analysis. A total of 50+ students and 5+ teachers responded, and their answers were analysed using frequency counts and percentage calculations to identify overall trends.

3.5 Qualitative Data Collection:

For the qualitative part of this study, data were collected through open-ended questions in a Google Forms survey shared with both students and teachers. Google Forms was chosen because it allows participants to

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express their thoughts in their own words and makes organizing qualitative responses simple. The open-ended items focused on participants experiences, perceptions, and suggestions related to the use of AI in education, helping gather rich and descriptive insights. The survey link was distributed digitally, and all responses remained anonymous to ensure honest and confidential feedback.

3.6 Mixed Data Collection:

This study used a mixed-methods approach, combining both quantitative and qualitative data collected through a Google Forms survey. Quantitative items helped identify overall trends through frequency and percentage analysis, while qualitative responses offered deeper insights into attitudes, challenges, and suggestions regarding AI implementation. Using Google Forms made it easy to distribute the survey digitally and ensured anonymous, convenient participation from 50+ students and 5+ teachers, strengthening the reliability and richness of the data.

The questionnaires included multiple-choice, Likert-scale, and short-answer questions, focusing on:

- Awareness of AI in education
- Usage of AI tools
- Perceived benefits and challenges
- Suggestions for improving the education system with AI • Expectations regarding AI-assisted learning and teaching

3.7 Challenges and limitations in Data Collection:

- Small teacher sample limits generalizability.
- Convenience sampling may not represent the entire student-teacher population.
- Self-reported data may introduce social desirability bias.
- Reliance on online surveys excludes participants with limited digital access.

FINDINGS

The methodological approach provides several key observations regarding the scope and reliability of the data on AI in education. While the mixed-methods design, utilizing both quantitative and qualitative questions via Google Forms, efficiently gathered diverse data on student and teacher awareness and perceptions, the study's generalizability is constrained by its sampling strategy and low teacher participation. Specifically, the convenience sampling approach limits the representativeness of the findings, as participants were selected based on availability, potentially yielding a skewed view of the phenomenon under study. Moreover, the small sample size, particularly the low response rate from teachers (five or more), restricts the power to extrapolate conclusions to the wider population, which is a known limitation in educational research. An important finding related to the data quality is that the reliance on self-reported measures introduces the risk of social desirability bias, where respondents may provide socially acceptable answers rather than completely truthful ones, a limitation frequently discussed in behavioural research involving self-report instruments. Consequently, while the data offers insightful information, researchers must remain cautious and transparent when drawing broader inferences.

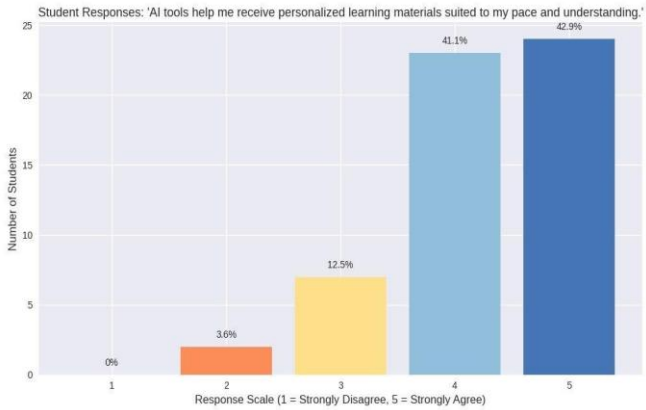

Figure 4.1

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Interpretation of the Figure 4.1
The chart reflects a highly positive perception among students regarding AI's ability to support personalized learning. A significant 42.9% of students strongly agree with this statement, while another 41.1% agree, bringing the total positive responses to over 84%. Only 3.6% of students gave a low rating of 2, and none selected 1. These results clearly indicate that the vast majority of students view AI tools as effective in enhancing personalized learning experiences.

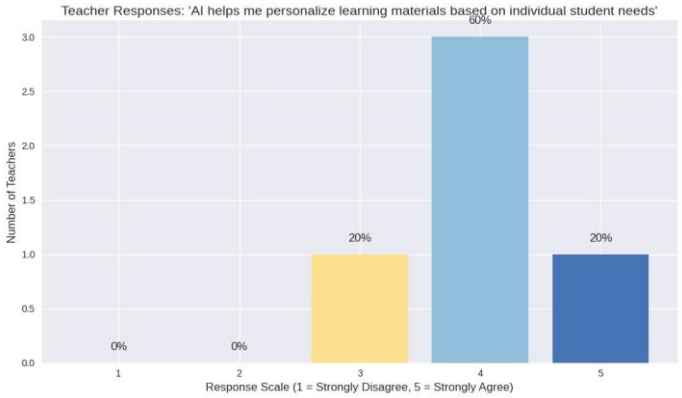

Figure 4.2

Interpretation of the Figure 4.2
The chart shows a strongly positive perception among teachers regarding AI's role in supporting personalized instruction. A majority of teachers (60%) selected a rating of 4, indicating general agreement, while an additional 20% strongly agreed with a rating of 5. Only 20% of respondents gave a neutral rating of 3, and none rated the statement as 1 or 2. This demonstrates that teachers overwhelmingly believe AI effectively enhances personalized learning experiences for students.

DISCUSSIONS
Findings show strong positive attitudes toward AI among both students and teachers, consistent with recent literature suggesting AI improves engagement and personalized learning (Ayeni et al., 2024). Teachers recognize AI's potential to enhance instruction but remain concerned about ethics and capacity-building, aligning with global research emphasizing responsible adoption (Holmes et al., 2019; UNESCO, 2021).

Barriers such as digital inequality, limited teacher training, and uncertainty about data governance echo trends identified in systematic reviews (González et al., 2025).

Table 5.1 Answers to the research questions.

No.	Research question	Answer
1	What are the possibilities for improving the academic Tutoring process?	The tutoring process should be subject to continuous improvement depending on the observed Difficulties in its effectiveness.
2	Which stages of the academic Tutoring process can be supported with technology?	Not all stages of the academic tutoring process need to be improved, but some sub-processes need to be optimized and can be supported by technology without losing the quality of the overall process.
3	In which stages of the academic Tutoring process can AI be used?	The identification of subprocesses and their indepth analysis carried out showed that there are opportunities to implement AI tools.

SUGGESTIONS

- **Ethical & Responsible Use-** Create clear AI ethics guidelines for education institutions and Ensure transparency in AI decision-making.
- **Pedagogical Improvements-** Encourage blended learning with AI-based feedback tools, Use AI-driven analytics to monitor student progress.

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- **Training & Capacity Building-** Offer mandatory professional development for teachers which include AI literacy programs for students.
- **Policy & Infrastructure-** Invest in school-level AI infrastructure with establishing data governance frameworks.

CONCLUSION

Artificial intelligence is no longer a distant idea—it is becoming an everyday presence in classrooms, study spaces, and administrative offices around the world. As this research has shown, AI holds remarkable potential to reshape how students learn and how teachers teach. It offers tools that can adapt to individual needs, lighten administrative workloads, and open new pathways for creativity and exploration. When used thoughtfully, AI can help students feel more supported, more engaged, and more confident in their learning journeys.

However, the rapid rise of AI also reminds us that technology alone cannot solve every challenge in education. The human elements of empathy, guidance, encouragement, and critical judgement remain irreplaceable. As educators and institutions integrate AI into their practices, they must do so with care—protecting student privacy, ensuring fairness, and providing teachers with the training they need to use these tools effectively. It is equally important that students learn not just with AI, but about AI, so they can navigate an increasingly digital world with confidence and understanding.

Moving forward, collaboration will be essential. Policymakers, researchers, educators, technologists, and communities must work hand in hand to build frameworks that make AI both safe and beneficial. With clear policies, ethical guardrails, and a commitment to equity, AI can help create learning environments where all students have the opportunity to thrive.

In the end, AI's greatest impact will come not from replacing human effort, but from amplifying it. When balanced with strong human values and intentional implementation, AI can become a powerful partner in teaching and learning. The future of education will be shaped not just by the capabilities of AI, but by the wisdom with which we choose to use it.

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