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Article · September 2024

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ARTIFICIAL INTELLIGENCE IN EDUCATION: TRANSFORMING LEARNING AND TEACHING

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Article Info: - Received : 08 July 2024 **Accepted** : 23 July 2024 **Published** : 30 July 2024

Abstract

Whilst there is plenty of new hype around artificial intelligence (AI) as we move into the third decade of the 21st century, the history books would tell you that it has been around for several years. To fully understand the present principles of AI, it is important to begin with a brief overview of its history. Turing claimed that a machine may be considered "intelligent" if it could converse with people while remaining hidden from their awareness. Artificial Intelligence (AI) is poised to revolutionize education by providing personalized learning experiences, improving administrative efficiency, and enhancing overall educational outcomes. This article explores the historical context of AI in education, current applications, benefits and challenges. By leveraging AI technologies, educators can offer tailored instruction, streamline administrative tasks, and utilize data analytics for informed decision-making. However, the integration of AI presents challenges such as ethical concerns, technical issues, and potential societal impacts. Despite these challenges, the benefits of AI in education are significant, promising a future where AI plays a central role in shaping educational practices.

Keywords: Artificial Intelligence, Personalized Learning, Educational Practices.

1. INTRODUCTION

Education is an important part of life for everyone, and a good education plays a vital role in having a successful life. Globally, there are constantly many changes taking place in the education system to better serve students. These changes might range from curriculum types to teaching methods. Utilized in practically every industry, artificial intelligence is a rapidly developing technology that is revolutionizing society. The field of education is one where artificial intelligence has the potential to significantly impact and in some cases has already done so.

Artificial intelligence in education is creating innovative ways to educate and learn in a variety of contexts. These days, educational institutions in several nations use artificial intelligence (AI). Teachers, students, parents, and of course educational institutions themselves now have an entirely new way of viewing education thanks to artificial intelligence in education[(1).] The application of artificial intelligence (AI) in education aims to support educators and students by using computer intelligence to improve and streamline the educational process, rather than substituting human teachers with humanoid robots[(2).] Many artificial intelligence (AI)

capabilities will be available to the educational system in the future, influencing how students learn.

2. WHAT IS AI

Artificial intelligence, which is poised to usher in a new era of global transformation through the creation of intelligent machines, is one of the burgeoning fields of computer science. We are currently surrounded with artificial intelligence. A wide range of subfields, from general to specialized, are currently being worked on by it, including painting, playing music, theorem proofing, chess, self-driving automobiles, and more. Artificial Intelligence is a fascinating and all-encompassing topic of computer science with immense potential for the future. AI has the propensity to make a machine function as a human.

Artificial Intelligence is a synergy of two words artificial and Intelligence, where artificial defines man-made and intelligence means thinking power. Hence, Artificial Intelligence means "a man-made thinking Power". A system with intelligence is expected to behave as intelligently as a human and behave in the best possible manner[(3)]. "Artificial Intelligence is a branch of computer science by which we can create intelligent machines which can behave like a human. Think like humans and able to make decisions[(4)]"

Artificial Intelligence (AI) is a branch of computer science focused on creating systems capable of performing tasks that typically require human intelligence. These tasks include problem-solving, learning, reasoning, and understanding natural language. AI has permeated various sectors such as healthcare, finance, and transportation, revolutionizing how these industries operate.

The availability of more digital materials and technological improvements have caused substantial changes in the education sector in recent years. In this shift, artificial intelligence (AI) has become a major key, providing creative ways to enhance instruction, learning, and evaluation. With the help of AI-powered technologies, teachers can customize their lessons to fit the different needs of their students by analyzing enormous volumes of data, seeing trends, and making predictions[(5)].

In education, AI has the potential to transform traditional teaching and learning methods, providing more personalized, efficient, and engaging experiences. This paper explores the historical context, current applications, benefits and challenges of AI in education.

3. HISTORICAL CONTEXT OF ARTIFICIAL INTELLIGENCE

The journey of AI in education began in the 1960s with the development of computer-assisted instruction systems. One of the earliest examples is PLATO (Programmed Logic for Automatic Teaching Operations), which provides computer-based training and educational games. LOGO, another early AI system, introduced students to programming and problem-solving.

In the 1980s, intelligent tutoring systems (ITS) emerged, leveraging AI to provide personalized instruction. These systems could adapt to individual students' learning paces and styles, offering tailored feedback and support[(6)]. The 2000s saw the rise of adaptive learning technologies, driven by advancements in machine learning and data analytics. These technologies further enhanced personalized learning by continuously adjusting educational content based on student's performance and engagement.

4. CURRENT APPLICATIONS OF AI IN EDUCATION

The applications of Artificial Intelligence in Education are as follows-

4.1. Personalized Learning

The potential of AI to deliver individualized learning experiences is one of the technology's most important effects on education. Adaptive learning systems driven by artificial intelligence examine enormous volumes of data about learning styles, preferences, and student performance[(7)]. For example, real-time feedback and tailored learning routes are provided by intelligent tutoring systems (ITS) like Carnegie Learning and Knewton through the application of AI. By providing tailored activities and explanations to improve comprehension and memory, these systems adjust to the strengths and limitations of each student.

4.2. Administrative Efficiency

AI also reduces expenses and improves efficiency by streamlining administrative tasks. The rapid and precise assessment of multiple-choice and short-answer questions provided by automated grading systems, such as those found in standardized examinations, saves teachers a great deal of time. Administrative duties including scheduling, enrolment, and resource allocation can also be handled by AI. For instance, chatbots like Ivy.ai help with administrative inquiries and give staff and students prompt answers to frequently asked issues. [(8)] This frees up workers to work on more difficult and

valuable duties while lessening the administrative load on educational institutions.

4.3. Enhanced Learning Experiences

With cutting-edge technology like augmented reality (AR) and virtual reality (VR), artificial intelligence (AI) improves learning experiences. These technological advancements produce immersive learning environments that increase accessibility and engagement for difficult subjects. AI-driven gamification also increases the interactivity and fun of learning.

4.4. Data Analytics

AI-driven data analytics offer insightful information on how well students perform academically and how they learn[9]. Through the use of predictive analytics, timely interventions may be made for students who are at risk of failing or leaving out. By assisting educators in identifying the most successful teaching techniques, learning analytics enables them to make data-driven decisions that enhance instructional tactics and curriculum design.

4.5. Smart Content

Artificial Intelligence (AI) collects extensive data on student actions and learning trends, which helps in the design of SMART material in education. With the help of AI, textbooks could be applications small chunks of digestible guides which is easy to read and understand.

4.6. Adaptive Learning

Adaptive learning in the context of e-learning is the incorporation of adaptive strategies and tools into online learning environments and curricula[10]. These systems evaluate learner data, such as their interactions with the platform, test scores, and advancement, using algorithms and artificial intelligence. It also tracks their academic progress and modifies the course or its learning pace.

4.7. Virtual Facilitator

A virtual facilitator is a leader and lesson planner who, as an alternative to giving lectures, promotes learning by creating a setting in which students are empowered to take charge of their education. [11] Virtual Facilitators can think, act and react to students' queries and act as assistants for teachers.

4.8. Automated Grader

By looking for patterns in students' answers and comparing them to preset standards, artificial intelligence (AI) systems minimize subjective biases and produce objective evaluations that support consistency and fairness in grading[12]. Robo-grader replace a part of the grading system, and human graders are always there for future assessment.

4.9. Chatbot/ chat campus

AI chatbots can be used in a wide range of educational settings, revolutionizing the process of learning[13]. They can serve as online tutors, offering pupils individualized study plans and answering questions about academic subjects. The chatbot collects the student's opinion through a dialogue interface as if it is a text interviewer and looks for reasons too for varied opinions.

4.10. Proctoring

AI powered systems ensure the authenticate at the student to take the exam and prevent from cheating[14]. The use of advanced algorithms in AI proctoring, which monitors test-takers through audio and video analysis, helps to detect cheating, and guarantees that the test-taker stays consistent throughout the exam, improves the security of online exams. The integrity of the online testing environment is preserved in this way.

5. Benefits of AI in Education

The integration of AI in education offers numerous benefits:

5.1. Improved Student Outcomes: AI-driven interactive tools and simulations increase student motivation and participation. Personalized learning experiences cater to individual needs, leading to better engagement, comprehension, and retention. AI-driven interventions can help struggling students receive the support they need, improving overall academic performance.

5.2. Greater Accessibility and Inclusivity: AI can create more inclusive learning environments by providing tailored support for students with diverse needs, including those with disabilities. For example, AI-powered tools like text-to-speech and speech-to-text applications assist students with visual or hearing impairments.

5.3. Efficiency in Administration: AI automates routine tasks, enabling educators to focus on more critical aspects of teaching and learning. Automation of administrative tasks reduces the workload for educators and staff, allowing them to focus on teaching and student support. This leads to more efficient operations and cost savings for educational institutions.

5.4. Support for Teachers and Educators: AI tools provide educators with insights into student performance and learning behaviors, helping them tailor their teaching methods to meet individual needs. Automated grading and administrative support free up time for teachers to engage more deeply with students.

6. CHALLENGES AND LIMITATIONS

Despite its benefits, the integration of AI in education presents several challenges and limitations:

6.1. Ethical Concerns

- ***Data Privacy and Security:*** The use of AI in education involves collecting and analyzing vast amounts of personal data. Ensuring the privacy and security of this data is paramount to maintain trust and comply.
- ***Bias and Fairness:*** AI algorithms can perpetuate and even exacerbate existing biases in education. For instance, if training data reflects historical biases, AI systems may reinforce those biases, leading to unfair treatment of certain groups of students. Ensuring fairness and equity in AI systems requires careful design, testing, and ongoing monitoring.

6.2. Technical Challenges

- ***Integration with Existing Systems:*** Incorporating AI into existing educational infrastructure can be complex and costly. Legacy systems may not be compatible with new AI technologies, requiring significant investments in upgrades and integration.
- ***Cost and Resource Requirements:*** Developing, implementing, and maintaining AI systems can be expensive. Educational institutions, especially those with limited resources, may struggle to afford these technologies.

6.3. Societal and Educational Impacts

- ***Dependence on Technology***: Over-reliance on AI and technology in education may lead to a reduction in critical thinking and problem-solving skills. Ensuring a balanced approach that complements, rather than replaces, traditional teaching methods is essential.
- ***Potential Job Displacement:*** The automation of administrative and some teaching tasks could lead to job displacement for educators and staff. It is crucial to address these concerns through reskilling and upskilling programs, preparing the workforce for new roles that AI technologies may create.

7. CONCLUSION

Artificial Intelligence has the potential to revolutionize education by providing personalized, efficient, and engaging learning experiences. AI has the potential to transform the education sector, enhancing learning outcomes, improving student engagement, and supporting teachers in their instructional roles. However, it is essential to address the challenges and ethical considerations associated with AI in education. As AI technologies continue to advance, they will play an increasingly central role in shaping the future of education, making learning more accessible, effective, and enjoyable for all.

REFERENCES

Yambi, Tomas & Yambi, Caluyua. (2020). Assessment and Evaluation in Education

https://help.blackboard.com/Learn/Administrator/SaaS/Courses/Manage_Courses/Goals

J. Gardner, M. Oleary and L. Yuan. Artificial intelligence in educational assessment: 'Breakthrough? Or buncombe and ballyhoo?'. *https://doi.org/10.1111/jcal.12577*.

E. Chris. (2014).Twitter for teaching: Can social media be used to enhance the process of learning?. British Journal of Educational Technology. vol. 5. pp. 902-915.

https://elearningindustry.com/ai-powered-and-standard-lms-which-one-to-choose

https://www.lumicademy.com/2021/08/what-are-the-major-components-of-a-learning-management-system/

https://en.wikipedia.org/wiki/Google_Classroom

https://www.computerworld.com/article/3276276/microsoft-teams-its-features-how-it-compares-to-slack-and-other-rivals.html

https://www.edapp.com/blog/ai-lms-what-artificial-intelligence-can-do-for-your-lms/

D. Herath and L. Jayaratne. (2017). A personalized web content recommendation system for E-learners in E-learning environment. National Information Technology Conference (NITC). pp. 89-95.doi:10.1109/NITC.2017.8285650

J Gardner, M. O'Leary and Li Yuan. (2021). Artificial intelligence in educational assessment: 'Breakthrough? Orbuncombe and ballyhoo? Journal of Computer Assisted Learning

C. Chen, J. Wang, L. Hsu. (2021). An interactive test dashboard with diagnosis and feedback mechanisms to Facilitate learning performance". www.elsevier.com/locate/caeai

R. Morilla, R.Omabe, C. Tolibas, E. Cornillez Jr., and J.Trecene. (2020). Application of machine learning algorithms in predicting the performance of students in mathematics in the modern world. Journal of Educational Research and Technology Management.

S. Abdelhamid, A. Katz. (2020). Using Chatbots as Smart Teaching Assistants for First-Year Engineering Students. American Society for Engineering Education.

Cite this article as: Dr. Deeksha Saraswat (2024). Artificial Intelligence in Education: Transforming Learning and Teaching, International Journal of Emerging Knowledge Studies. 3(7), pp. 326-329.