



Artificial Intelligence in Education – Impact on Higher Education in India

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Abstract

Artificial intelligence (AI) is rapidly changing the landscape of education and has great potential to personalize learning, expand access, and impact learning and development. This paper explores the multifaceted impact of AI in education and demonstrates its potential to create personalized learning pathways using AI-powered platforms and intelligent learning systems that adapt to the needs of each student, strong and rapid learning to produce a personal learning experience. Immersive learning experiences through AI-powered games and simulations, immersive elements, and personalized feedback foster deep engagement and turn learning into a rewarding journey.

Learning analytics and predictive models provide educators valuable data about student progress and potential challenges, allowing them to change strategies and address individual needs. Beyond academic skills, AI can contribute to social and intellectual learning, creativity and critical thinking, fostering future-ready individuals. But along with great work, there are hidden challenges. Ethical considerations of fair access, teacher training, and data privacy and security must be addressed to integrate AI into education equitably and fairly.

The paper therefore concludes by advocating a future in education where AI serves as a powerful tool, used appropriately and ethically, to personalize learning, improve participation, and bring out the potential of all students. We need continued research, collaboration and action to harness the power of AI for the education and advancement of future generations.

Introduction

AI is quickly becoming a disruptive force in the education industry. It promises to personalize learning experiences, increase engagement, and improve student performance. Its impact extends far beyond the classroom and impacts every aspect of student learning and growth. The growth of new AI technologies in education will only benefit everyone if it strengthens human-centred approaches to teaching and respects ethics and ethical standards. AI should focus on improving learning for all students, empowering teachers and strengthening learning management systems.

Craft personalized learning pathways: AI-powered platforms and intelligent tutoring systems dynamically adapt to individual student needs, strengths, and learning pace, offering a bespoke educational experience.

Ignite engagement and motivation: Immersive learning experiences through AI-powered games and simulations, gamified elements, and personalized feedback foster deeper engagement and transform learning into a rewarding journey.

Empower educators with data-driven insights: Learning analytics and predictive modelling equip educators with valuable data on student progress and potential challenges, enabling them to tailor their strategies and proactively address individual needs.

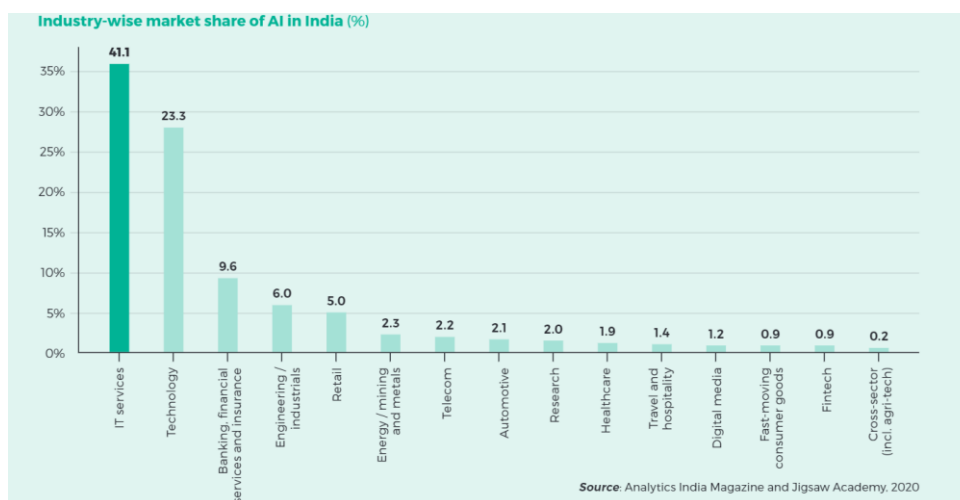
Nurture broader student development: Beyond academic skills, AI can contribute to social and emotional learning, creativity, and critical thinking, fostering well-rounded individuals prepared for the future.

Mr. Lynch from The EdAdvocate mentioned, “AI does not detract from classroom instruction but enhances it in many ways.”

AI can be integrated into education in 5 different ways.

- **Personalization:** It can be overwhelmingly difficult for one teacher to figure out how to meet the needs of every student in his/her classroom. AI systems easily adapt to each student’s individual learning needs and can target instruction based on their strengths and weaknesses.
- **Tutoring:** AI systems can gauge a student’s learning style and pre-existing knowledge to deliver customized support and instruction.
- **Grading:** AI can help grade exams using an answer key; but it can also compile data about how students performed and even grade more abstract assessments such as essays.
- **Feedback on course quality:** For example, if many students are answering a question incorrectly, AI can zero in on the specific information or concepts that students are missing, so educators can deliver targeted improvements in materials and methods.
- **Meaningful and immediate feedback to students:** Some students may be shy about taking risks or receiving critical feedback in the classroom, but “with AI, students can feel comfortable to make the mistakes necessary for learning and receive the feedback they need for improvement.”

Picture 1 - Industry-wise market share of AI in India (%)



The picture above shows IT services has the maximum market share in AI after the technology sector, followed by banking and finance and the engineering sector.

Picture 2 – AI covered by the most common boards in the Indian education system

AI covered by the most common boards in the Indian education system

Board	Description	Covered schools
Central Board of Secondary Education (CBSE)	Recent introduction of AI in the curriculum (CBSE and Intel, 2019a, 2019b)	>24,000 schools ³⁹
Council for the Indian School Certificate Examinations (Indian Certificate for Secondary Education and Indian School Certificate)	The computer science curriculum has a small section on trends in computing and ethical issues, which mentions AI ⁴⁰	2,734 schools ⁴¹
International General Certificate of Secondary Education	The ICT curriculum has a small section on emerging technologies, which mentions AI (Cambridge Assessment International Education, 2018)	566 schools ⁴²
International Baccalaureate	AI is not included in any subject but is sometimes touched upon in Theory of Knowledge (International Baccalaureate Diploma Programme, 2022), a mandatory course within the International Baccalaureate programme	204 schools ⁴³
State boards	AI has not been included in state curricula yet. However, it has been announced that Madhya Pradesh will be the first state to do so soon. With the support of Microsoft, a course on AI spanning nearly 240 hours will be introduced in classes above Grade 8 across 53 selected schools. ⁴⁴	

Source: Compiled by authors

From an education perspective, AI has been adopted by all the boards but CBSE-based schools adopted it the most followed by ICSE and IB. The State board schools need to be motivated to adopt AI in the schools provided the State government supports the schools in terms of aid and grants.

Picture 3 – Examples of online platforms offering AI courses for lifelong learners and teachers

Examples of online platforms offering AI courses for lifelong learners and teachers

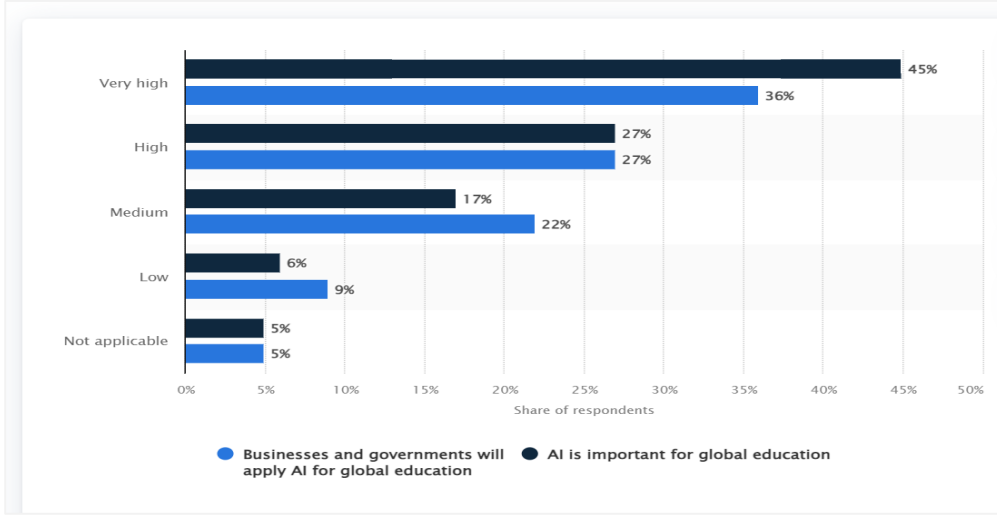
International	Indian private sector	Government of India
Elements of AI ⁶⁵	Future Skills Prime	AI for Everyone by IndiaAI, the national AI portal of India ⁶⁶
OKAI ⁶⁷	VEPSUN ⁶⁸	Future Skills Prime ⁶⁹
AI4ALL ⁷⁰	Ethnus ⁷¹	SWAYAM ⁷²
Coursera ⁷³	Skillup ⁷⁴	DIKSHA ⁷⁵
edX ⁷⁶	'Ai for All' by Intel and the MoE, Government of India ⁷⁷	
Alison ⁷⁸		
Udemy ⁷⁹		
Harvard Online Courses ⁸⁰		
MIT OpenCourseWare ⁸¹		

Source: Compiled by authors

E-learning has increasingly been adopted after COVID-19 and many ed-tech companies introduced many courses to enhance learning and skills. The government of India introduced many programs for students and teachers like DIKSHA, SWAYAM and Future Skills Prime. A separate portal based on AI was created for the benefit of academicians.

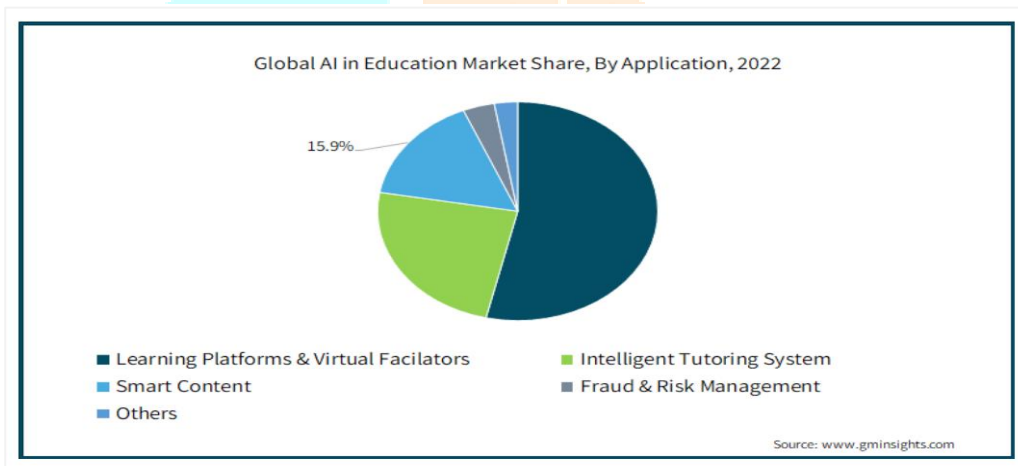
Picture 4 – Share of participants who believe AI will aid global education in India 2018

This statistic displays the results of a survey conducted in 2018 about the share of participants who believe artificial intelligence (AI) applications will aid global education in India, by likelihood. During the survey, around 45 percent of respondents in India held a very high belief that artificial intelligence was important for global education. ([Shangliao Sun](#), Feb 17, 2021)



Picture 6 – Global AI in education Market share, by application 2022

The pie chart shows that the learning platforms have been widely used across the globe and have more than 50% share in the Global AI market share followed by intelligent tutoring systems. AI-based content is slowly gaining market share and in the future, we may see a lot of content generation by AI which is already been introduced in the form of ChatGPT, Bard, Microsoft Copilot and so on.



Research Method/ Methodology

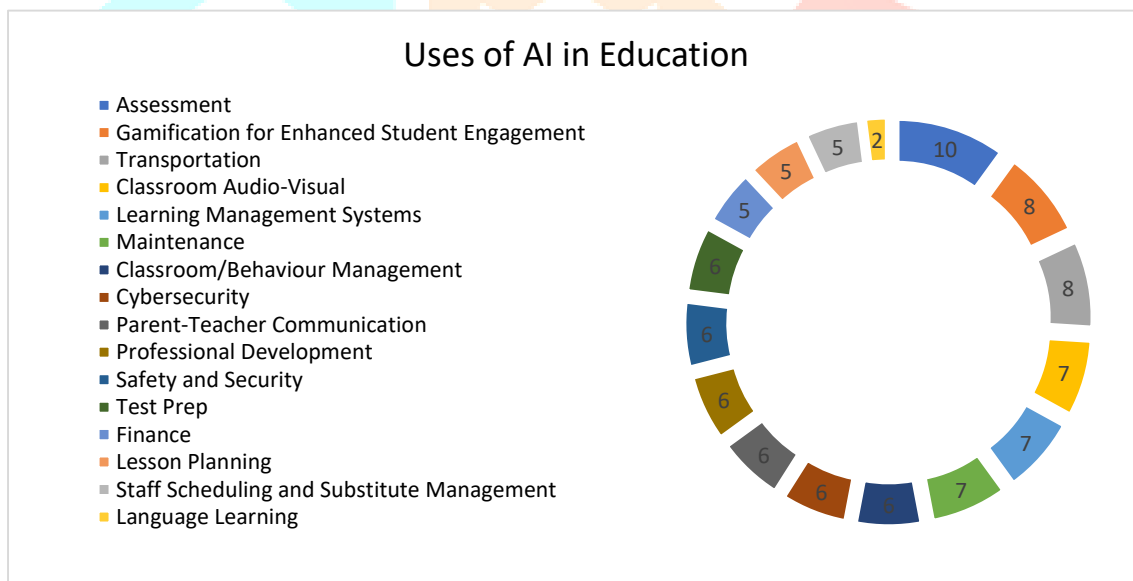
The primary data was collected using a questionnaire about the current uses of AI in education and AI in higher education. The stakeholders like teachers and professors were approached about their perceptions, opinions, and utility regarding AI in education. The questionnaire gathered broader data on attitudes, experiences, and beliefs about AI in education from larger groups of participants.

Results

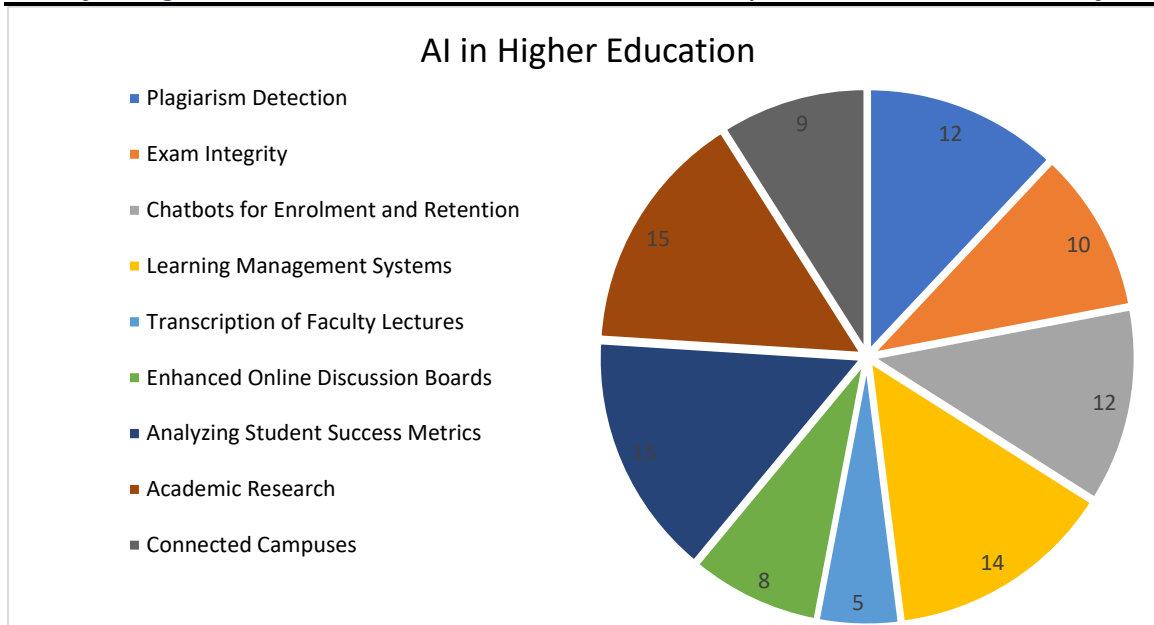
The purpose of the investigation was achieved by applying a survey method for the data collection using the originally designed questionnaire. The questionnaire was designed to obtain the respondents' opinions regarding their opinions about uses of AI in education and its application in Higher Education. The responses of a sample size of 100 teachers and professors have been analyzed.

Table 1 - Current uses of AI in education

Current uses of AI in education	Value
Assessment	10
Gamification for Enhanced Student Engagement	8
Transportation	8
Classroom Audio-Visual	7
Learning Management Systems	7
Maintenance	7
Classroom/Behaviour Management	6
Cybersecurity	6
Parent-Teacher Communication	6
Professional Development	6
Safety and Security	6
Test Prep	6
Finance	5
Lesson Planning	5
Staff Scheduling and Substitute Management	5
Language Learning	2
	100

**Table 2 – AI in Higher Education**

AI in higher education	Value
Plagiarism Detection	12
Exam Integrity	10
Chatbots for Enrolment and Retention	12
Learning Management Systems	14
Transcription of Faculty Lectures	5
Enhanced Online Discussion Boards	8
Analyzing Student Success Metrics	15
Academic Research	15
Connected Campuses	9
	100



Discussion/Analysis

A survey investigating the utilization of artificial intelligence (AI) in pedagogy was conducted among a representative sample of 100 educators (comprising teachers and professors) in Hyderabad (Table 1). The findings revealed a notable prevalence of AI applications in assessment creation and student progress evaluation, to gauge conceptual understanding. Additionally, educators implemented gamification techniques to foster enhanced student engagement in the learning process. Furthermore, the trend towards incorporating audiovisual tools within the classroom environment was observed, alongside increasing adoption of learning management systems (LMS). While the implementation of LMS entailed elevated maintenance costs, its long-term benefits were recognized. The remaining applications of AI, including classroom behaviour management, cybersecurity, parent-teacher communication, safety and security measures, and professional development, garnered comparable levels of utilization. Notably, language acquisition and pedagogical planning emerged as the least prevalent uses of AI in the surveyed educational landscape.

Similarly, a questionnaire was used to specifically understand the uses of AI in higher education (Table 2). The highest scores of 14-15 were for Learning Management Systems, Analyzing Student Success Metrics, and Academic Research. This indicates a strong focus on utilizing AI for managing learning environments, data-driven student support, and research advancements. Applications like Chatbots for Enrolment and Retention (12) and Enhanced Online Discussion Boards (8) highlight a focus on student engagement and improving communication channels. Scores of 12 for Plagiarism Detection and Exam Integrity suggest concern about academic honesty and the potential of AI to assist in maintaining it. Transcription of Faculty Lectures (5) suggests interest in leveraging AI for content creation and accessibility. Applications related to language learning and lesson planning received the lowest scores, suggesting these areas are less explored or face implementation challenges. This table shows a diverse range of AI applications being explored in education, with a strong emphasis on data-driven approaches, online learning systems, and student engagement. While some areas like language learning and teaching support seem less developed, the overall picture suggests a dynamic and evolving landscape.

These tables only show relative interest, not actual implementation levels. The impact and effectiveness of these applications need further research and evaluation. Ethical considerations in AI use for education must be addressed.

Conclusions

One of the most significant contributions of AI is its ability to tailor learning experiences to individual student needs. AI can make learning fun and interactive rather than boring and mundane. AI empowers educators with valuable data to optimize their teaching strategies. Beyond academic skills, AI can contribute to broader student development in terms of social and emotional learning, creativity and critical thinking. The future of education is brimming with possibilities thanks to AI.

AI in education holds immense potential to revolutionize learning by tailoring the experience to individual needs, freeing up teachers' time, expanding support beyond the classroom, and unlocking opportunities for all students.

- **Education like a bespoke suit:** AI crafting personalized learning paths, adapting to students' pace, strengths, and weaknesses. No more one-size-fits-all, but individualized journeys to mastery.
- **Teachers empowered with time:** AI alleviates administrative burdens like grading, record keeping, and scheduling. More time for teachers to guide, inspire, and connect with students.
- **24/7 learning:** AI tutors offer instant feedback, conquer tricky concepts, and provide continuous support even outside the classroom.
- **Breaking down learning barriers:** AI tools translate languages, adapt to learning styles, and cater to diverse needs, ensuring every student has the same chance to succeed.

In essence, AI can transform education into a personalized, efficient, and inclusive experience, nurturing the full potential of each learner and bridging the gap to a brighter future for everyone.

While challenges persist, there's no denying that AI has the potential to transform education and help students unlock their full potential. By using AI responsibly and ethically, we can build a world where learning is personal, interactive, and accessible for everyone. Keep in mind that while AI is a powerful tool, its impact on education is dependent on how we deploy it. With thoughtful planning, ethical thinking, and continuous learning, AI can be a powerful enabler in shaping tomorrow's learners and thinkers.

To thrive in the evolving education landscape, embracing the groundbreaking ed-tech trends of 2024 is essential. These game-changing technologies are redefining how we learn and teach, and integrating them into your business fuels innovation and ensures you stay ahead of the curve.

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