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A Comprehensive Review of AI Applications in Education

Dr K Bhargavi, Dr R Nirmala, Ms S Hemalatha

Assistant Professor, Head & Assistant Professor,

Department of Computer Science,

Shri Krishnaswamy College for Women. Chennai-40, India.

Email id: bhargavikskc@gmail.com

Email id: nimimohan2452@gmail.com

Email id: ameh.jj@gmail.com

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Abstract

Artificial Intelligence started its journey from the point when everything was automated, bringing it easy for mankind to complete a task in a smart way. Artificial Intelligence -Simply can be explained or expressed as Synthetic Human brain, Metaverse of mankind. Man has created a replica of excellent brains that work far beyond the normal and excelled in it. The focus of AI in the field of education benefits in many aspects. Education does not concentrate on one particular aspect of learning. Wherever the Learning Occurs that is where the education happens. Diversified learning and process involved in learning acquired through AI is out set in the field of education. Learning gives development. In this paper we are exploring more about the contribution and scope of Artificial intelligence in education. This technology can be made use as a tutor for one to one learning in educational platforms. AI brings out the greatest improvements in the educational output of every individual. This has spread across in education, practising ethical concerns in technology too.

Keywords: *Personalised Learning, Intelligent Tutoring Systems, Learning Management System (LMS), Natural Language Processing, Content Creation, Gamification.*

1. Introduction

Education is the foundation of mortal progress, playing a pivotal part in shaping societies, husbandry, and individual lives. For centuries, traditional tutoring styles have

concentrated on standardized classes and schoolteacher-led instruction. Still, these approaches frequently struggle to meet the different requirements of scholars, leading to difference in learning issues. In response to these challenges, artificial intelligence (AI) has surfaced as a revolutionary force in education, offering advanced tools and methodologies that enhance both tutoring and literacy gests.

AI-driven inventions are transubstantiating the education sector by enabling substantiated literacy, automating executive tasks, perfecting availability, and fostering interactive literacy surroundings. The integration of AI into education is not just a technological advancement but a paradigm shift in how knowledge is delivered, assimilated, and assessed. From intelligent training systems and adaptive literacy platforms to prophetic analytics and AI-generated content, these inventions are reconsidering traditional educational practices.

One of the most significant benefactions of AI to education is substantiated literacy. Unlike conventional classroom settings, where a single tutoring approach is used for all scholars, AI-powered platforms can acclimatize content to suit individual literacy paces and preferences. Through algorithms in machine learning, these platforms dissect scholars' performance data, identify strengths and sins, and knitter instruction consequently. This position of customization helps scholars grasp generalities more effectively and fosters independent literacy.

AI-driven platforms recommend learning coffers grounded on scholars' interests and academic progress, helping them explore subjects in lesser depth. Beyond substantiated instruction, AI is also making education more inclusive. Scholars with disabilities profit from AI-driven availability tools similar as speech-to-text operations, text-to-speech transformers, and AI-powered sign language practitioners. These technologies insure that learning surroundings accommodate scholars with different requirements, promoting equal openings for education.

Likewise, AI is being used for prophetic analytics, helping preceptors and institutions identify scholars at threat of falling behind. By analysing patterns in pupil gestures, attendance, and performance, AI models can predict implicit challenges and recommend interventions. This visionary approach allows preceptors to give timely support, reducing powerhouse rates and perfecting overall academic success.

2. AI ways in Education – individualized literacy

By conforming tutoring and content styles grounded on individual pupil needs, artificial intelligence empowers personalised literacy. Platforms of Adaptive literacy use algorithms to

estimate scholars' knowledge gaps, learning styles, and progress to knitter educational content and to address literacy issues. For illustration, platforms like Smart Sparrow and DreamBox Learning use AI to deliver substantiated assignments in real-time.

Substantiated literacy is further developed by applying recommendation systems that suggest relevant resources, such as papers, videos, and practice exercises, based on the performance and interests data of scholars. A substantiated literacy approach boosts learners to be malleable in their literacy and gives them control over what, where, when, and how they learn. Technology has been pivotal in addressing pupil variability and easing personalised literacy progress. Positive issues were also linked in amalgamated or face-to-face literacy scripts, revealing that the added value of PE extends beyond the online digital literacy environment.

2.1The Technologies and Capabilities

The current generation of digital natives is veritably comfortable with technology. Moment's scholars are technologically smart, and the pervasive presence of technology in their lives has fostered a new participatory culture among moment's and unborn generations of learners. There are multitudinous approaches to personalized literacy.

Some approaches view technological invention as enabling substantiated literacy by exercising logical tools and algorithms to give automated adaptive literacy tasks and contents. Educational technology is viewed as a collection of tools that help preceptors in acclimatizing tutoring styles to the requirements of individual scholars while covering pupil progress and furnishing feedback.

The operation of AI in education has enabled the complete integration of tutoring and literacy and the possibility of reforming tutoring and literacy. The composition discusses adaptive literacy, schoolteacher evaluation, and virtual classrooms. Emerging technologies include adaptive literacy technologies, artificial intelligence, mobile technology, social technology, MOOCs, virtual and stoked reality, gamification, and the Internet of effects.

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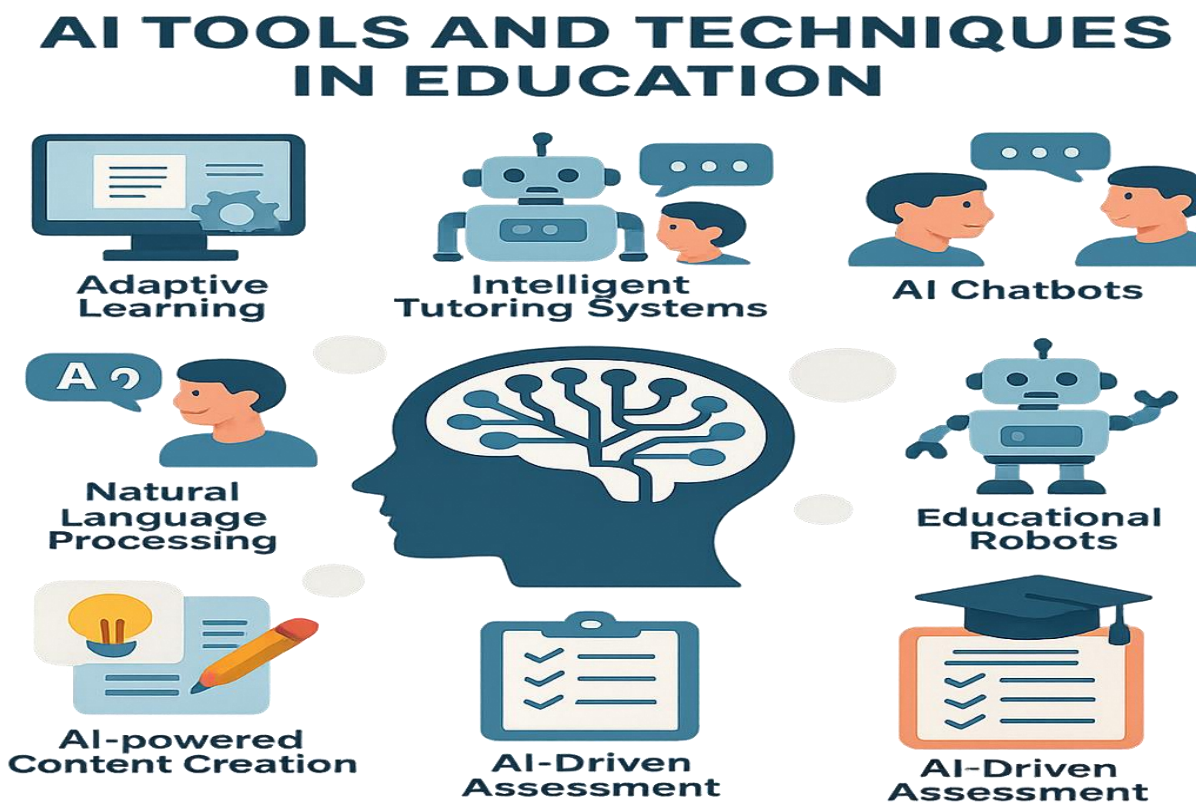

Figure1:AI Tools and Techniques in Education.

2.2 Intelligent Tutoring Systems (ITS)

Intelligent training systems(ITS) are designed to give one- on- one instruction that mimics the experience of having a particular instructor. The approach known as ITS has been pursued by experimenters in education, psychology, and artificial intelligence.

Intelligent training systems (ITS) give scholars with real-time feedback and support, guiding learners through complex motifs while conforming to difficulty situations grounded on their responses. By bridging gaps in appreciation, ITS enhances learning issues and reduces the burden on preceptors, allowing them to concentrate on further complex tutoring tasks. Carnegie Learning's MATHia platform supports scholars in working on calculation problems while offering corrective feedback(VanLehn, 2011).

ITS also incorporates machine literacy to upgrade its tutoring strategies over time, making it increasingly effective at addressing individual literacy requirements(Nkambou et al., 2018). It enables learners to exercise their chops by carrying out tasks within largely interactive literacy surroundings. typically, computer-grounded systems similar as CAL(Computer backed literacy) or CBT(Computer-based Training), use traditional educational styles by furnishing instruction to learners without concerning themselves with a model of the learner's knowledge. therefore, these instructions can not help learners collectively. By

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discrepancy, an ITS assesses each learner's conduct within these interactive surroundings and develops a model of their knowledge, chops, and moxie. Grounded on the learner model, it can conform educational strategies, in terms of both the content and style, and provides applicable explanations, hints, exemplifications, demonstrations, and practice problems to individual learners. In order to give the applicable instruction to learners, an ITS system is composed of three types of knowledge, organised into four separate software modules. 4066 Pipatsarun Phobun and Jiracha Vicheanpanya/ Procedia Social and Behavioural Sciences 2(2010).

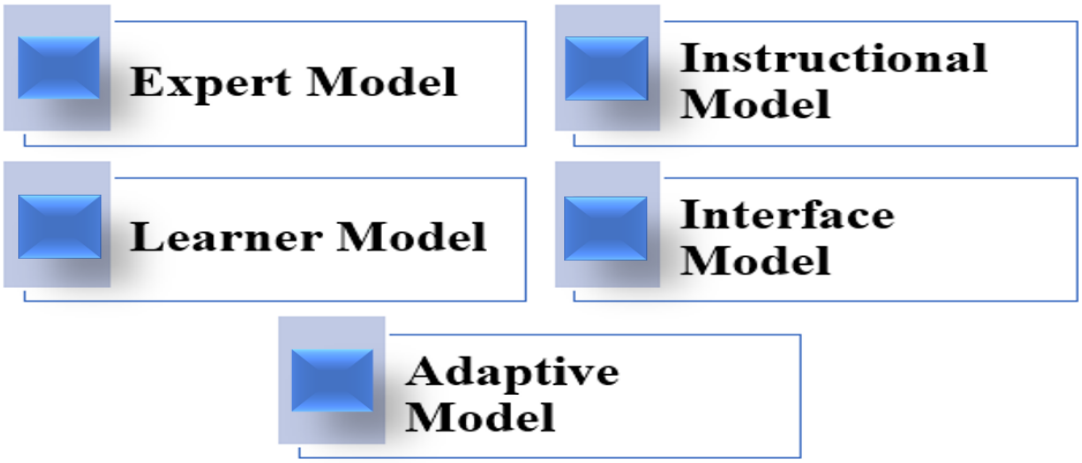

Figure 2: Types of Intelligent Tutoring Systems

Expert Model is a computer representation of a sphere expert's subject matter knowledge(declarative knowledge) and problem-solving capability(procedural knowledge). This knowledge enables the ITS to compare the learner's conduct and selections with those of an expert to estimate what he or she does and doesn't know.. A Learner Model

Learner Model is a position of the learner's knowledge while he she interacts with the training system. The model evaluates each learner's performance from his/ her geste during interacting with the training system in order to determine their knowledge, perceptual capacities, and logic chops. The model will induce substantiation and uses conclusion to give several applicable instructions to individual learners.

An Instructional Model contains knowledge for making opinions about educational tactics. It relies on the individual processes of the learner model for making opinions about what, when and how to present information to a learner. For illustration, if a learner has been estimated as a freshman in a particular procedure, this model will show some step- by- step demonstrations of the procedure before asking the student to perform the procedure on his or her own. When a learner earns moxie, this model might decide to present increasingly complex scripts.

likewise, this model may also choose motifs, simulations, and exemplifications that are applicable to a position of the learner's knowledge.. An Interface Model

The interface model is important as a communication medium and literacy terrain that can support learners in a task. It can also act as an external representation of the expert model and educational model. These kinds of training systems can give the learner a wide selection of practice database case studies alongside personalised feedback for working on each case study. also, it's veritably accessible for the learners, who need to exercise and learn at their own pace. The ensuing section introduces ERM- VLE(Hall & Amp; Gordon, 1998a; Hall & Gordon, 1998b; Hall & Amp Gordon, 1998c), COLER(Constantino- Gonzalez & Suthers, 2000; Constantino- Gonzalez, et al., 2001) and KERMIT(Suraweera & Mitrovic, 2001, 2004), three intelligent training systems developed for tutoring onE-learning system.

Adaptive Model ITS was to support a learner in the process of problem-solving. It was assumed that the needed knowledge is acquired outside of the system, for instance, by attending a lecture or reading a text. Along with the growth of computer capabilities, more and more ITS inventors set up it as reasonable to give an ITS and a literacy material in electronic form in one package. Very soon it came clear that hypertext or hypermedia provides the stylish option for organizing on- line literacy material(Hockemeyer, C., Albert, D, 1999). A combination of an ITS and AH was a natural starting point for the exploration of adaptive educational hypermedia in AITS. AITS is ITS with AH into the section expert model of ITS, which consists Adaptive donation and Adaptive Navigation Support. To be a more general ITS, which means that it can be used in other disciplines, the ITS needs to be designed and enforced so as to support revision of the lecture content, the decision rules and the fact base of the expert model, and the styles to measure performances of literacy. The expert model shows how information about a learner and the knowledge depository are used by the expert model to identify the most applicable content with the stylish tutoring strategy for a given learner. The expert model Adaptive donation Adaptive Navigation Support Interface4068 Pipatsarun Phobun and Jiracha Vicheanpanya/ Procedia Social and Behavioral lores 2(2010) 4064 – 4069 identifies what should be learned next by comparing the contents of a given course to the current knowledge of the learner. Using the prerequisite relationship between different motifs, the system identifies a set of recommended lectures and depending on the literacy style either presents one of them or asks the learner to elect one. Abstract of Adaptive Intelligent Tutoring Systems forE-Learning Systems presents AITS for E-Learning Systems, the situation is basically different in the case of learning produced using AH and ITS that technologies are suitable to

stoutly elect the most applicable literacy material from their knowledge bases and present it at the right time and in the right way for every individual learner, therefore making the stylish use of every scrap of educational material. Both are typically used for computer- grounded instruction. still, AH is more suited for the instruction of generalities whereas ITS generally assists in the use of these generalities to break problems. thus, a general instruction system requires both of these educational approaches in order to give a full literacy with adaption grounded on Learners' geste via Internet.

2.3 Natural Language Processing(NLP)

Natural language processing(NLP) is a crucial AI field used in language literacy and assessment. NLP-powered tools, similar to chatbots and virtual sidekicks, grease instant communication between scholars and preceptors. operations like Duolingo and Grammarly employ NLP to dissect textbooks, give alphabet suggestions, and ameliorate language proficiency. also, AI systems like E-Rater by ETS estimate essays for alphabet, structure, and consonance, offering instant feedback to scholars(Attali & Burstein, 2006). NLP also facilitates real- time restatement and speech recognition, breaking language walls and making educational content accessible to a global followership(Chowdhary, 2020), making education more interactive and accessible. AI-driven NLP also enables automated grading and feedback, reducing preceptors' workload while icing timely evaluation of assignments and examinations.

2.4 Content Creation and Curation

AI's part in content creation and curation is inversely transformative. AI-powered systems can induce educational accoutrements, epitomise papers, produce quizzes, and indeed develop individualised assignment plans and interactive modules. These capabilities not only enhance the literacy experience but also enable preceptors to design further engaging and effective classes.

For example, systems like Content Technologies Inc. use AI to induce substantiated handbooks grounded on course syllabi(Kumar et al., 2020). Interactive content, including virtual labs and simulations, enhances engagement by furnishing hands- on learning gestures. This approach is particularly effective in STEM education, where generalities frequently bear practical operation(De Jong et al., 2013).

2.5 Prophetic Analytics

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Predictive analytics uses AI to analyse nonfictional data and prognosticate future issues. In education, it identifies at-risk scholars, predicts performance trends, and recommends intervention strategies, helping instructors take visionary measures to support floundering scholars(Arnold & Pistilli, 2012) and institutions in resource allocation.

2.6 Gamification and Immersive Literacy

Gamification integrates game design rudiments, such as points, trophies, and leaderboards, into educational conditioning to enhance provocation and engagement. AI-driven platforms like Kahoot! and Classcraft use gamification to make literacy more interactive and pleasurable(Deterding et al., 2011). Virtual reality(VR) and augmented reality(AR), powered by AI, give immersive literacy experiences. For illustration, tools like Google peregrinations allow scholars to explore literal spots or scientific marvels in a virtual terrain(Johnson- Glenberg, 2018).

2.7 Chatbots and Virtual Assistants

AI-powered chatbots and virtual assistants provide round-the-clock support to students and educators. They answer queries related to courses, schedules, and assignments, reducing the administrative burden on teachers (Fryer et al., 2019). Learning companions like IBM's Watson Tutor assist students by offering study tips, reminders, and personalized feedback, creating a more supportive learning environment (Brown et al., 2020).

2.8 Teacher Support

AI tools streamline administrative tasks, such as grading and attendance tracking, allowing teachers to focus on instruction. Automated grading systems evaluate multiple-choice and short-answer questions efficiently, providing instant feedback to students (Jordan, 2020). Professional development platforms use AI to recommend training programs tailored to educators' skills and needs, fostering continuous improvement (Baker et al., 2019).

2.9 Data-Driven Decision Making

AI enables data-driven decision-making by analysing large datasets to uncover insights into student performance, engagement, and curriculum effectiveness. Learning analytics tools help institutions monitor progress at individual, classroom, and institutional levels, facilitating evidence-based improvements (Ferguson, 2012).

3. Challenges and Ethical Considerations

Despite these advantages, the perpetuation of AI in education comes with challenges, including ethical concerns, data sequestration issues, and the threat of over-reliance on

technology. Ensuring that AI tools are used responsibly and augment rather than replace it is essential for sustainable integration.

Privacy concerns arise from the collection and use of student data. Ensuring data security and compliance with regulations like GDPR and FERPA is critical (Schiff, 2020). Bias in AI algorithms can lead to inequitable outcomes, necessitating rigorous testing and monitoring to ensure fairness. Additionally, the cost of AI tools may pose barriers for underfunded institutions, exacerbating educational inequalities (Luckin et al., 2016).

Conclusion

AI has the potential to transform education by personalising learning, enhancing engagement, and supporting teachers. Its techniques, including intelligent tutoring systems, NLP, gamification, and predictive analytics, address diverse educational needs and challenges. However, realising AI's full potential requires addressing ethical concerns, fostering inclusivity, and ensuring equitable access. As AI continues to evolve, collaboration among educators, technologists, and policymakers will be essential to shape a future where education is accessible, effective, and empowering for all.

References:

1. Owoc, Mieczysław L., Agnieszka Sawicka, and Paweł Weichbroth. "Artificial intelligence technologies in education: benefits, challenges and strategies of implementation." *IFIP international workshop on artificial intelligence for knowledge management*. Cham: Springer International Publishing, 2019.
2. Singh, Satya Vir, and Kamal Kant Hiran. "The impact of AI on teaching and learning in higher education technology." *Journal of Higher Education Theory & Practice* 12.13 (2022).
3. Taylor, Ross, et al. "Personalized learning in education: a machine learning and simulation approach." *Benchmarking: An international journal* 32.7 (2025): 2662-2689.
4. Ahmed, Fatima. "The digital divide and AI in education: Addressing equity and accessibility." *AI EDIFY Journal* 1.2 (2024): 12-23.
5. Mousavinasab, Elham, et al. "Intelligent tutoring systems: a systematic review of characteristics, applications, and evaluation methods." *Interactive Learning Environments* 29.1 (2021): 142-163.
6. Paladines, José, and Jaime Ramirez. "A systematic literature review of intelligent tutoring systems with dialogue in natural language." *IEEE Access* 8 (2020): 164246-164267.

7. Kulik, James A., and John D. Fletcher. "Effectiveness of intelligent tutoring systems: a meta-analytic review." *Review of educational research* 86.1 (2016): 42-78.
8. Shaik, Thanveer, et al. "A review of the trends and challenges in adopting natural language processing methods for education feedback analysis." *IEEE Access* 10 (2022): 56720-56739.
9. Paladines, José, and Jaime Ramirez. "A systematic literature review of intelligent tutoring systems with dialogue in natural language." *IEEE Access* 8 (2020): 164246-164267.
10. Sundari, M. Shanmuga, Harshini Reddy Penthala, and Anand Nayyar. "Transforming education through AI-enhanced content creation and personalized learning experiences." *Impact of artificial intelligence on society*. Chapman and Hall/CRC, 2024. 98-118.
11. Gómez Niño, Julián Ricardo, et al. "Gamifying learning with AI: A pathway to 21st-century skills." *Journal of Research in Childhood Education* 39.4 (2025): 735-750.
12. Calvert, Carol Elaine. "Developing a model and applications for probabilities of student success: a case study of predictive analytics." *Open Learning: The Journal of Open, Distance and e-Learning* 29.2 (2014): 160-173.
13. Cao, W., and N. Mai. "Predictive analytics for student success: AI-driven early warning systems and intervention strategies for educational risk management." *Educational Research and Human Development* 2.2 (2025): 36-48.
14. Labadze, Lasha, Maya Grigolia, and Lela Machaidze. "Role of AI chatbots in education: systematic literature review." *International journal of Educational Technology in Higher education* 20.1 (2023): 56.
15. Gubareva, Regina, and Rui Pedro Lopes. "Virtual Assistants for Learning: A Systematic Literature Review." *CSEDU (1)* (2020): 97-103.
16. Ait Baha, Tarek, et al. "The impact of educational chatbot on student learning experience." *Education and Information Technologies* 29.8 (2024): 10153-10176.
17. Gaftandzhieva, Silvia, et al. "Data-driven decision making in higher education institutions: State-of-play." *International Journal of Advanced Computer Science and Applications* 14.6 (2023).
18. Kaddoura, Sanaa, and Fatima Al Husseiny. "The rising trend of Metaverse in education: Challenges, opportunities, and ethical considerations." *PeerJ Computer Science* 9 (2023): e1252.

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https://musikinbayern.com **DOI https://doi.org/10.15463/gfbm-mib-2026-551**
19. Eden, Chima Abimbola, Onyebuchi Nneamaka Chisom, and Idowu Sulaimon Adeniyi. "Integrating AI in education: Opportunities, challenges, and ethical considerations." *Magna Scientia Advanced Research and Reviews* 10.2 (2024): 006-013.