

Artificial Intelligence in Education: Enhancing Usability and Adoption Among Educators in Digital Classrooms

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Abstract

The use of Artificial Intelligence (AI) in education has changed digital learning environments. It provides new tools to improve teaching and boost student engagement. However, even with more AI-enabled technologies available, not all educators are using them equally. This uneven adoption is mainly due to problems with usability, accessibility, and digital readiness. This study addresses the critical gap between the potential of AI in education and its practical utilization by educators in digital classrooms. The primary objective of this research is to examine the factors influencing the usability and adoption of AI tools among educators and to explore strategies for enhancing their effective integration into teaching practices. The study uses a descriptive and exploratory research design. It relies on secondary data gathered from academic journals, industry reports, and policy documents. A thematic analysis method is used to find key patterns related to AI usability, educator acceptance, and barriers to implementation. The findings show that AI technologies like intelligent tutoring systems, automated assessment tools, and virtual assistants can greatly improve instructional efficiency. However, their adoption is blocked by issues such as technical complexity, lack of training, data privacy concerns, and limited support from institutions. The study further highlights that user-friendly design, professional development initiatives, and policy-level interventions play a crucial role in enhancing AI adoption among educators. This research contributes to the existing literature by emphasizing a human-centric approach to AI integration in education, focusing on simplifying technology to align with educators' needs and capabilities. The study offers actionable insights for policymakers, educational institutions, and technology developers to create AI systems that are inclusive and accessible. Ultimately, fostering usability and trust in AI can accelerate its adoption, enabling educators to fully leverage its potential in creating effective and engaging digital learning environments.

Keywords: Artificial intelligence (AI) in education, AI adoption, usability of AI systems, digital classrooms, AI systems, educational technology (EdTech)

INTRODUCTION

Artificial Intelligence (AI) is the ability of machines to act like humans by learning, reasoning, and making decisions. It is changing the education sector very quickly. In the context of education, AI enhances teaching and learning processes through personalization, automation, and data-driven insights, making classrooms more adaptive, efficient, and student-centered. AI-powered tools such as personalized learning platforms, automated grading systems, virtual assistants, and predictive analytics help improve instructional effectiveness and student outcomes by catering to individual learning needs and providing real-time feedback [1].

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Even though AI has a lot of potential, not many teachers are using it yet. This gap is largely influenced by challenges such as lack of training,

low digital literacy, technical complexity, resistance to change, and concerns related to data privacy. A key factor affecting adoption is the usability of AI systems. Many educators find these tools difficult to understand and integrate into their existing teaching practices, which reduces their willingness to use them effectively. Therefore, adopting a human-centric approach to AI design becomes essential, ensuring that these technologies are user-friendly and aligned with the skills and needs of educators [2].

AI offers significant advantages by automating routine administrative tasks, assisting in lesson planning, and providing insights based on student performance data. This lets teachers spend more time on creative and interactive parts of teaching. Additionally, AI enhances student engagement through personalized learning experiences, adaptive assessments, and continuous feedback, thereby supporting diverse learning styles and improving overall learning outcomes [3].

For AI to be successfully used in schools, the schools themselves must also be ready. This means having access to the right technology, having supportive leaders, and having ongoing professional development. The National Education Policy 2020 (NEP [4] 2020) in India emphasizes the integration of AI and other emerging technologies to promote innovation and digital competencies. Hence, improving usability, accessibility, and training is crucial for increasing AI adoption and realizing its full potential in building an inclusive and future-ready education system [5].

AI in India: From vision to impact

India is rapidly transforming its AI vision into measurable impact through policy initiatives, educational reforms, and digital infrastructure development.

National Education Policy 2020 on AI

The NEP knows that AI, big data, and machine learning will change the job market a lot and encourage new ideas. It highlights the need for students to learn AI, computer science, and data science as part of a multidisciplinary approach. The policy aims to prepare youth with relevant skills for better economic opportunities. Since education falls under the Concurrent List, (NEP [4] 2020) guides both central and state policies, supporting India's goal of becoming a global leader in AI (Figure 1).

AI initiatives in school education

The Ministry of Education has incorporated Artificial Intelligence into school education across India in alignment with the National Education Policy (NEP [4] 2020) and the National Curriculum Framework (NCF), primarily through CBSE and NCERT initiatives [6]. At present, CBSE provides a 15-hour AI skill module beginning from Class VI and also offers AI as an optional subject for students in Classes IX to XII. Additionally, NCERT has included AI-related content in Class XI Computer Science and Informatics Practices textbooks and has utilized AI/ML technologies to translate Grade 1–2 textbooks into 22 Indian languages (Figure 2).

AI courses for students and educators

- *DIKSHA platform:* DIKSHA (Digital Infrastructure for Knowledge Sharing), an initiative of the Ministry of Education, leverages AI to promote inclusivity through features such as AI-enabled keyword search in videos and a read-aloud function for visually impaired learners. The DIKSHA mobile app is accessible to teachers, students, and parents, and offers engaging learning resources aligned with the prescribed school curriculum [7].
- *SOAR initiatives:* The Ministry of Skill Development and Entrepreneurship has introduced SOAR (Skilling for AI Readiness) to enhance AI awareness and skills among students from Classes VI to XII as well as educators. The program comprises three 15-hour modules for students and a 45-hour “AI for Educators” module designed for teachers (Figure 3).
- *SWAYAM platform:* The Ministry of Education's SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) provides over 110 free AI courses from institutions like Indian Institutes of Technology and Indian Institute of Science, with more than 41.2 lakh students enrolled.

NEP 2020: Climbing To AI Excellence



Figure 1. NEP 2020: Climbing to AI Excellence—Strategic Objectives for India's AI-Driven Educational Transformation.

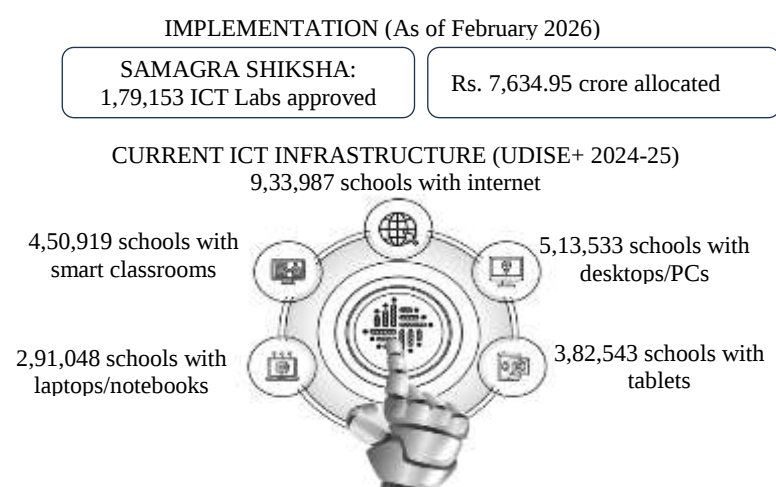


Figure 2. Implementation Status and ICT Infrastructure Development in Indian Schools (UDISE+ 2024-25).

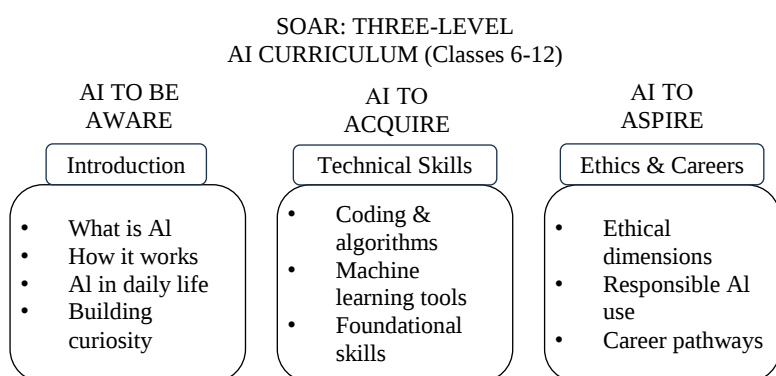


Figure 3. SOAR Three-Level AI Curriculum Framework for Classes 6-12.

AI in Higher Education

- *University Grants Commission (UGC):* The 2022 undergraduate curriculum incorporates subjects such as Artificial Intelligence, 3D machining, big data analytics, machine learning, drone technology, and deep learning, along with their applications in areas like healthcare, environmental sustainability, and sustainable living (Figure 4).
- *All India Council for Technical Education (AICTE):*
 - Integrated AI elements across all IT-related courses
 - Organizes hackathons to enhance AI awareness
 - Provides scholarships for women in engineering (PRAGATI, Saraswati)
 - Conducts faculty development programs

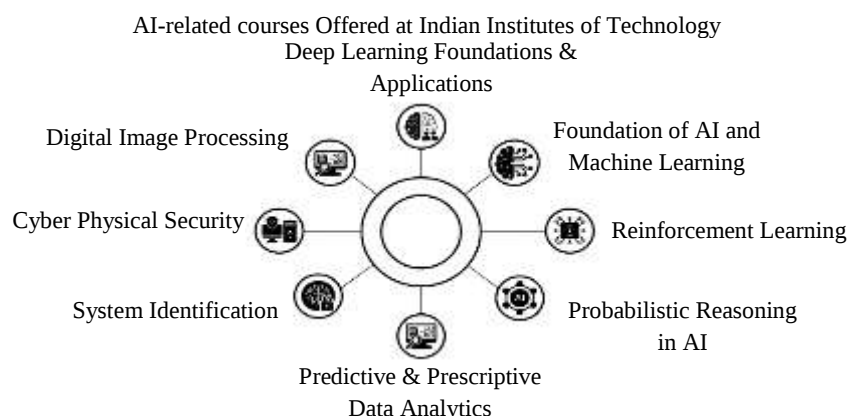


Figure 4. AI-related courses offered at Indian institutes of technology (IITs).

Data and images sources: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2234853®=3&lang=1>

- *Level of AI adoption among teachers:* The adoption of artificial intelligence among teachers is steadily increasing, with a majority using AI tools for classroom instruction and educational support. However, variations in usage frequency indicate the need for continued professional development and training to promote more widespread and effective integration of AI in teaching practices.
- *Moderate Adoption with Predominant Use of Basic Tools:* Most teachers have adopted basic digital technologies (e.g., LMS platforms, online teaching tools), but the use of advanced AI applications such as intelligent tutoring systems and predictive analytics remains limited. This indicates that AI adoption is still at a developing stage rather than fully integrated [8].
- *Variation Based on Digital Literacy and Skill Levels:* The level of AI adoption varies significantly depending on teachers' digital competencies. Educators with higher technical skills and exposure to technology are more likely to experiment with and adopt AI tools, while others show resistance due to lack of confidence and training [9].
- *Institutional Support Influences Adoption Levels:* Teachers working in institutions with strong digital infrastructure, training programs, and leadership support demonstrate higher AI adoption. Conversely, lack of institutional encouragement and resources leads to lower engagement with AI technologies [10].
- *Subject and Discipline-Based Differences:* AI adoption differs across academic disciplines. Teachers in STEM and technical fields are generally more inclined to use AI tools compared to those in humanities and social sciences, where integration is relatively slower [11].
- *Gap Between Awareness and Actual Usage:* Although awareness about AI in education is increasing, there is a noticeable gap between knowing about AI tools and actually using them in teaching practices. Many educators recognize the benefits of AI but hesitate to implement it due to usability issues and perceived complexity.

Impact on teaching efficiency and student engagement

Artificial intelligence enhances teaching efficiency by automating routine tasks, supporting lesson planning, and providing personalized learning resources.

Automation of Administrative Tasks Improves Teaching Efficiency

AI tools simplify routine tasks such as grading, attendance management, and report preparation. This helps reduce teachers' workload, enabling them to devote more time to effective teaching and meaningful student engagement.

Personalized Learning Improves Student Engagement

AI-powered systems offer personalized learning pathways tailored to each student's needs, pace, and performance. This personalization increases student interest, participation, and retention.

Data-Driven Insights Support Better Teaching Decisions

AI enables educators to analyze student performance data in real time, helping them identify learning gaps and adapt teaching strategies. This leads to more effective and targeted instruction, improving overall teaching efficiency.

Real-Time Feedback Enhances Learning Outcomes

AI-powered tools provide instant feedback to students on assignments and assessments. This ongoing feedback cycle maintains student engagement and supports faster improvement.

Interactive and Adaptive Learning Environments Increase Engagement

AI supports the creation of interactive digital classrooms through simulations, chatbots, and adaptive content. These technologies make learning more engaging, dynamic, and student-centered [12].

- *Challenges and usability issues of AI tools:* Despite their growing adoption, AI tools face challenges related to accuracy, data privacy, technical complexity, and integration with existing educational systems. Limited digital skills, insufficient training, and concerns about reliability and ethical use can also affect the effective utilization of AI technologies by educators and students.

Lack of Professional Training and Skill Development

One of the key challenges is the lack of well-structured training programs for educators. Many teachers are not adequately trained to understand or implement AI tools, leading to low confidence and hesitation in using such technologies effectively.

Technical Complexity of AI Systems

AI tools are often perceived as complex and difficult to operate, especially for non-technical educators. The use of advanced algorithms, data interpretation, and system configurations creates a barrier, making teachers reluctant to integrate AI into their teaching practices.

Limited Digital Literacy Among Educators

A considerable number of educators lack advanced digital skills, which are essential for using AI tools. This digital divide results in uneven adoption, where only technologically proficient teachers actively engage with AI, while others struggle to keep pace.

Lack of Awareness and Understanding of AI Capabilities

Many educators are not fully aware of how AI can be applied in education or how it can enhance teaching efficiency and student engagement. This lack of awareness limits experimentation and reduces the motivation to adopt AI tools.

Time Constraints and Workload Pressure

Teachers frequently experience heavy workloads, which limits the time available for them to learn and adapt to new AI technologies. As a result, the effort needed to understand and implement these tools is often viewed as an added burden rather than a supportive aid.

Resistance to Change and Fear of Technology

Some educators exhibit resistance to adopting new technologies due to fear of failure, uncertainty, or perceived threats to their traditional teaching roles. This psychological barrier slows down AI adoption.

Inadequate Institutional Support

The absence of continuous technical support, training infrastructure, and encouragement from institutions further discourages educators. In the absence of adequate guidance and resources, teachers

struggle to adopt and consistently use AI tools [13].

LITERATURE REVIEW

Wang et al [10] (2024) conducted a comprehensive review and found that AI is widely used for adaptive learning, intelligent tutoring, and analytics, but effective implementation depends on usability and accessibility.

Mustafa [3] (2024) highlighted that AI applications are primarily designed to support teachers and students, with less focus on administrators, indicating a need for broader integration strategies.

Bond [14] (2024) emphasized that AI enables data-driven decision-making, including predicting student performance and improving retention, thereby enhancing institutional effectiveness.

Teacher training and professional development significantly influence AI adoption, with a strong link between digital skills and the effective use of AI tools.

AI has the potential to significantly enhance the quality of higher education by improving research efficiency, fostering innovation, and strengthening industry-academia collaboration. AI-driven education systems can create a more dynamic and skill-oriented learning environment.

Arpan Tulsyan [15] (2025) argued that AI can address India's learning crisis by enabling personalized learning and improving educational equity at scale. He emphasized that AI technologies can help bridge gaps in access and quality, particularly in large and diverse education systems like India.

Kuldeep Sharma and Rachana [4] (2025) explored the opportunities and challenges of AI from the perspective of educational stakeholders. Their study found that while AI enhances teaching efficiency and learning outcomes, its adoption is constrained by lack of training, infrastructure limitations, and usability challenges.

A study on the impact of AI on the Indian education system highlighted that AI can automate routine tasks, personalize learning, and address issues such as teacher shortages and accessibility. However, it also emphasized challenges related to digital readiness and teacher preparedness.

UNESCO [11] (2023–2025) emphasized that AI can address key challenges in education, promote inclusive learning, and accelerate progress toward quality education. At the same time, it highlighted risks related to ethics, data privacy, and unequal access, stressing the need for responsible AI implementation.

OBJECTIVES

- To study the role and the adoption of Artificial Intelligence (AI) tools among educators in digital classroom environments.
- To examine the current level of AI adoption among educators and assess the impact of digital literacy and institutional readiness on its effective integration.
- To identify and evaluate the key challenges hindering AI adoption in education.
- To assess the impact of AI-enabled tools on teaching efficiency and student engagement in contemporary digital learning environments.
- To propose a human-centric framework for improving the usability, accessibility, and acceptance of AI technologies among educators.

RESEARCH METHODOLOGY

This study adopts a comprehensive descriptive and analytical research design to systematically evaluate the adoption, usability, and effectiveness of Artificial Intelligence (AI) in education. It integrates structured data analysis to identify patterns, assess user experiences, and generate meaningful insights into the practical implementation of AI in educational settings. The research focuses on understanding patterns, challenges, and influencing factors affecting AI adoption among

educators in digital classrooms.

Data Collection Method

The study relies exclusively on secondary data gathered from credible and reliable sources, including:

- Government reports and policy documents (such as the National Education Policy [5] 2020)
- Reports from international and national organizations (UNESCO, World Bank, etc.)
- Educational technology reports and surveys
- Online academic databases (Google Scholar, ResearchGate, Scopus-indexed journals)

Scope of the Study

- AI adoption among educators in digital classroom environments
- Usability of AI tools and its impact on adoption
- Challenges faced by educators and institutional readiness
- Policy initiatives influencing AI integration in education

DATA ANALYSIS AND INTERPRETATION

- *Interpretation:* AI adoption among teachers is increasing, but it remains uneven, with a large proportion still in the initial or exploratory stages of usage (Table 1). While awareness and occasional use are relatively high, consistent and advanced integration of AI tools in teaching practices is still limited. This indicates a clear gap between availability and effective utilization, highlighting the need for improved training, usability, and institutional support (Figure 5).
- *Interpretation:* The data indicates that teachers primarily use AI for supportive and time-saving tasks such as lesson planning and content creation rather than core instructional activities (Table 2). This suggests that AI is functioning more as an assistive tool than a transformative element in pedagogy. The limited use in areas like assessment and personalization highlights the need for deeper integration of AI into teaching and learning processes (Figure 6).
- *Interpretation:* The data shows that AI adoption is relatively higher among high school and K–12 teachers compared to elementary educators, indicating greater exposure and applicability at advanced levels. However, regular usage among higher education faculty remains comparatively low, suggesting gaps in consistent integration. Overall, adoption declines at lower levels due to factors such as limited digital readiness, training, and suitability of AI tools for younger learners (Table 3) (Figure 7).
- *Interpretation:* The data indicates that AI significantly enhances teaching practices, with a majority of educators reporting improved instructional methods and efficiency. High levels of student engagement suggest that AI-driven personalization and interactive tools positively influence learning experiences. Despite these benefits, the overall adoption remains partial, indicating untapped potential that can be realized through wider and more effective implementation (Table 4) (Figure 8).
- *Interpretation:* A significant number of educators lack familiarity with AI, affecting their confidence and adoption. Concerns about plagiarism and reduced human interaction further hinder its use. Overall, skill gaps and ethical issues remain key barriers, highlighting the need for training and clear guidelines (Table 5) (Figure 9).

Table 1. AI adoption among teachers (global data).

Indicator	Percentage (%)	Interpretation
Teachers using AI in classrooms	60%	Majority adoption but not universal
Teachers using AI weekly	32%	Regular but limited active usage
Teachers not using AI at all	35–40%	Significant non-adoption gap
Teachers using AI tools at least once	68%	Awareness is high but usage varies
Teachers using AI daily	22%	Advanced adoption still low

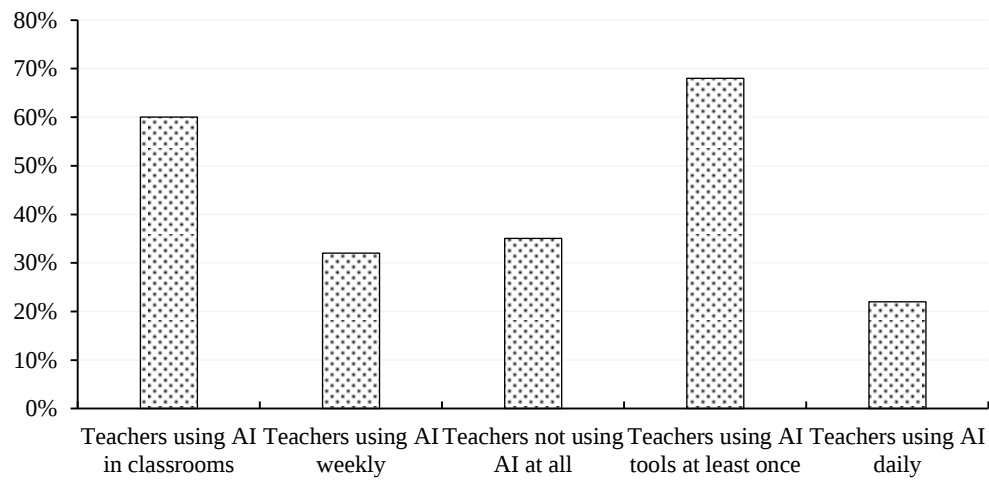


Figure 5. AI adoption among teachers in educational settings.

Table 2. AI usage by purpose (among teachers).

AI Application Area	Usage (%)
Lesson planning	37%
Worksheet creation	33%
Content personalization	28%
Administrative tasks	28%
Assessment creation	25%

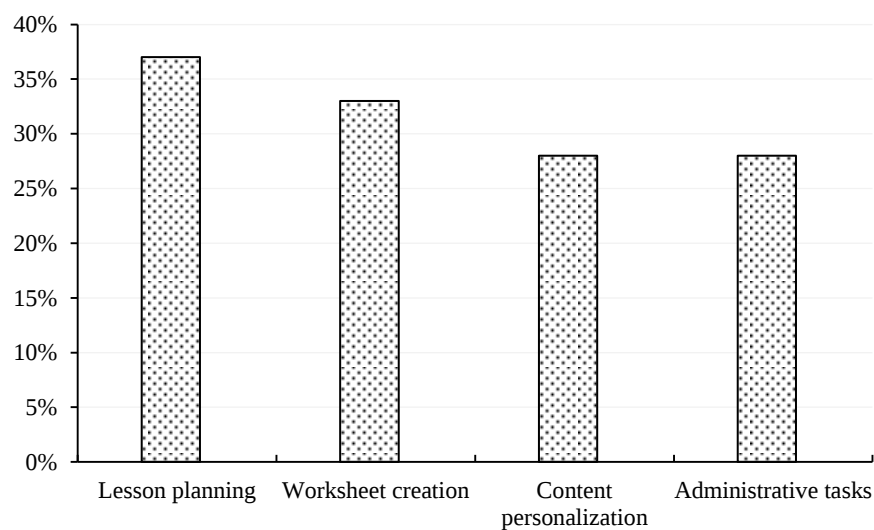


Figure 6. AI usage by purpose.

Table 3. Adoption variation across education levels.

Category	AI Usage (%)
K-12 teachers (general use)	72%
Higher education faculty (regular use)	22%
High school teachers	69%
Elementary teachers	42%

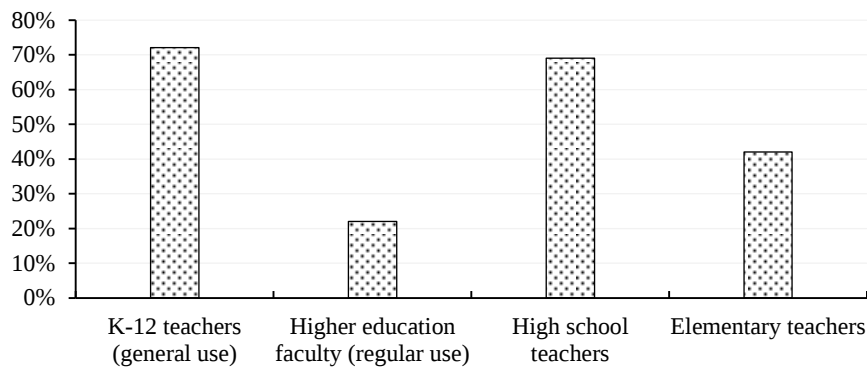


Figure 7. AI adoption across education levels (%).

Table 4. Impact on teaching & engagement.

Impact Area	Percentage (%)
Teachers reporting improved teaching methods	69%
Students reporting higher engagement	72%
Teachers experiencing reduced workload	68%

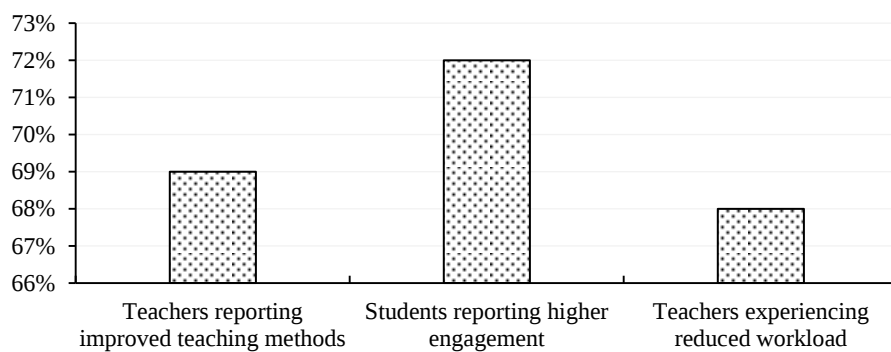


Figure 8. Impact on teaching and engagementt (%).

Table 5. Key gap indicators (adoption challenges).

Issue	Percentage (%)
Teachers concerned about plagiarism	65%
Teachers concerned about reduced interaction	62%
Teachers lacking strong AI familiarity	76%

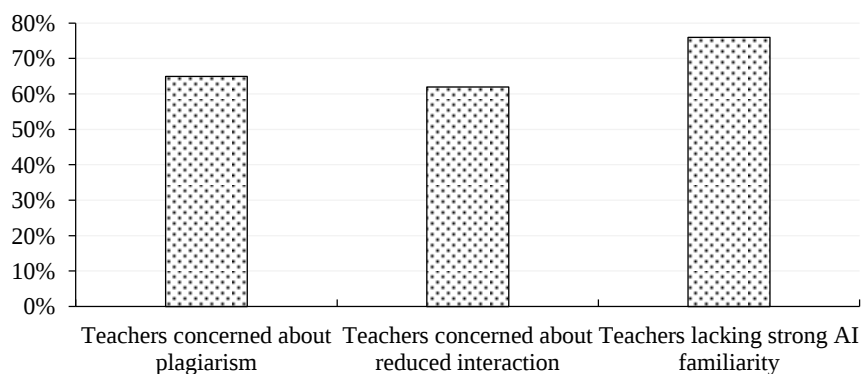


Figure 9. AI, affecting their confidence and adoption.

CONCLUSION

The present study, titled “Artificial Intelligence in Education: Enhancing Usability and Adoption Among Educators in Digital Classrooms,” demonstrates that AI has become a transformative force in contemporary education, with substantial potential to enhance teaching efficiency and foster greater student engagement. The analysis of secondary data reveals that while awareness and initial exposure to AI tools among educators are increasing, the level of adoption remains moderate and uneven across institutions and disciplines.

A key finding of the study is that usability plays a critical role in influencing AI adoption. Many educators face difficulties in using AI tools due to their complexity, lack of user-friendly interfaces, and insufficient customization to meet pedagogical needs. As a result, there exists a gap between the availability of AI technologies and their effective utilization in teaching practices.

The study also identifies several challenges faced by educators, including lack of training, limited digital literacy, time constraints, and resistance to change. These factors significantly affect educators’ confidence and willingness to integrate AI into their classrooms. Furthermore, the digital readiness of educational institutions varies widely, with institutions having better infrastructure and support systems demonstrating higher levels of AI adoption.

Despite these challenges, the study confirms that AI has a positive impact on teaching efficiency and student engagement. Automation of routine tasks, personalized learning, and real-time feedback mechanisms contribute to improved learning outcomes and more interactive classroom environments.

Government initiatives, particularly the National Education Policy 2020, have played a vital role in promoting digital transformation and encouraging the integration of AI in education. However, the effectiveness of such policies depends on their implementation at the institutional and educator levels.

Overall, the study concludes that while AI holds immense potential to revolutionize education, its successful adoption depends on enhancing usability, strengthening institutional support, and building educators’ capacity. A human-centric approach to AI design and implementation is essential to ensure that technology serves as an enabler rather than a barrier in education.

Suggestions

Enhance Training and Capacity Building

- Conduct regular training programs, workshops, and certifications for educators on AI tools
- Focus on practical, hands-on learning rather than theoretical knowledge
- Promote AI literacy and digital competence among teachers

Improve Usability of AI Tools

- Develop simple, user-friendly, and intuitive AI interfaces
- Design AI tools based on educators’ needs and teaching practices
- Encourage the adoption of human-centric and explainable AI systems

Strengthen Institutional Support

- Provide technical assistance and IT support teams in institutions
- Ensure access to adequate infrastructure such as internet, devices, and software
- Encourage leadership to promote technology-driven teaching culture

Integrate AI into Curriculum and Pedagogy

- Align AI tools with curriculum objectives and teaching strategies
- Encourage educators to use AI for personalized learning and assessment
- Promote blended learning models combining AI and traditional teaching

Promote Awareness and Positive Attitude

- Organize awareness programs to highlight benefits of AI in education
- Address concerns related to ethics, privacy, and job security
- Encourage peer learning and collaboration among educators

Strengthen Policy Implementation

- Ensure effective execution of policies like the National Education Policy 2020
- Increase investment in digital education initiatives and AI infrastructure
- Promote collaboration between government, academia, and industry

Encourage Research and Innovation

- Support research on AI usability and adoption in education
- Promote development of locally relevant AI tools
- Encourage pilot projects and case studies in educational institutions.

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