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Artificial Intelligence in Education for Personalized Learning a Case Study of Mirpur University of Science and Technology (Must) Mirpur AJ&K

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ABSTRACT

The use of Artificial Intelligence (AI) has been increasingly popular in education especially higher education. Therefore, this research aims to explore the use of AI technologies in higher institutions, evaluate their effectiveness in enhancing academic achievement and students' engagement, and identify implementation-related challenges. Undergraduate students from various faculties were 380 randomly selected and provided questionnaires as part of a quantitative research design. Based on the results, the majority (91.1%) of the students actively use AI technologies for academic assistance, test preparation, and assignment writing, such as Chat GPT, QuillBot, and Canva. Students reported higher motivation, improved understanding of course content, improved time management, and overall academic achievement because of AI-enabled learning. Despite these benefits, weaknesses were found to include data privacy problems, technological limitations, inadequate training, and the continued role of human participation in learning. As per the research findings, AI technologies improve personalized learning at MUST; however, effective implementation calls for corresponding infrastructure, ethical standards, and training for teachers and students. This research provides perceptive details regarding the assimilation of AI into higher education spaces and offers possible solutions to increase its efficiency when applied within academic institutions.

Keywords: *Artificial intelligence, Personalized Learning, Higher Education*

INTRODUCTION

We're observing a revolution in all fields, including education – all caused by the rapid development of artificial intelligence (AI). The ability of AI to accommodate according to every student's learning experience makes it a valuable asset in educational settings. Utilities possessed by AI such as natural language processing, predictive analytics and intelligent tutoring systems, continuously evaluate student's performance or behaviour.

Student- centered teaching methods are increasing in demand, hence why there is such widespread global interest in AI within higher education. For developing countries like Pakistan, where schools often struggle with overcrowded classrooms, limited resources, and diverse student needs, AI has the potential to significantly contribute to the solution. One of the newer universities looking into AI to improve its teaching and learning practices is the Mirpur University of Science and Technology (MUST) in Azad Jammu & Kashmir. The success, however, of these initiatives mainly depends on their design and implementation. We are observing in real-time, how traditional learning methods are being

restructured by AI, allowing for personalized learning experiences tailored for every student (Pane et al., 2015).

Contrary to the conventional, one-size-fits-all teaching methods, personalized learning makes use of data-driven insights and adaptive technologies to adjust teaching methods, content, and assessment based on each student's unique needs, learning styles, and performance (Van Lehn, 2011; Holmes et al., 2019). AI tools can track a student's performance by identifying knowledge gaps, and endorse resources tailored towards the student's requirements tailored with the intent to boost understanding and retention (Spector, 2014; Sajja et al., 2023).

A key advantage of personalized learning is its flexibility across different educational settings. For example, AI solutions have the aptitude to serve as supplementary learning tools that offer ongoing guidance and quick feedback in classrooms with challenging student-to-instructor ratios and limited resources. In developing countries such as Pakistan' where we observe disparities in infrastructure, quality of teaching and access to good education, such flexibility could reduce the significant barriers to inclusive education.

Statement of the Problem

Even as AI technologies continue to enhance, it seems personalized learning strategies have not been thoroughly utilized in most universities, including the Mirpur University of Science and Technology (MUST). Traditional teaching methods often fail to cater to individual learning styles, needs, and speeds, resulting in lower student engagement and varied academic outcomes. Learning to integrate AI into personalized learning approaches efficiently, is crucial when it comes to improving education quality at MUST. Thus, the aim of this research is to examine the potential, current state, and challenges of AI-based personlized learning within institutions of higher education.

Objectives:

The research aims to accomplish the following goals.

1. To examine the use of AI driven personalized learning tools in higher education.
2. To assess the impact of AI driven personalized learning on student engagement and academic achievement.
3. To identify the challenges and limitations associated with the use of AI in personalized learning.

Significance of the Research

This research is of special relevance to Mirpur University of Science and Technology (MUST) because it investigates the possibility of AI-based personalized learning technologies improving the quality of tertiary education. MUST, as one of the fast-developing universities in Azad Jammu and Kashmir, has most of the typical challenges facing most developing universities, including high student-to-teacher ratios, variability in student learning needs, and meager academic resources. The integration of AI-based personalized learning systems can offer personalized learning experiences, enabling students to learn at their pace and based on their individual strengths and weaknesses.

By determining the effects of AI on student motivation and academic performance, this study has the potential to provide evidence-based information on how such technologies have the capacity to enhance classroom engagement, enhance understanding of course content, and improve learning outcomes for MUST students. In an environment where digital transformation is increasingly becoming the focus of education systems worldwide, embracing AI-based solutions could assist the university in filling

knowledge gaps in conventional education and equipping students with the skills needed in the modern, technologically oriented workforce.

In addition, through the identification of the challenges and drawbacks revolving around AI in personalized learning, this research will assist MUST administrators and instructors in embracing these technologies in a practical, affordable, and ethical fashion. This is particularly essential in a resource-challenged environment where technology integration decisions need to be strategic and sustainable.

In the end, the results of this study will not only enrich the scholarly literature on AI in higher education but also directly serve MUST's mission of academic excellence, innovation, and global competitiveness, positioning the institution as a leader to adopt transformational educational technologies in the region.

LITERATURE REVIEW

Artificial intelligence (AI) in tertiary education ranges from adaptive learning systems, intelligent tutoring systems (ITS), learning analytics, chatbots, and recommendation engines that adapt content, pacing, and feedback to unique learners. Systematic reviews in tertiary education indicate consistent increases in AI research since 2010, with research clustering around adaptive support, assessment, and analytics for personalization, as well as highlighting gaps in pedagogy-driven design and educator preparedness (Zawacki-Richter et al., 2019).

Meta-analytic evidence regarding ITS—one of the oldest lines of AI in education—describes medium-to-large gains in learning (median $d \approx 0.66$) over traditional instruction, suggesting great promise for focused, high-feedback personalization when curricular alignment is strong (Kulik & Fletcher, 2016; Institute for Defense Analyses, 2016). More recent syntheses in postsecondary education also identify similarly positive impacts on engagement, completion, and performance when platforms adjust content and feedback to previous performance and profile information; quality of studies and outcome measures are diverse, and transfer to long-term learning is uneven (MDPI, 2024).

Today's platforms personalize by (a) adapting the sequencing of activities, (b) predictive analytics that identify at-risk students for early intervention, and (c) chatbots/aids that offer immediate formative feedback or navigation assistance. Reviews report persistent research correlations between adaptive content, time-on-task, and enhanced persistence, while learning analytics assist teachers in differentiating instruction. However, researchers warn against over-reliance on automated hints and solutions, which can stifle deeper learning if there are no human guidance and metacognitive scaffolds provided (MDPI, 2024).

Policy-making institutions focus on human centered, explainable AI with open guardrails on privacy, security, bias reduction, and academic honesty. UNESCO's worldwide guidance (Miao & Holmes, 2023) calls for institutions to embrace governance approaches, develop educator capabilities, and place generative AI (GenAI) as a support—not replacement—technology. In the same vein, the OECD (2021, n.d.) calls for capability frameworks, skills maps, and evaluation standards so that personalization is leveraged for equity and quality instead of convenience.

Evidence emerging from the classroom indicates AI has the potential to enhance short-term task performance but risk damaging long-term learning if it provides definitive answers rather than helping guidance; optimal outcomes are achieved with designs that limit AI to hints, exemplars, and feedback while maintaining learners as the drivers (Financial Times, 2025). Institutions thus require principles-guided assessment policy and instructional designs that maintain authenticity and minimize over-reliance.

For Pakistan's higher-education context, research shows increasing interest in AI-facilitated learning, whose adoption is influenced by perceived usefulness, ease of facilitating conditions, and digital

literacy. Recent studies with Pakistani university groups such as English as a Foreign Language (EFL) students document intention to adopt AI tools where infrastructures and faculty support exist (Aslam et al., 2025; Hussain et al., 2025). This presents a significant opportunity for institutions like MUST in AJ&K, where size, staff workload, and bandwidth constraints make analytics-based personalization appealing, especially if accompanied by capacity building.

For MUST, a practical agenda emerges from existing literature, suggesting that low-friction, high-impact applications, such as early-alert analytics in key courses and AI-based feedback in programming and writing-intensive subjects, could be introduced first. Furthermore, a human-in-the-loop approach might be used, where educators review interventions and adjust difficulty levels. Also, to implement governance promptly—such as minimizing data use, checking for bias, documenting models, and informing students—staff capacity could be developed through specific micro-credentials focused on timely design, revising assessments, and interpreting data. These measures follow international standards and address regional challenges in AJ&K (Miao & Holmes, 2023; OECD, 2021).

Overall, research supports the idea that AI-facilitated personalization can enhance engagement and performance, particularly through intelligent tutoring systems, adaptive sequencing, and learning analytics. However, thorough longitudinal studies, equity audits, and educator-focused designs are still lacking, mainly in South Asian public sector environments (Zawacki-Richter et al., 2019; MDPI, 2024). This gap encourages a case study at MUST to document not only whether learning improves but also how teaching practices, student involvement, and assessment integrity evolve under responsibly managed AI.

METHODOLOGY

The research utilized a quantitative research design, which is concerned with gathering and analyzing numerical data in order to explain phenomena, test hypotheses, and establish statistical patterns (Creswell & Creswell, 2018). Quantitative approaches are commonly used in education studies due to their ability to test established theories and the fact that they permit researchers to measure variables objectively (Johnson & Christensen, 2020). This model was found to be relevant to the current study because it allowed for the investigation of the views of undergraduate students on artificial intelligence (AI) in personalized learning and permitted statistical testing of the postulated hypotheses.

The population under study was all the undergraduate students who study at Mirpur University of Science and Technology (MUST), Mirpur AJ&K, in various faculties. There were a total of 7,961 students. Krejcie and Morgan's (1970) sample size table was applied to determine that a sample of 380 respondents was adequate to be generalized. Stratified random sampling was adopted to provide assurance across faculties.

The data were gathered using a standardized questionnaire to assess students' attitudes toward AI in education and tailored learning. Standardized questionnaires are commonly known to yield standardized responses, hence enhancing reliability and comparability (Bryman, 2016). The tool consisted of 20 items on a Likert scale, addressing areas of student participation, academic achievement, and perceived usefulness of AI technologies.

To determine the reliability of the instrument, a pilot test was carried out using 50 undergraduate students. The pilot test yielded a Cronbach's alpha coefficient of .776, showing good internal consistency since above 0.70 is deemed reliable (Tavakol & Dennick, 2011). 380 questionnaires were distributed to undergraduate students in various faculties at MUST. All questionnaires given out were completed, with a 100% response rate. The data was cleaned before analysis to eliminate inconsistencies and missing values.

DATA ANALYSIS

The data collected was analyzed with Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics (means, frequencies, and standard deviations) summarized the data. Inferential statistics, such as reliability tests and correlation analysis, were conducted to establish patterns and test the hypotheses. SPSS was used because it can handle large databases and produce stable statistical outputs that facilitate evidence-based conclusions (Pallant, 2020). The results were displayed in the form of tables to improve clarity and interpretation.

Adoption of AI-Based Learning Tools

The findings reflect extensive use of AI-based tools by undergraduate students. Based on Table 1, an overwhelming majority (91.1%) had used AI platforms like adaptive learning systems, tutoring apps, or personalized learning apps, compared to just 8.9% who had not. This implies that AI tools have already become an integral part of students' academic lives.

Table 1: Use of AI-Based Learning Tools

Response	**Frequency**	**Percent**
Yes	346	91.1%
No	34	8.9%
Total	**380**	**100%**

Student Attitudes Toward AI in Learning

A large percentage of the students had positive attitudes towards AI incorporation in learning. As shown in Table 2, 87.1% reported enjoying to use AI tools, 9.2% did not, and 3.7% were not sure.

Table 2: Enjoyment of AI Tools for Learning

Response	**Frequency**	**Percent**
Yes	331	87.1%
No	35	9.2%
Not Sure	14	3.7%
Total	**380**	**100%**

This result supports previous research positing that positive attitudes towards AI increase acceptance and use of such technologies in educational settings (Creswell & Creswell, 2018).

Usage Patterns of AI Tools

The majority of students used AI tools for exam preparation (60.5%), followed by assignments (19.7%), quizzes (8.7%), creative work (8.7%), and presentation (2.4%) (Table 3). This pattern reflects the perceived function of AI as a high-stakes support tool for revision and assessment preparation.

Table 3: Contexts of AI Tool Usage

Context	Frequency	Percent
Exam preparation	230	60.5%
Assignments	75	19.7%
Quizzes	33	8.7%
Presentations	9	2.4%
Creative work	33	8.7%

ChatGPT was the most used AI tool (63.7%) when the students were asked specifically about platforms, followed by Canva (24.2%), Murf AI (6.1%), QuillBot (4.7%), and Absorb LMS (1.3%) (Table 4). This indicates that writing and design-based tools and generative AI are prevalent in student usage.

Table 4: Most Commonly Used AI Tools

Tool	Frequency	Percent
ChatGPT	242	63.7%
Canva	92	24.2%
Murf AI	23	6.1%
QuillBot	18	4.7%
Absorb LMS	5	1.3%

Motives for AI Usage

As illustrated by Table 5, the most frequent reason for AI use was personalized learning (49.2%), followed by extra help (27.9%), time management (13.9%), interest (6.3%), and practice or revision (2.6%). These findings emphasize personalization as the driving factor behind student interaction with AI, support reflected in global findings that personalization enhances academic motivation (Luckin et al., 2016).

Table 5: Motives for Using AI Tools

Motive	Frequency	Percent
Personalized learning	187	49.2%
Extra help	106	27.9%
Time management	53	13.9%
Interest	24	6.3%

Practice/Revision	10	2.6%

Challenges of AI-Based Learning

While students have given positive feedback about their experiences, various issues were identified (Table 6). Concerns regarding lack of alignment with learning needs (M = 3.99, SD = 0.93), technical problems (M = 3.78, SD = 0.99), and the need for human teachers (M = 3.89, SD = 0.99) were reported by respondents. Data privacy issues (M = 3.30, SD = 1.30) and insufficient training (M = 3.81, SD = 1.07) were also mentioned.

Table 6: Challenges of AI for Personalized Learning

Statement	**Mean**	**SD**
Concerned about data privacy when using AI tools	3.30	1.31
AI tools sometimes misunderstand my learning needs	3.99	0.93
Technical issues hinder my experience	3.78	0.99
Human teachers are still essential despite AI advances	3.89	0.99
Lack of training limits effective use of AI tools	3.81	1.07

These results refer to technical and moral obstacles, which reflect international discussions regarding data protection, bias in algorithms, and teacher preparedness (UNESCO, 2023).

Impact of AI on Academic Achievement

Students mostly concurred that AI enhanced their academic performance (Table 7). High mean ratings were obtained for enhanced understanding of the course material (M = 4.00, SD = 0.85), increased engagement (M = 3.99, SD = 0.88), and enhanced academic performance (M = 3.91, SD = 0.91). These results indicate that AI has a positive effect on motivation, engagement, and understanding, thus promoting academic attainment.

Table 7: Impact of AI on Academic Achievement

Statement	**Mean**	**SD**
AI tools increased my motivation to study	3.85	0.98
I feel more engaged during AI-supported learning sessions	3.99	0.88
AI has helped me perform better academically	3.91	0.91
AI recommendations improved my understanding of materials	4.00	0.85
AI platforms helped me manage study time effectively	3.87	0.94

Uses of AI in Personalized Learning

As indicated in Table 8, students firmly agreed that AI tools customize learning content (M = 3.83, SD = 0.96), offer more timely feedback (M = 3.83, SD = 0.84), and assist in creating realistic study goals (M = 3.82, SD = 0.97). Moderate agreement was documented on AI adjusting to different learning speed and inclination toward AI-enabled learning over conventional classrooms.

Table 8: Uses of AI in Personalized Learning

Statement	Mean	SD
AI tools tailor learning materials to my needs	3.83	0.96
I receive timely feedback from AI compared to traditional	3.84	0.84
AI platforms help me set realistic academic goals	3.82	0.97
AI adapts to my learning pace and style effectively	3.70	1.00
I prefer AI-assisted learning over traditional learning alone	3.56	1.19

These results support the literature on adaptive learning technologies' role in enabling personalization (Luckin et al., 2016; Chen & Chen, 2020).

Summary of Findings

Generally, it is seen that undergraduate students at MUST use and enjoy AI tools extensively for personal learning. Dominant platforms were ChatGPT and Canva, used mainly for exam preparation and personal learning. Though students expressed high satisfaction and academic improvement, issues regarding privacy, technical challenges, and the involvement of human instructors are paramount. While AI contributes to enhanced learning outcomes, effective governance and adequate training are essential when it comes to integration, as suggested by the findings.

CONCLUSION

This study demonstrates that the rapid implementation of artificial intelligence into teaching (AI) at Mirpur University of Science and Technology (MUST), Mirpur AJ&K, has transformed the way students engage with learning. Confirmed by the findings, AI represents more than a passing technological trend or fad, serving as a transformative force shaping academic achievement, student engagement, and institutional practices. These technologies have become indispensable to students' academic routines, from exam preparation to assignments and creative projects, with over 91% of students reporting the use of AI tools such as ChatGPT, Canva, and QuillBot,.

When it comes to addressing limitations inherent in traditional "one-size-fits-all" teaching approaches, AI has proven effective, offering personalized pathways, real-time feedback, and adaptive resources tailored to individual needs. The high mean values across survey responses indicate that these features play a significant role in the enhancement of students' motivation, comprehension, and performance.

Nevertheless, challenges remain. Valid data privacy concerns, unequal access to technology, technical constraints, and inadequate training, all act as obstacles in the way of maximizing the full potential of AI. Importantly, students stressed that human educators remain requisite, as they offer ethical guidance, creativity, and emotional support—dimensions beyond the capacity of AI to replicate. Moreover,

dependence on AI create reservations about academic integrity, critical thinking, and independent problem-solving.

To conclude, AI holds transformative potential for higher education at MUST, but its benefits can only be realized through careful, ethical, and inclusive integration. Institutional readiness—through infrastructure development, policy frameworks, teacher training, and continuous monitoring—is vital to ensuring that AI complements rather than replaces human-led education.

RECOMMENDATIONS

To harness the benefits of AI in a way that outweighs its limitations, MUST is advised to adopt a comprehensive framework that merges policy development, capacity building, advancement of infrastructure, and inclusivity. Faculty and students should be systematically trained in ethical AI use, data privacy safeguards, and effective integration into pedagogical processes. In order to uphold academic integrity and fair assessment practices, ensuring strong infrastructure such as AI- focused labs, licensed tools and reliable internet access is crucial. Offering non-technical students AI literacy and interdisciplinary courses, with the use of inclusive, linguistically accessible tools that support students with disabilities or underprivileged backgrounds is necessary to encourage innovation in learning spaces. A hybrid learning model personalized by teacher-led instructions should be encouraged, with educators sustaining their positions as facilitators instead of being replaced. For sustainable and ethical adoption of AI in higher education, faculty involvement when it comes to AI tool selection and recognizing innovative teaching practices is indispensable.

REFERENCES

Arrive. (2021). Equity and artificial intelligence in education: Will AIED amplify or alleviate inequities in education? https://arxiv.org/abs/2104.12920

Arrive. (2023). Advancements in generative AI: A comprehensive review of GANs, GPT. https://arxiv.org/abs/2311.10242

Baleens, F., Syed, T. H., & Ulla, S. (2024). Generative AI in higher education: Challenges and opportunities in the Pakistani context. *International Journal of Emerging Educational Technologies, 10*(2), 22–38.

Barrio, G. A., Amen, M., & Jamari, M. B. (2024). Adoption of ChatGPT among university students in Sindh: Behavioural intention vs. actual usage. *Journal of Educational Technology & Society, 27*(1), 15–30.

Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.

Chen, X., & Chen, L. (2020). Artificial intelligence in education: Personalized learning systems and their impact on student performance and engagement. *The Critical Review of Social Sciences Studies, 3*(1), 2456.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Dip Editors. (2024). Effects of AI tools like ChatGPT on student performance and engagement: A global meta-analysis. *Education Sciences, 14*(3), 56. https://doi.org/10.3390/educsci14030056

Glenn, J. (2025). The impact of AI on personalized learning in higher education. J*ournal of Educational Technology, 34*(2), 123–135.

Hardier, G., & Glenn, L. E. (2025). Artificial intelligence for personalized learning: A systematic literature review. *International Journal of Information and Learning Technology, 42*(1), 1–14.

Holmes, W., et al. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Springer.

Imran, M. (2024). The role of artificial intelligence (AI) in personalized learning: A case study in K–12 education. *Global Educational Studies Review*. https://gesrjournal.com/article/the-role-of-artificial-intelligence-ai-in-personalizedlearning-a-case-study-in-k12-education

Johnson, L., Becker, S. A., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2018). *NMC Horizon Report: 2018 Higher Education Edition*. The New Media Consortium.

Johnson, R. B., & Christensen, L. (2020). *Educational research: Quantitative, qualitative, and mixed approaches* (7th ed.). SAGE Publications.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Kulak, J. A., & Fletcher, J. D. (2016). Effectiveness of intelligent tutoring systems: A meta-analytic review. *Review of Educational Research, 86*(1), 42–78.

Lu, X., et al. (2018). The impact of intelligent tutoring systems on student learning outcomes: A meta-analysis. *Educational Psychology Review, 30*(4), 1051–1074.

Lucking, R., Holmes, W., Griffiths, M., & Forcer, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education.

Ma, Y., & Siu, K. (2018). Artificial intelligence impacts on higher education. In *MWAIS 2018 Proceedings*. Association for Information Systems.

Ma, Y., & Siu, K. (2019). Higher education in the AI age. In *AMCIS 2019 Proceedings*. Association for Information Systems.

Ofcom, R., et al. (2021). Personalized learning: A framework for the future. E*ducational Research Review, 15*(4), 45–59. *Pakistan Languages and Humanities Review, 9*(1), 216–233. https://doi.org/10.47205/plhr.2025%289-I%2921

Pallant, J. (2020). *SPSS survival manual* (7th ed.). McGraw-Hill Education.

Rather, A. A., Zareen, S. J., & Rafique, A. A. (2025). Artificial intelligence and curriculum prospects. *Digital Society and Smart Research, 3*(5), 473–485. https://thedssr.com/index.php/2/article/view/566

Saga, R., et al. (2023). AI in education: Enhancing student engagement and retention. J*ournal of Educational Computing Research, 61*(3), 567–589.

Sea, T., et al. (2021). The long-term efficacy of AI in education.

Selwyn, N. (2019). Balancing technological advancements with ethical considerations in education.

Spector, J. M. (2014). Conceptualizing K–12 blended learning environments. *Educational Technology Research and Development, 62*(4), 507–520.

Springer Open. (2023). A meta-systematic review of artificial intelligence in higher education.https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-02300436-z

Springer. (2022). Ethical principles for artificial intelligence in education. https://link.springer.com/article/10.1007/s10639-022-11316-w

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Thong, L. (2022). Systematic review of personalized learning in higher education: Learning content structure, learning materials sequence, and learning readiness support. *Interactive Learning Environments, 31*(10), 7053–7073.

Van Lehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist, 46*(4), 197–221.

Williamson, B., & Piattoeva, N. (2021). Education governance and ratification. *Learning, Media and Technology, 46*(1), 1–15. https://doi.org/10.1080/17439884.2021.1894324

Woolf, B. P., Burleson, W., Arroyo, I., Dragon, T., Cooper, D. G., & Picard, R. W. (2010). Affect-aware tutors: Recognizing and responding to student affect. *International Journal of Artificial Intelligence in Education, 20*(1), 43–69.

Yousef, J. H., & Yousef, M. J. (2025). Enhancing academic advising through AI: A conceptual model for Furhat robot adoption in higher education. *Artificial Intelligence & Robotics Development Journal*.

Zafar, A., Sheehan, A., & Rohan, R. (2024). ChatGPT impact on Pakistani higher education: Case-based learning, engagement, and assessment. *South Asian Journal of Educational Studies, 19*(1), 45–60.

Zain, T., Tauter, Y., & Ali, M. S. (2025). Sustainable distance learning in higher education: Exploring artificial intelligence's role in personalization and engagement.

Zhou, Z., et al. (2024). Perceptions of AI in higher education: Insights from students at a top-tier Chinese university. *Education Sciences*. https://www.mdpi.com/