



A STUDY ON ARTIFICIAL INTELLIGENCE REVOLUTION AND PERSONALIZED LEARNING SYSTEM IN INDIA

Prof. V. Shireesha

Professor of Commerce, College: Govt. City College (A),Nayapul, Hyderabad.

Abstract

The realm of personalized education is witnessing a transformative integration with Artificial Intelligence (AI), poised to redefine the contours of pedagogical strategies. Central to this transformation is the emergence of personalized learning experiences, where AI endeavours to tailor educational content and interactions to resonate with individual learners' unique needs, preferences, and pace. The present study focused on the different dimensions of AI-driven personalized learning system in India, from its potential to enhance e-learning modules, AI-powered virtual tutors, growth and development, characteristics, opportunities and challenges exposed. As the tapestry of education becomes more intertwined with digital innovations, understanding AI's role in individualizing learning becomes essential

Key Words: *AI Personalized Learning, Education System ET.*

Introduction

The modern education system tendency changed from offline to online learning models which encourage virtual learning system. Globally, e-learning market emerged as transformative change in education by improvement of traditional learning models with innovative technology. The global e-learning market was around \$354.06 billion in 2024 and expected to be reached to 750 billion dollars by the end of 2030 with an average CAGR of 14 percentage. Similarly, Indian electronic learning platform industry witnessed as second largest in world with market size of \$ 12.7 billion in 2024 which is expected to be reached to 54.40 billion by the end of 2033 with CAGR of 19.20 percentage. The positive look in global e-platform is another aspect which drives the Indian e-platforms industry. In general, e-learning business models included self-paced learning, instructor led training, blended learning (off line/online) and micro learning.. The major driving factor of e-learning business included high smart phone adoption rate, tablets, lap tops, government imitations towards online courses like MOOCs, NPTEL, LMS and other. The e-learning platforms are widely deployed different types of technologies such as cloud based platform; mobile learning, Gamified learning, and AI powered personalized learning. Models of e-learning market is classified into different groups according to the provide (content provider and service provider), course type (primary, secondary, higher, online certification and test preparation), technology (online, LMS, mobile e-learning, rapid e-learning, virtual class room), leaning mode (instructor led and self-paced), delivery mode (LMS, package content) and end user (academic, corporate and government).

Artificial Intelligence in Digital Learning

The adoption of AI in online and digital learning platforms accelerated transformative shift in pedagogical approach of traditional learning model and addressed the challenges like scalability, personalization and learning engagement. The traditional education systems often struggle with challenges like class size, lack of dynamic curriculum, limited capacity which failed in meeting personalized learning needs. The top ten global leaders in usage of AI in online learning is as follows United States with 70% of AI in online learning, China, 40.17%, UK 27.21%, India 25.54%, UAE 22.72%, France 22.54%, South Korea 20.48%, Germany 18.49 %, Japan 18.47% and Singapore



18.15%. The top ten companies working on AI education market are Google LC, Micro soft, IBM corporation, Pearson PLC, black board inc, Carnegie learning inc, Ccourse era, Duo lingo, Bridge u ltd, Dream Box learning,

Artificial Intelligence Education Market Models

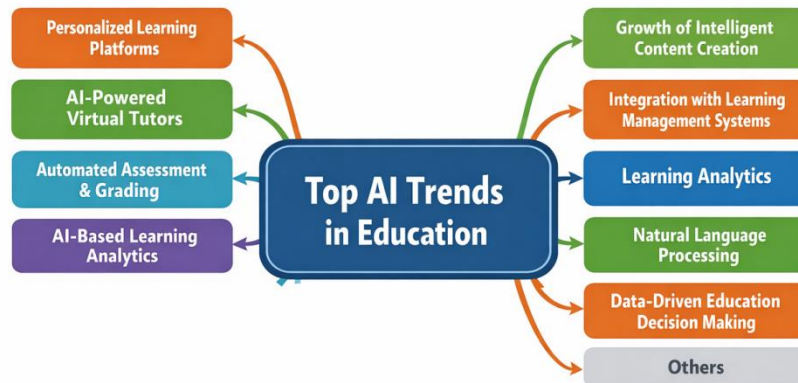


Figure 01: AI model in Personalized Education System

1. Personalized Learning Platforms
2. AI-Powered Virtual Tutors
3. Automated Assessment & Grading
4. AI-Based Learning Analytics
5. Growth of Intelligent Content Creation
6. Integration with Learning Management Systems
7. Natural Language Processing
8. Data-Driven Education Decision Making
9. Others

Personalized Learning Platforms: AI- hosting personalized learning platforms are transforming the students interact with high quality educational content. They also analyze student learning behaviour, patterns, and performance data. It also to deliver customized learning paths and provides recommendations to improve knowledge and skills.

AI-Powered Virtual Tutors: AI Virtual tutors help the students in improving themselves with real-time academic and industrial support and guidance. They explicitly and perfectly answer questions, simplify the complex concepts, and offer personalized feedback to the students. It enables the students to learn at their own pace outside environment of traditional classroom



Automated Assessment & Grading: AI technologies are progressively being utilized to streamline grading and assessment tasks. Smart systems can assess assignments, quizzes, and exams effectively, lightening the burden for educators along with offering quicker feedback to students.

AI-Based Learning Analytics: Analytics tools powered by AI assist educators in monitoring student achievement and learning advancement via comprehensive data insights. These platforms detect learning deficiencies, forecast student results, and help educators create more efficient teaching methods

Growth of Intelligent Content Creation: Artificial intelligence is utilized to create personalized learning content, engaging lessons, and automated educational resources. Content generation driven by AI assists educational institutions in producing scalable learning materials without compromising on content quality and relevance

Integration with Learning Management Systems: AI-driven LMS utilize artificial intelligence to streamline, customize, and improve online education. Essential AI features encompass customized learning journeys, automated content production such as quiz creation, round-the-clock smart chatbots, predictive skills gap assessment, and advanced search capabilities. They convert learning from fixed, uniform content presentation into a customized, active experience, minimizing administrative tasks and enhancing engagement.

Learning Analytics: AI learning analytics utilizes ML and data mining for evaluate student engagement, generating personalized and performance data, and scalable adaptive learning pathways. These systems offer instant insights, forecast student results, and allow teachers to customize instruction which ultimately enhance retention and academic achievement.

Natural Language Processing: Natural Language Processing (NLP) is a field of artificial intelligence (AI) focused on equipping computers to comprehend, interpret, produce, and handle human language (verbal or written). By connecting human dialogue and computer comprehension, NLP drives applications such as chatbots, sentiment analysis, machine translation, , and assistance in voice

Data-Driven Education Decision Making: AI Data-Decision Making involves leveraging artificial intelligence to evaluate student, staff, and institutional data to inform enhancements in education. It entails using machine learning to recognize patterns and foresee results, allowing educators to make data-driven decisions on personalized education, curriculum development, and resource distribution instead of depending on intuition alone

Opportunities for Ai Personalized Learning In India

With rapid growth across the sectors, India will become AI power house in world every soon. In 2024, 89 percentage new start-ups are using AI technology and 87 percentage of new entrepreneurs are actively employed AI. As per report of NAASCOM present AI talent poor in India is around 6.00-6.50 lakhs and expected need of 1.25 million by the year end 2027 The National Education Policy (NEP) 2020 identified potentiality of AI's in economic growth, solving issued in education, improving teacher capabilities, and personalising learning which led to more emphasises on AI-learning across all educational levels.



1. In India, The Ministry of Education introduced AI into school curriculum across India through CBSE and NCERT, from the 9 grade but it is option to IX and X students. It has 15 hours of AI class work for VI class students
2. Atal innovation mission was hands on with AI learning platforms
3. Under two government schemes “SamagraShiksha” ICT labs are integrated with AI & emerging tech education.
4. Under Diksha platforms both students and teachers can access and learning subject and skills through videos.
5. The ministry of skill development entrepreneurship introduced another scheme called SOAR under three levels first level AI aware(introduction), second level- AI to acquire (technical skills) and AI to Aspire (ethics and careers).
6. The government also launched SWAYAM platform with 110+fee AI courses from IITs and IISc.
7. AICTE is offering various AI courses such as deep learning foundation & application, foundation of AI&ML, reinforcement learning, probabilistic reasoning, system identification, digital image processing, cyber physical security and predictive and prescriptive data analytics.
8. The AI is also using in research like Gen AI research hub, LLM for young developers, master training activation, unleash LLM Hackathons and AI innovation Accelerator.

Challenges of AI Personalized Learning System in Education

Inadequate Consent Mechanisms: There is lack transparent and robust consent processes in AI personalized learning platforms. In students, exclusively minors and their guardian’s frequently struggle to fully understand the extent of data collection or its implications. Besides, platforms such as Duolingo is using broad consent clauses, making it challenging for users to opt out of specific data collection practices, raising questions about the ethical handling of user information.

1. **Risk of Data Breaches:** The delicate nature of student information renders it a prime target for cyber-attacks, potentially leading to severe repercussions. For instance, the Duolingo data leak in 2023 revealed the personal details of more than 2.6 million users, such as email addresses and educational data. These violations clearly demonstrate the vulnerabilities in the data security measures of educational platforms. Likewise, Chegg, a well-known educational resource platform, experienced a data breach in 2020 that affected the information of more than 40 million users.
2. **Lack of Accountability and Oversight:** Numerous platforms function in regulatory grey zones, resulting in inadequate supervision of their management of sensitive student information. For instance, Proctorio has encountered legal and ethical challenges due to its unclear data retention policies and for gathering data that detractors claim exceeds what is required for remote assessments
3. **Complexity of Consent Forms:** Platforms often employ extensive, technical consent agreements that hinder users’ full comprehension. This complicates the ability of students, parents, and educators to make knowledgeable choices regarding data sharing.
4. **Global Disparities in Standards:** While frameworks such as GDPR mandate explicit consent, their application across regions remains inconsistent. For instance, some jurisdictions lack stringent enforcement mechanisms, leaving students’ privacy more vulnerable.



5. **Insufficient Security Measures:** A personalized learning platform's failure to prioritize or implement advanced privacy protection measures, including differential privacy methods, data encryption, multi-factor authentication, or other essential safeguards, leaves sensitive data vulnerable to possible misuse or inquiry.
6. **Inconsistent Enforcement:** The application of privacy laws differs significantly, especially in developing nations where digital infrastructure and legal systems are continuing to develop. This inconsistency creates considerable holes in safeguarding numerous students worldwide.
7. **Need for Integrated Approaches:** Addressing privacy concerns in isolation is insufficient. A holistic approach that incorporates fairness, transparency, and accountability is critical for the responsible deployment of AI in education.

Figure 02: Challenges of AI Based Personalized Learning System



Conclusion

The application of artificial intelligence in education system is at nascent stage and witnessed fast growth since last decade only. However, AI application across the sectors is reported tremendous growth which demands new AI powered talented human resources. This resulted in introduction of AI in Indian education system from school level also. The major types of AI models included personalized learning platform, AI powered virtual tutor, automated assessment & grading, learning analytics, growth of intelligent content creation. Integration with learning management systems, natural language processing, data-driven education decision making. The major challenges of AI based personalized learning included inadequate consent mechanism, risk of data breach, lack of accountability, global disparities, complexity in consent forms, inconsistent enforcement and insufficient security measures.



References

1. <https://www.weforum.org/stories/2025/01/future-of-jobs-report-2025-jobs-of-the-future-and-the-skills-you-need-to-get-them/>.
2. <https://kpmg.com/in/en/media/press-releases/2026/01/indias-semiconductor-and-ai-surge-powers-global-economic-transformation-kpmg-at-world-economic-forum-2026.html> <https://nasscom.in/knowledge-center/publications/state-data-science-ai-skills-india-data-and-art-smart-intelligence#> .
3. <https://www.niti.gov.in/sites/default/files/2023-03/National-Strategy-for-Artificial-Intelligence.pdf>.
4. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf.
5. <https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2068251&=3&lang=2>.
6. Olagunju, Timi&Asrar, Jumana.(2024).Ethical Challenges in Ai-Driven Personalized Learning Platforms. 10.13140/RG.2.2.27183.44962.
7. Mimoudi, Aziz. (2024). AI, Personalized Education, and Challenges. International Conference on AI Research. 4. 271-280. 10.34190/icaire.4.1.3133.
8. <https://www.thersa.org/articles/blog/ai-enabled-personalised-learning-opportunities-challenges/>
9. Deckker, Dinesh &Sumanasekara, Subhashini&Fakhrou, Abdalnaser. (2025). AI-Powered Personalised Learning: Promise and Pitfalls. World Journal of Advanced Research and Reviews. 26. 2081-2095. 10.30574/wjarr.2025.26.3.2425.