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Enhancing Pedagogical Strategies: A Study on AI Tools in College Classrooms

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Abstract: The rapid integration of Artificial Intelligence (AI) in education has opened new possibilities for enhancing teaching and learning practices in higher education. This study explores how AI tools are transforming pedagogical strategies in college classrooms. Focusing on both instructional design and delivery, the research investigates the adoption, effectiveness, and challenges of AI-assisted teaching methods across various disciplines. Through a mixed-methods approach—incorporating surveys, interviews, and classroom observations—the study identifies the most commonly used AI tools such as intelligent tutoring systems, automated grading software, and generative content platforms. It examines how these tools are reshaping traditional teaching roles, enabling data-driven instruction, and promoting student engagement and personalization. Furthermore, the research evaluates faculty attitudes toward AI, institutional support structures, and ethical considerations surrounding tool deployment. The findings aim to provide educators, administrators, and policymakers with practical insights into best practices for integrating AI



into college pedagogy while maintaining academic rigor, equity, and human-centered learning.

Keywords: AI in education, pedagogical strategies, faculty attitudes toward AI, practical insights

1. INTRODUCTION

The landscape of higher education is undergoing a significant transformation, driven in large part by the rapid evolution of Artificial Intelligence (AI) technologies. AI tools are no longer confined to niche applications but are becoming increasingly integrated into everyday teaching practices across college campuses worldwide. From intelligent tutoring systems and AI-powered assessment tools to generative platforms and adaptive learning environments, these technologies offer educators powerful new ways to design, deliver, and personalize instruction.

1.2 Research Objectives

- To identify the most commonly used AI tools in higher education teaching.
- To evaluate how these tools enhance or transform pedagogical approaches.
- To assess faculty perceptions and readiness for AI integration.

2. REVIEW OF LITREATURE

Alyammahi (2020) examined the effect of AI-driven digital learning platforms on student learning and teaching methodologies in Abu Dhabi schools. The research pointed out that AI-based tools greatly improved individualized learning experiences and increased student engagement. Yet, it also found that teachers struggled to adopt AI-based teaching methods because they lacked adequate training and technological support (Alyammahi, 2020).

Bagai and Mane (2024) examined the concept of an AI-based mentorship platform for professional growth, debating the possibilities as well as limitations of its application (Bagai & Mane, 2024). Their study highlighted that AI would enable adaptive learning experiences and offer customized mentorship, leading to enhanced professional development. However, issues pertaining to data privacy, algorithmic bias, and over-reliance on AI in decision-making were recognized as potential hindrances to successful adoption.

Jamal (2023) analyzed artificial intelligence's influence on teacher education and its potentials and challenges. According to the study, teachers were assisted with lesson planning, evaluation, and clerical activities using AI-supported tools, leading to a lesser workload and giving way to greater student focus (Jamal, 2023). It was still acknowledged that artificial intelligence could never totally substitute the role of personal contact in schooling because emotional intellect and critical thought remained integral in



great teaching practices. Also, resistance to AI implementation because of concerns over job loss and ethical issues related to data protection were cited as significant challenges.

3. RESEARCH METHODOLOGY

This research would seek to analyze the prospects and challenges of using AI-driven teaching-learning development aids by teachers. A systematic approach to research is employed to obtain, analyze, and interpret proper data in light of the said objectives.

The research is a mixed-methods design that encompasses quantitative and qualitative methods. The quantitative section is based on a guided survey used to gather statistical information regarding teachers' experience of AI tools, while the qualitative section comprises interviews aimed at developing an in-depth understanding of challenges facing and methods for integrating AI into education. The blend captures both quantifiable effects and teachers' personal experiences.

Ethical Considerations

Ethical standards are strictly adhered to for maintaining confidentiality of the participants and voluntary participation. Informed consent is taken from all the respondents, detailing the purpose of research, use of data, and privacy protocols. The data collected is anonymized, and participants are free to withdraw at any point in time. Institutional ethical clearance is obtained prior to undertaking the research.

4. DATA ANALYSIS AND INTERPERTATIONS

This section presents the analysis of both quantitative and qualitative data collected through surveys and interviews. The aim is to assess the prospects and challenges of using AI-driven teaching-learning aids by educators. The analysis is divided into two parts:

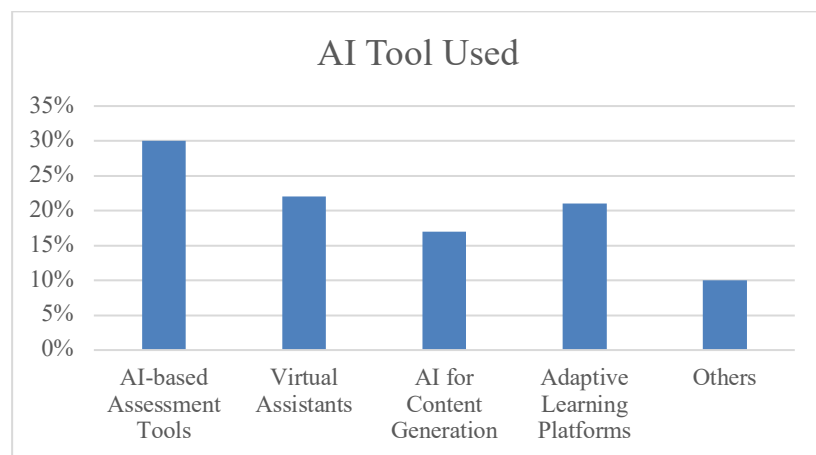
4.1 Quantitative Data Analysis

A total of 150 survey responses were received from teachers across various educational institutions. The data was processed using SPSS, and analysis was done using descriptive statistics (frequency, percentage, mean) and inferential statistics (T-test and ANOVA).

Table 1 presents the distribution of AI tool usage among the 150 surveyed educators. The table highlights the frequency and percentage of participants using different categories of AI-driven teaching aids, including assessment tools, virtual assistants, content generation tools, adaptive learning platforms, and other technologies. This quantitative data provides an overview of current AI integration trends within educational settings.

**Figure 1**

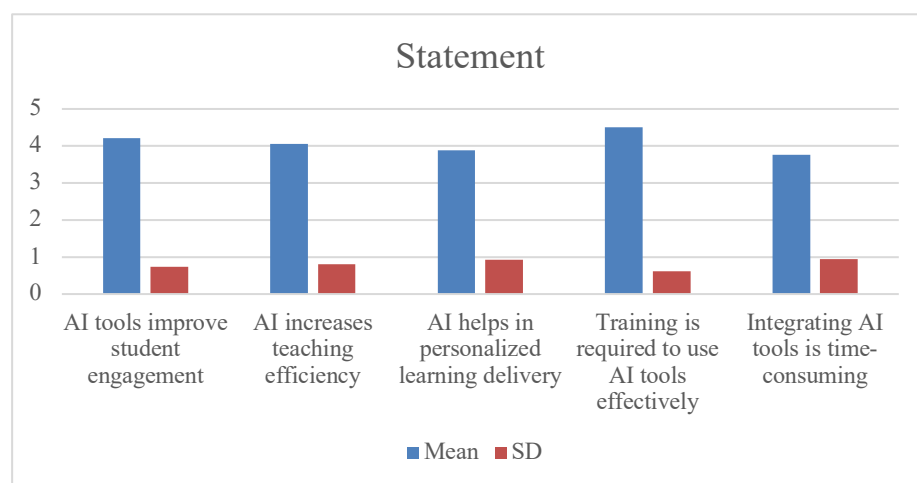
Graphical representation on Frequency and Percentage of AI Tool Usage in Teaching



The data reveals that AI-based assessment tools are the most widely used, with 30% of respondents incorporating them into their teaching practices. This reflects a growing reliance on automated grading and feedback systems to enhance efficiency. Virtual assistants and adaptive learning platforms are also prominent, used by 22% and 21% of participants respectively, indicating their effectiveness in personalizing instruction and managing classroom interactions. AI tools for content generation were used by 17%, suggesting a moderate interest in leveraging AI for lesson planning and material creation. The remaining 10% fall under the 'Others' category, which may include niche or institution-specific tools. Overall, the table shows a diverse adoption of AI technologies, with assessment-related applications leading the trend.

Figure 2

Graphical Representation on Mean Perception Scores of AI Impact on Teaching (Likert Scale 1-5)





The highest mean score (4.50) was recorded for the statement "Training is required to use AI tools effectively," indicating a strong consensus among teachers that professional development is essential for successful AI integration. "AI tools improve student engagement" (mean = 4.21) and "AI increases teaching efficiency" (mean = 4.05) also received high ratings, suggesting widespread agreement on the benefits of AI in enhancing interactivity and productivity in classrooms.

4.2 Qualitative Data Analysis

Fifteen semi-structured interviews were transcribed and analyzed using thematic analysis. NVivo software was used to code and group responses into key themes.

Key Emerging Themes:

1. Lack of Training and Digital Literacy

- Many participants emphasized the absence of structured training programs for AI integration.
- *"Teachers are expected to use these tools without understanding how they work."*

2. Infrastructure and Access Barriers

- Poor internet connectivity and lack of institutional support were major hurdles.
- *"In rural areas, it's a dream to even have basic projectors, let alone AI platforms."*

3. AI as a Support, Not a Replacement

- Respondents largely saw AI as an assistive tool, not a teacher replacement.
- *"It can handle repetitive tasks, but human presence is irreplaceable."*

4. Student Motivation and Engagement

- Positive feedback regarding improved attention spans and student motivation.
- *"Students seem more excited when AI elements are added to lessons."*

4.3 Integration of Quantitative and Qualitative Insights

The survey data aligns with the interview findings in recognizing AI's potential to improve engagement and efficiency while also emphasizing the need for training and infrastructural support. While the majority of teachers have a positive outlook, barriers such as technical skills, institutional readiness, and time constraints must be addressed for broader adoption.

5. DISCUSSION

The findings of this study highlight the evolving role of AI tools in enhancing teaching-learning practices, as well as the complexities educators face during integration. Quantitative data reveals that AI-based assessment tools are the most commonly used, reflecting educators' preference for tools that automate evaluation and feedback processes. Virtual assistants and adaptive learning platforms also



show considerable usage, suggesting that personalization and interactive learning are becoming central in modern classrooms. However, tools for content generation and others are used less frequently, pointing toward a cautious and need-based adoption of AI technologies.

Perception scores indicate an overall positive outlook among educators. Teachers largely agree that AI improves student engagement and teaching efficiency, and acknowledge its potential for personalized learning. Yet, the highest agreement was seen in the need for proper training, indicating that while AI is viewed favorably, a significant skills gap persists. The concern over the time-consuming nature of AI integration further reflects practical limitations that may affect adoption rates, particularly among educators with heavier workloads or limited technical support.

6. CONCLUSION

The findings indicate that institutional type and teaching experience influence perception, with college educators and less experienced teachers demonstrating greater receptivity to AI's benefits. Nevertheless, a common concern across all groups is the need for adequate training and support. Qualitative insights affirm that teachers value AI as a supportive tool rather than a replacement, and highlight the motivational impact of AI on students. For broader and more effective adoption, it is essential that educational institutions prioritize professional development programs, improve infrastructure, and promote policies that support sustainable AI integration while preserving the central role of the teacher in the learning process.

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