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Aparna Sakore
Department of BBA, Dr. D. Y. Patil Arts, Commerce & Science College, Pimpri, Pune, Maharashtra, India

Nisha Dhumak
Department of BBA, Dr. D. Y. Patil Arts, Commerce & Science College, Pimpri, Pune, Maharashtra, India

Corresponding Author:
Aparna Sakore
Department of BBA, Dr. D. Y. Patil Arts, Commerce & Science College, Pimpri, Pune, Maharashtra, India

Virtual tutors and beyond: Exploring the role of AI in personalised learning experiences

Aparna Sakore and Nisha Dhumak

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Abstract
Artificial Intelligence (AI) is steadily transforming the educational landscape, particularly through the advent virtual tutors. These tools are revolutionizing how students interact with content by offering learning experiences customized to individual needs. This paper explores how AI-driven tutors accommodates to students' learning styles, monitor their progress, and provide real-time feedback that enhances academic outcomes. Using methods like machine learning and natural language processing, these systems help maintain learner motivation and performance especially in digital and hybrid classrooms.
In addition to basic instruction, AI technologies are now capable of diagnosing learning gaps, forecasting student outcomes, and proposing targeted support. However, the increasing dependence on such tools raises several ethical questions. Data privacy, algorithmic fairness, and the retention of meaningful teacher-student interaction remain key concerns. This paper also considers how educators and AI can collaborate effectively, with AI handling repetitive tasks and offering valuable insights into student development. By reviewing current applications and challenges, we emphasize the importance of using AI ethically to ensure inclusive, adaptive, and high-quality education for heterogeneous learners.

Keywords: Artificial intelligence (AI), adaptive learning in education, online learning, digital education, academic performance, ethical issues in AI

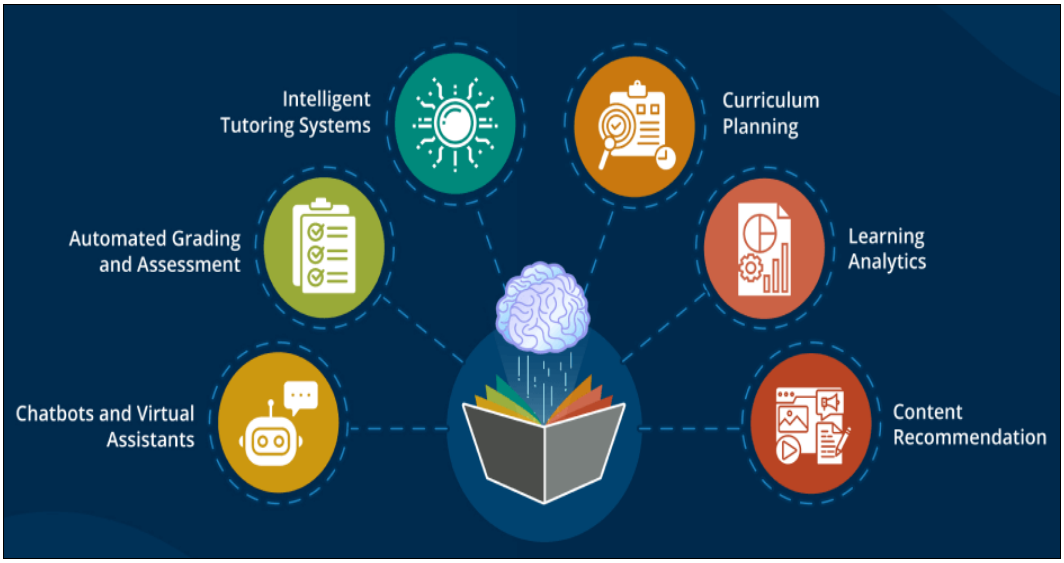
Introduction
The use of Artificial Intelligence (AI) in education is reshaping how students learn and how teachers teach. One of the most notable advances is the development of AI-powered virtual tutors. These tools are changing traditional approaches by offering learning experiences that can be adjusted to each student's individual needs. Unlike traditional approach, virtual tutors employ technologies like machine learning and natural language processing to grasp each student unique learning style and adjust accordingly as they advance.
This shift is especially important in online and hybrid classrooms, where keeping students engaged and meeting their specific needs is key to success. Virtual tutors can give instant feedback, spot areas where students are struggling, predict how they might perform, and suggest targeted strategies to help them improve. They also lighten the load for teachers by handling routine tasks and offering insights into how students are doing over time.
Nevertheless, integration into AI education, also raises up significant ethical and practical questions. Issues like safeguarding student information, avoiding bias in algorithm, and preserving genuine human engagement in the learning process need thoughtful consideration. This study examine how AI especially virtual tutors is growing presence in education. Investigate their contribution in individual learning, outline the ethical dilemmas they present, and emphasize the need for continued educator involvement to uphold equity and maintain high standard in teaching.

Future trends in AI-enhanced education
As artificial intelligence continues to advance, its role in education is becoming more dynamic, personalized, and far-reaching. Here are five developments that highlight how AI-powered virtual tutors are shaping a more student cantered future in education:

1. Emotional sensitive AI Tutors
Future AI tools in education will be able to recognize and respond to students' emotions such as confusion, frustration, or excitement using affective computing.

By interpreting these emotional cues, AI tutors can offer support that feels more human and compassionate, helping students stay engaged and motivated.

2. Personalized, instant Learning Paths: AI systems will increasingly use real-time data to customize learning experiences. These tools will adjust lesson plans, difficulty levels, and learning strategies based on a student's progress and goals making learning more effective and directly relevant to each individual.



3. Immersive, Multi-sensory Learning
With the blending of AI, augmented reality (AR), virtual reality (VR), and voice interaction, students will gain access to rich, interactive learning environments. This will be especially valuable in subjects like science, medicine, and engineering, where hands-on experience is crucial.

4. Teachers and AI as Partners: Rather than replacing educators, AI will serve as a supportive partner. It can handle routine tasks like grading or tracking performance, while also offering insights into student needs. This frees up teachers to focus more on mentoring, creativity, and building meaningful connections with students.

5. Transparent and Ethical Use of AI
As AI becomes a bigger part of education, ethical considerations will take center stage. Future AI tools will need to be transparent, protect student data, and ensure fair treatment for all learners making sure that the benefits of personalized learning are accessible and equitable.

6. Gamified and Goal-Oriented Learning Experiences
As AI tutors advance, game based learning technique will play a larger role in sustaining student interest. By in cooperating interactive elements such as reward systems, achievement tokens, and progress trackers, AI tutors can assist students stay motivated while also monitoring skill development. These elements customize motivation strategies and encourage consistent learning habits.

7. Emotionally Inclusive and Neurodiverse-Aware AI
AI systems are beginning to identify the vaired emotional and cognitive needs learners including students with attention disorders, autism, or learning difficulties. By utilize behavioral pattern and biometric cues, future AI tutors will be designed to accommodate neurodiverse students with personalized learning settings, pacing, and content delivery methods.

Objectives

1. To understand the basic principles of artificial intelligence used in education.
2. To find challenges faced by students and teachers while using virtual tutors.
3. To explore future innovations in AI that could modify learning experiences.
4. To analyse the advantages and limitations of incorporating AI into traditional and digital learning environments.

Scope of the study

This study explores how AI-powered virtual tutors can support more personalized learning experiences in both digital and blended classrooms. It looks at how these tools adapt to each learner's unique style, offer real-time feedback, and help track academic progress over time. The research also highlights how AI can work alongside educators to enhance teaching, rather than replace it. In addition, the study considers important ethical issues, including data privacy and fairness. The focus is specifically on educational settings such as K-12 schools, colleges and universities, and professional learning programs.

Limitations of the study

1. The study focuses exclusively on AI-powered virtual tutors and does not explore other educational uses of AI, such as support tasks or campus surveillance technology.
2. It does not address the computational aspects of AI development, such as software creation, calculation methods, or architecture.
3. The research is limited to structural education context, specifically K-12 and, and excludes tertiary institution nontraditional environments and business education.
4. Ethical considerations are discussed in broad terms, without extensive examination of legal system or policy models.

5. The study does not examine how geographical or financial disparities affect availability or adaption of AI technologies in education.

Literature Review

1. Personalized Learning and Student Adaptation

AI-driven virtual tutors are transforming education by adjusting to each student's learning style, pace, and progress. As Woolf explains, these systems use artificial intelligence techniques and live data to individual. Customized responses, as Inventado (2014) [1] points out, not only keeps students more interested but also leads to better educational performance. These adaptive systems support varied learning preferences and have been shown to improve information retention in virtual settings (Chen *et al.*, 2020) [10].

2. Improving Academic Success

One of AI's biggest advantages to education is its ability to deliver instant feedback and interactive material. This helps students stay engaged and focused and perform better academically. According to Luckin *et al.* (2016) [11], AI can pinpoint students' learning challenges early and suggest timely support measures, helping close knowledge gaps. Holmes *et al.* (2019) [12] add that this continuous review supports steady and increase academic development student motivation.

3. Assisting Educators and Promoting Teamwork

Rather than taking the place educators, AI is designed to function alongside them. Zawacki-Richter *et al.* (2019) [13] argue that AI tools help lighten teachers' administrative workload while offering valuable observation into student learning patterns. Fischer *et al.* (2020) [14] emphasize the importance of AI human cooperation, where AI handles routine duties like grading, allowing teachers to focus more on coaching and emotional care.2. Enhancing Academic Performance

4. Next Steps in AI Tutoring

Emerging AI technologies are aiming to become more emotion aware and engaging. D'Mello and Graesser (2012) [14] discuss systems that can detect students' emotional cues such as confusion or boredom and respond accordingly. Radianti *et al.* (2020) [15] envision combining AI with immersive tech reality to offer hands on learning experiences, especially valuable in technical and scientific fields.

5. Moral and Privacy Considerations

Despite its benefits, AI in education brings significant moral risks. Eynon (2020) warns that the inner mechanism of AI systems can be unclear, potentially reinforcing existing inequalities. Selwyn (2019) [16] raises concerns about the growing dependence on AI, suggesting it could diminsh the quality of human connections in learning. Both stress the need for accountable and transparent use of AI in classrooms.

6. Barriers to Implementation

While the promise of AI is compelling, its practical application remain inconsistent. As Luckin *et al.* (2016) [11] note, not all schools have the necessary digital infrastructure to support AI integration. Selwyn (2019) [16] further points out that many institutions lack proper ethical standards and adequate educator preparation additionally, over-automation could risk making students too reliant on technology, potentially weakening their analytical thinking.

Case Study: AI Tutor Use in Rural vs. Urban Maharashtra School: To offer a real-world perspective on the influence of AI tutors, a comparative case study was conducted in two secondary schools in Maharashtra: one situated in urban Pune and the other in the rural district of Nanded. Both schools utilized AI-based tutoring platforms concentrating on science and mathematics for a three-month pilot phase.

In Pune, students had access to personal digital devices, high-speed internet connectivity, and consistent teacher support. The AI platform employed daily and featured personalized lesson pacing, progress monitoring, and gamified evaluations feedback from both students and educators was highly positive, with an average test score improvement of 14% in mathematics.

In contrast, the rural school in Nanded faced infrastructure challenges such as limited internet access and device sharing. AI tools were accessible only during scheduled computer lab hours. However, the integration of Marathi-language support in the AI platform helped improve student engagement and understanding. The average score increase of 8%, despite irregular usage.

Table 1: Urban and rural schools differ in access, usage, language, performance, and challenges.

Criteria	Urban School (Pune)	Rural School (Nanded)
Device & Internet Access	High	Limited
AI Usage Frequency	Daily	Weekly/Lab-limited
Language Preference	English + Marathi	Marathi preferred
Test Score Improvement	+14%	+8%
Student Motivation	High	Moderate to High
Teacher Role	Monitoring + Data Use	Facilitator + Translator
Challenges	Need for emotional AI	Need for offline/localized tools

This case study demonstrated that while AI tutors can facilitate personalized learning in both contexts, equity in access, regional language support, and infrastructure investment are vital for rural adoption. Teachers remain pivotal to AI integration, particularly in resource-constrained environments where emotional and contextual understanding is still most effectively provided by humans.

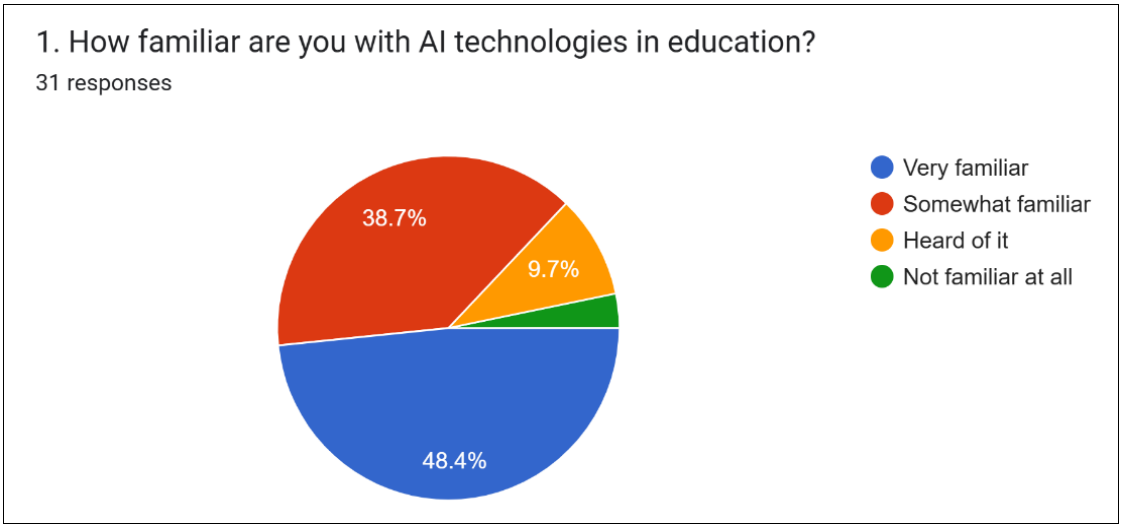
Research Methodology

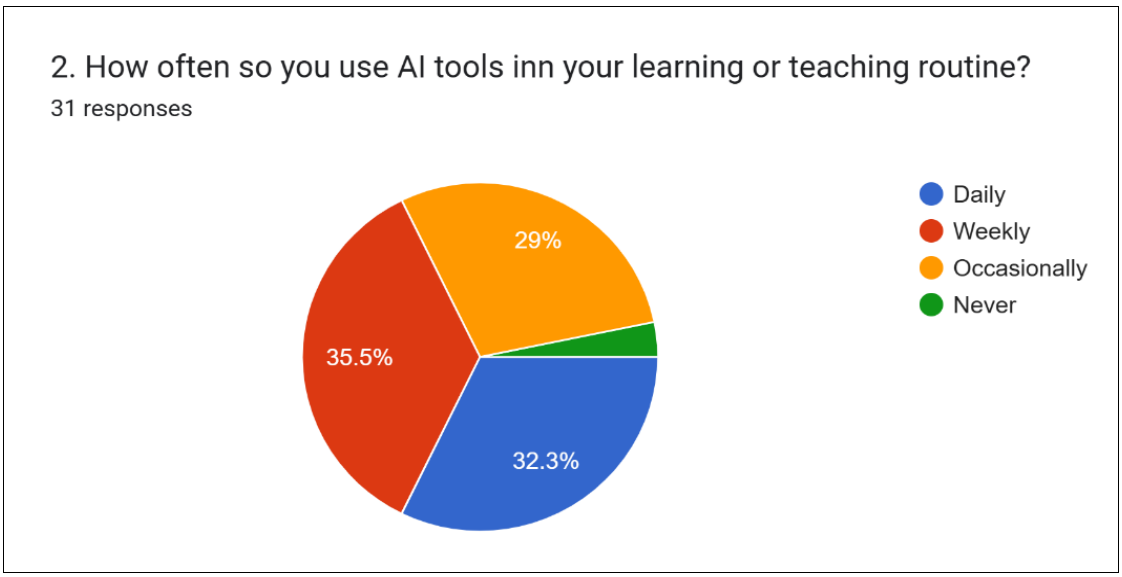
This study employs a descriptive approach, drawing from firsthand insights collected through structured questionnaires. The objective is to comprehend how AI-powered virtual tutors are shaping personalized learning experiences, especially within digital and blended classrooms. To ensure data relevance, responses were

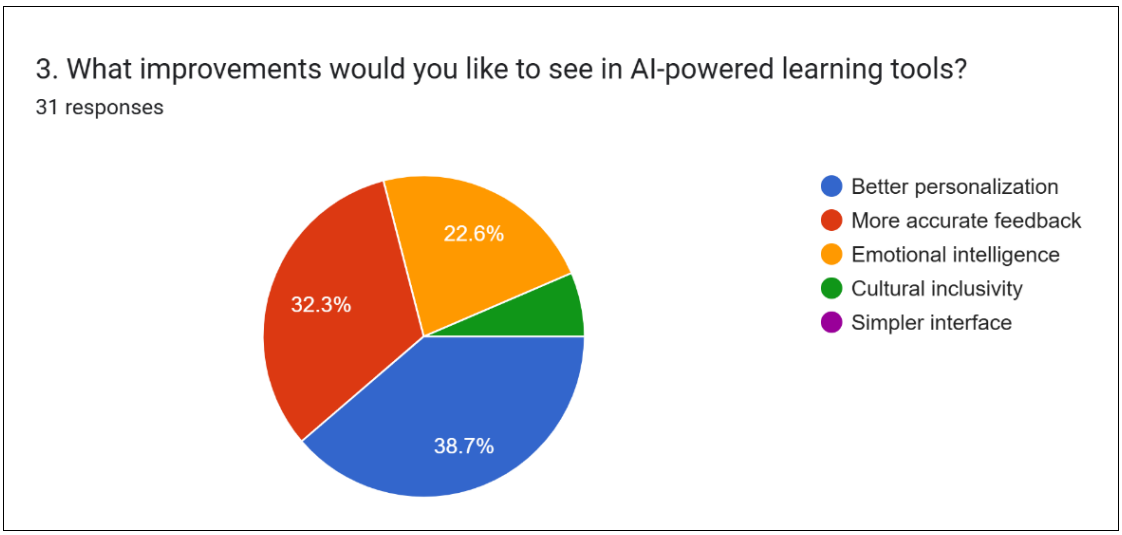
gathered form students and educators actively using AI tutoring platforms. Participants were purposively selected, and feedback was collected both online and face-to-face.

The questionnaire addressed aspects such as user engagement, learning outcomes, and any ethical considerations. To analyse the data, basic statistical techniques were utilized, examining correlations between different AI features and students' academic performance. Ethical standard were rigorously followed participation was voluntary, and privacy was strictly safeguarded.

Data Interpretation

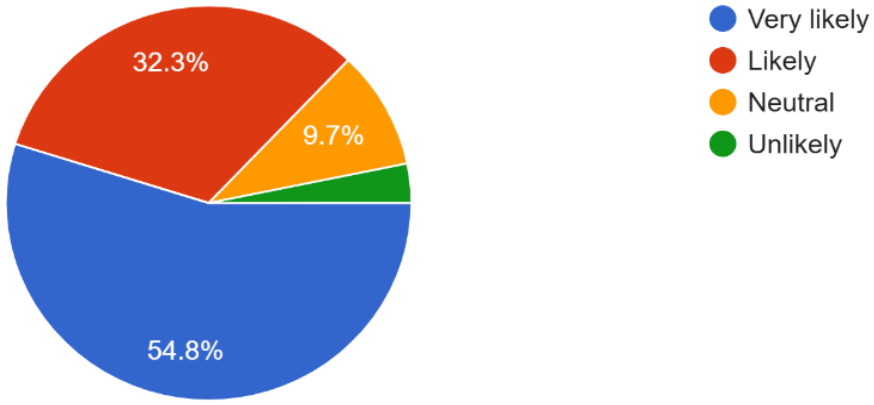






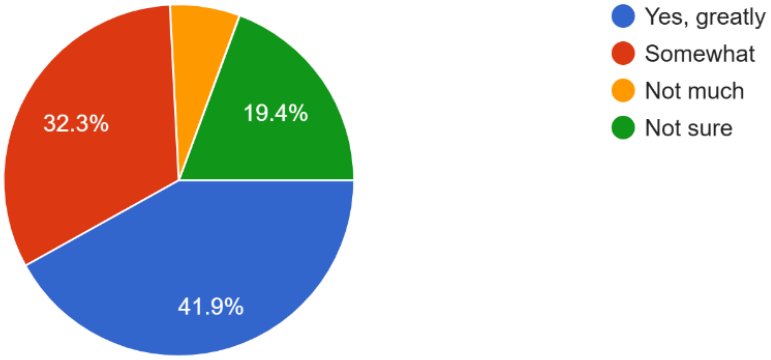
4. How likely are you to use more AI-based tools in the future?

31 responses



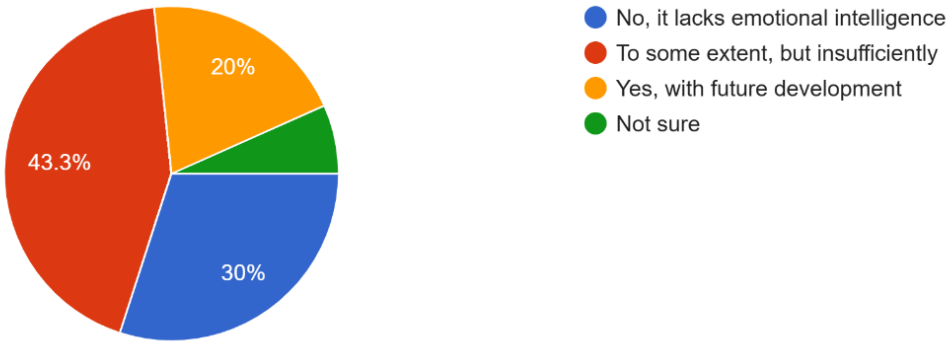
5. Do you think AI can help reduce the education gap for underserved communities?

31 responses



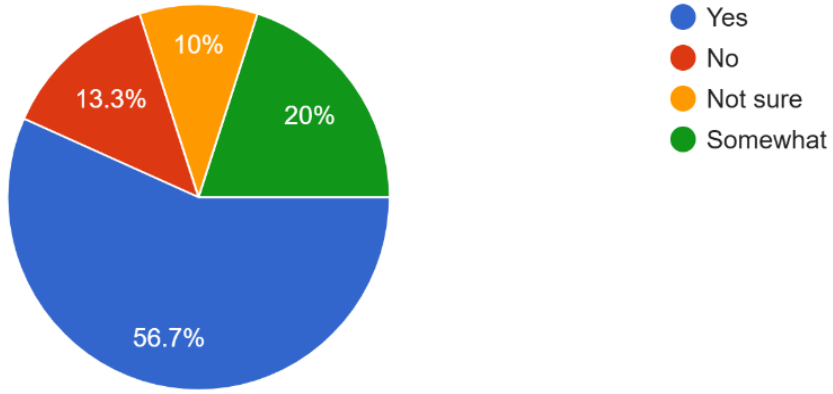
6. Can AI truly understand learner emotions and contexts like a human educator can?

30 responses



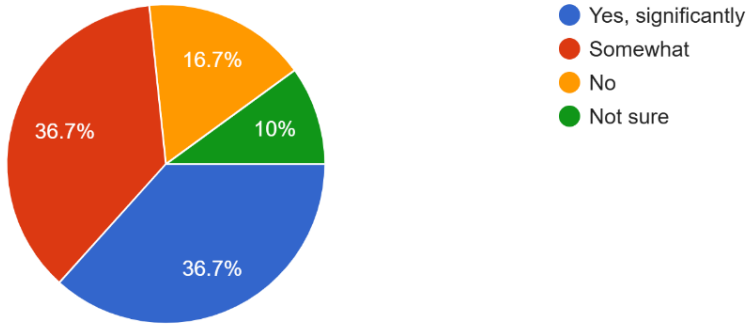
7. Do you think learners are at risk of becoming overly dependent on AI tools/

30 responses



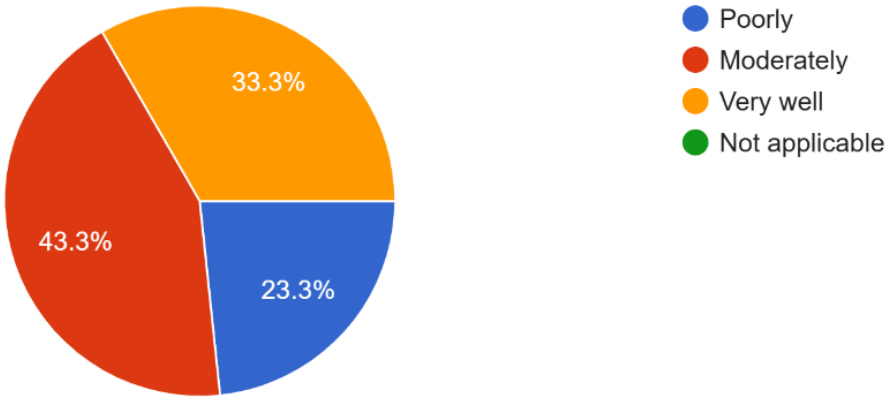
8. Does personalized learning through AI reduce opportunities for collaborative, social learning?

30 responses



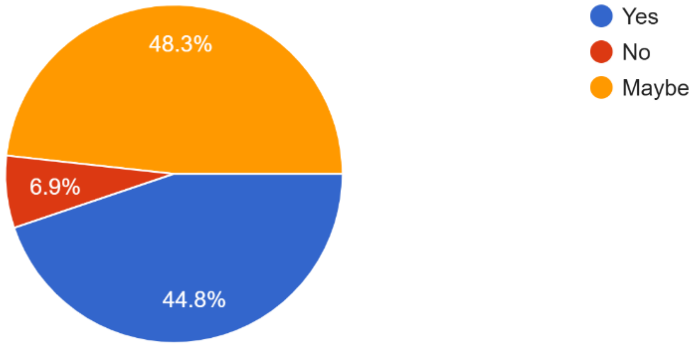
9. How well do AI tools support deep critical thinking and problem-solving?

30 responses



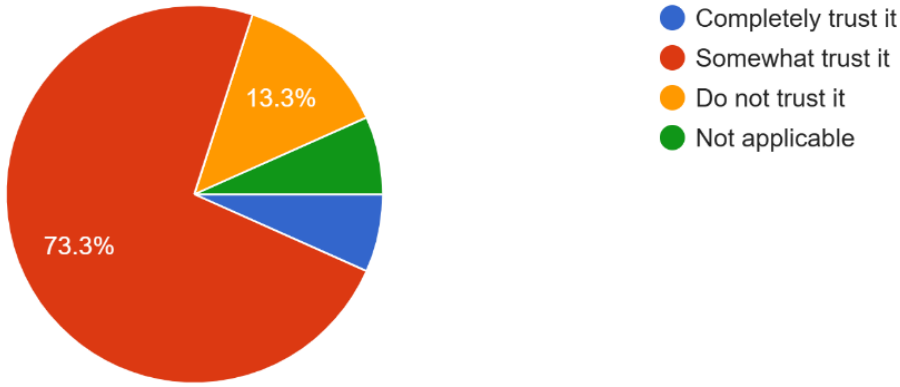
10. Do you anticipate AI becoming a central component of education in the next decade?

29 responses



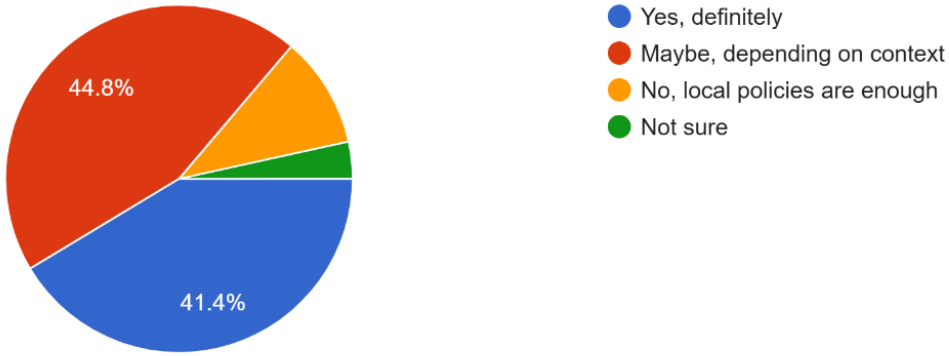
11. What is your level of trust in AI-generated feedback or grading?

30 responses



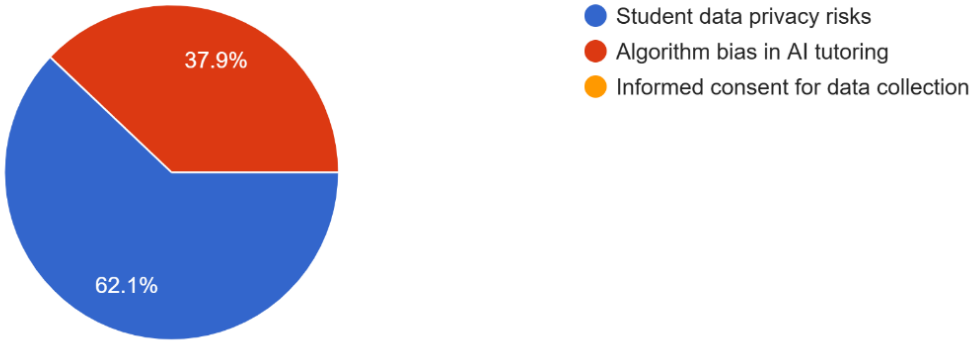
12. Should the use of AI in education be governed by international ethical standards?

29 responses



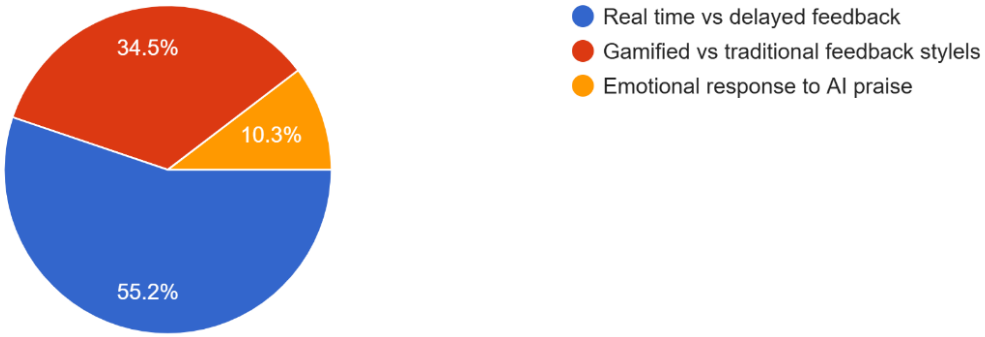
13. What are the ethical concerns of using AI in education?

29 responses



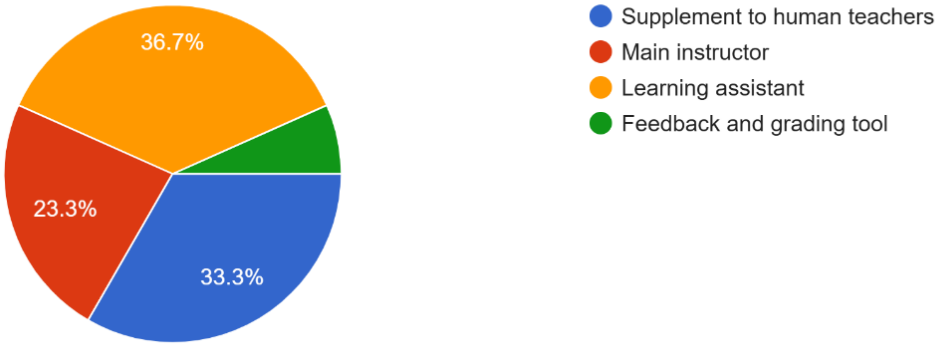
14. How does AI feedback affect student motivation?

29 responses



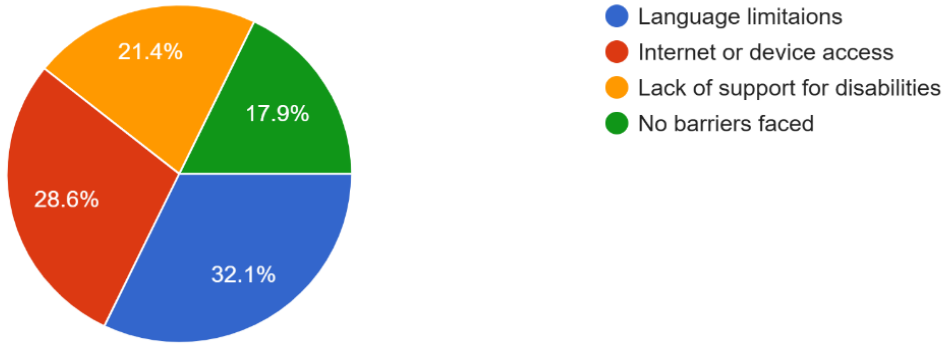
15. In your opinion, what is the ideal role of AI in the classroom?

30 responses



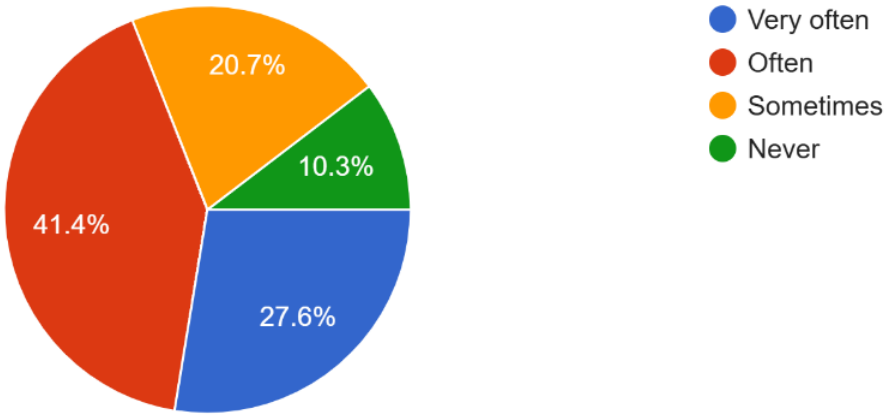
16. Have you faced any barriers while using an AI-based learning tool?

28 responses



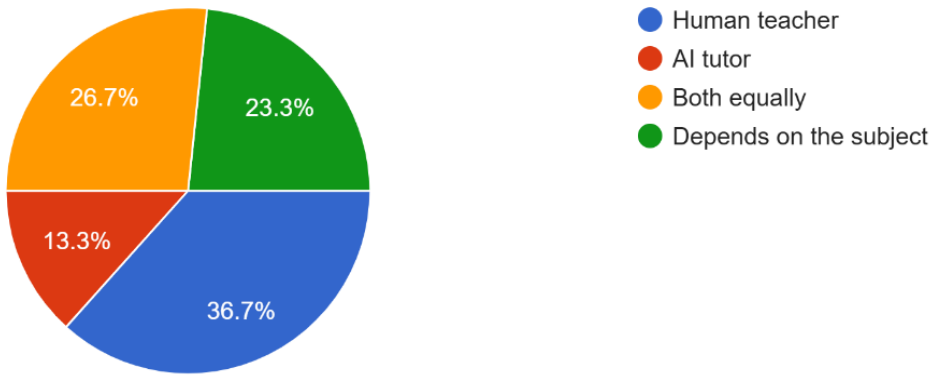
17. Do you feel the AI gives you choices in how or what to learn?

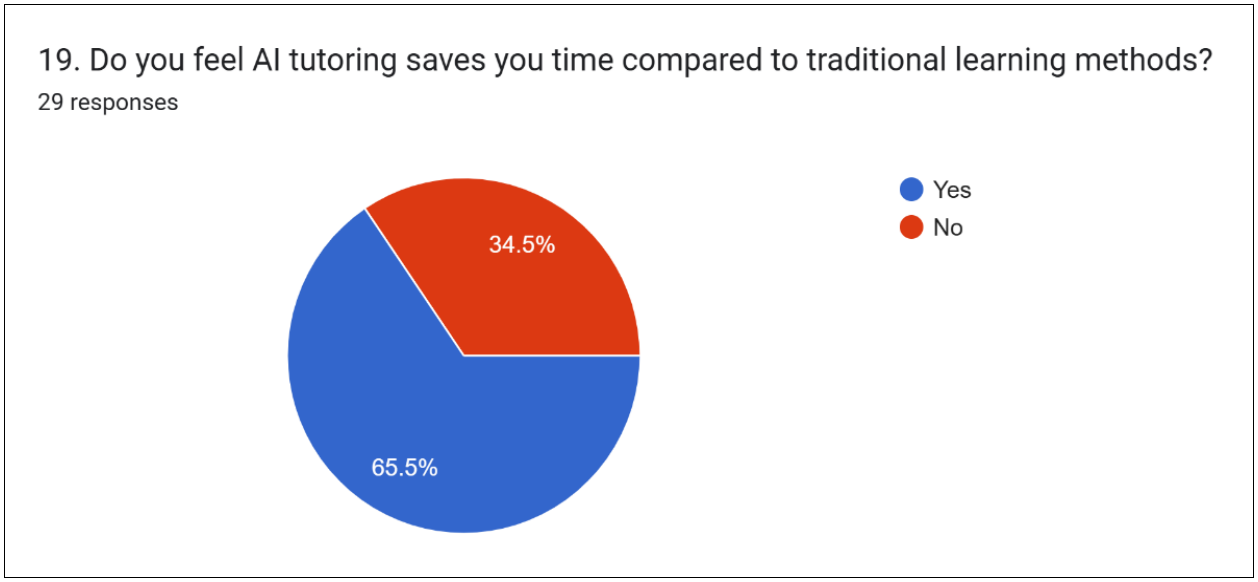
29 responses

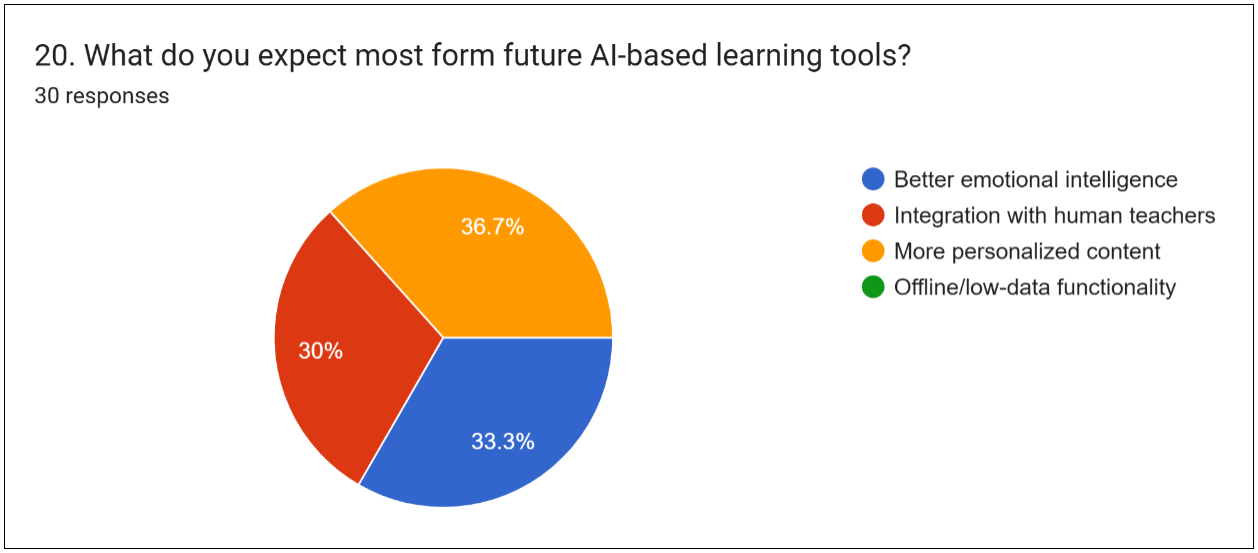


18. What do you prefer for learning complex topics?

30 responses







Results and Discussion

Survey Insights: Navigating AI's Role in Education

Recent survey results indicate that significant majority of participants approximately 87% are familiar with the application of AI in education. Many are already incorporating AI tools into their routines, with 32.3% using them daily and 35.5% weekly. This reflects an increasing dependence on AI as part of the teaching and learning process. Respondents expressed a clear demand for enhance AI tool features, particularly when it comes to individual education (38.7%) and more precise feedback (32.3%). Emotional awarness also emerged as a significant area where respondents hope to see progress.

Looking ahead, over half of the respondents (54.8%) said they are very likely to expand their use of AI tools. There is a strong belief among many (41.9%) that AI has the potential to minimize educational inequality. However, concerns persist especially around students becoming too reliant on these tools. In fact, 56.7% worry about overreliance, and a large majority (73.4%) only "somewhat trust" the feedback provided by AI, suggesting a cautious but hopeful attitude. Ethical reservation were also top of mind. Student data privacy (62.1%) and algorithmic bias (37.9%) were frequently mentioned, with 44.8% supporting the creation of international ethical standards for AI in education. While most respondents recognized the benefits particularly in saving time and supporting learning (65.5%) they still viewed human educators as essential, especially for complex subjects.

Overall, respondents saw AI not as a replacement, but as a complementary tool or assistant to teachers. Barriers such as language limitations and uneven internet access were noted, underscoring the need for more inclusive and adaptable AI systems.

Conclusion

This research underscores the revolutionary potential of AI-powered virtual tutors in shaping more customized, interactive, and effective learning environments. The integration of technologies such as machine learning, natural language processing, and affective computing has enabled AI tutors to tailor content delivery to individual learning preferences, deliver instant feedback, and promote academic progress across varied educational contexts.

The findings reveal that AI tools are increasingly being embraced, with students and teachers recognizing their advantages in terms of increased engagement, automation of routine tasks, and tailored instruction. However, this rising dependency is accompanied by legitimate concerns regarding data protection, algorithmic impartiality, and the

potential decline of meaningful interpersonal interaction in education.

The comparative case study between urban and rural schools in Maharashtra provides a real-world illustration of AI tutoring's impact. While both settings showed tangible academic gains, issues such as limited infrastructure, language needs, and digital access gaps were more pronounced in rural areas. This emphasizes the need for localized content, inclusive system design, and equitable resource allocation to ensure all students benefit from AI-enhanced learning.

Moreover, future directions highlight the rise of emotionally intelligent, neurodiversity-aware, and game-based learning models, where AI functions as a collaborative assistant rather than a replacement for educators. The ethical use of AI rooted in transparency, equality, and fair access must remain a top priority.

In summary, while AI tutors offer exceptional opportunities to personalize and upgrade learning, their effectiveness relies on strategic implementation, active teacher participation, and a deep commitment to responsible innovation. By addressing both the strengths and limitations of AI, education systems can move toward more inclusive, flexible, and high-caliber learning experiences for all learners.ss

References

1. Das A, Malaviya S. Adoption of adaptive learning based e-learning platforms among university students in Uttarakhand, India: A study. J Inform Educ Res. 2024;4(3):n.p.
2. Rathika P, Yamunadevi S, Ponni P, Parthipan V, Anju P; Hindusthan Institute of Technology. Developing an AI powered interactive virtual tutor for enhanced learning experiences. Int J Comput Exp Sci Eng. 2024. https://doi.org/10.22399/ijcesen.782
3. Dawkhar A, Chandekar A, Panchal N, Ghatte S. Beyond the blackboard: AI driven virtual tutors and the evolution of digital learning. Int J Sci Res Sci Eng Technol. 2025. https://doi.org/10.32628/IJSRSET25122204
4. Ghori AS. An analysis of AI intervention in education systems of India. Int J Intell Syst Appl Eng. 2023;11(3):1263-1276.
5. Sodur S, Singh H, Pol R, Kale M. A virtual tutor to enhance the solving skills of school children using performance evaluation and navigation system. In: ICT Analysis and Applications. Lecture Notes in Networks and Systems. Singapore: Springer; 2023. p. 117-125. https://doi.org/10.1007/978-981-19-5224-1_13
6. Goyal H, Garg G, Mordia P, Ramachandran V, Kumar D, Sesh Challa J. The impact of large language models on K-12 education in rural India: A thematic analysis of student volunteers' perspectives. arXiv. 2025.
7. Bardia A, Agrawal A. MindCraft: Revolutionizing education through AI powered personalized learning and mentorship for rural India. arXiv. 2025.
8. Gupta R, Goyal H, Kumar D, Mehra A, Sharma S, Mittal K, *et al*. Sakshm AI: Advancing AI assisted coding education for engineering students in India through Socratic tutoring and comprehensive feedback. arXiv. 2025.
9. Inventado P. Adaptive Learning through Artificial Intelligence. ResearchGate; 2025. Available from: https://www.researchgate.net/publication/372701884_Adaptive_Learning_through_Artificial_Intelligence
10. Chen X, Zhang Y, Xu Y. Artificial Intelligence in Education: Promise and Implications for Teaching and Learning. ResearchGate; 2025. Available from: https://www.researchgate.net/publication/332180327_Artificial_Intelligence_in_Education_Promise_and_Implications_for_Teaching_and_Learning
11. Luckin R, Holmes W, Griffiths M, Forcier LB. Intelligence Unleashed: An Argument for AI in Education. Pearson; 2016. Available from: https://edu.google.com/pdfs/Intelligence-Unleashed-Publication.pdf
12. Holmes W, Bialik M, Fadel C. Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. ResearchGate; 2025. Available from: https://www.researchgate.net/publication/332180327_Artificial_Intelligence_in_Education_Promise_and_Implications_for_Teaching_and_Learning
13. Zawacki-Richter O, Marín VI, Bond M, Gouverneur F. Systematic Review of Research on Artificial Intelligence Applications in Higher Education. Springer; 2019. Available from: https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-019-0171-0
14. Fischer F, D'Mello S, Graesser A. Developing Emotion-Aware, Advanced Learning Technologies: A Taxonomy of Approaches and Features. ResearchGate; 2025. Available from: https://www.researchgate.net/publication/311343301_Developing_Emotion-Aware_Advanced_Learning_Technologies_A_Taxonomy_of_Approaches_and_Features
15. Radianti J, Eynon R. Historical Threads, Missing Links, and Future Directions in AI in Education. Learning, Media and Technology. 2020;45(3):223-235. Available from: https://www.tandfonline.com/doi/full/10.1080/17439884.2020.1798995
16. Selwyn N, Luckin R. Critical Data Studies, Abstraction and Learning Analytics: Editorial to Selwyn's LAK Keynote and Invited Commentaries. Journal of Learning Analytics. 2019;6(3):5-10. Available from: https://files.eric.ed.gov/fulltext/EJ1237559.pdf