INCREASING ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION – PRESENT STATUS, CHALLENGES AND ROAD AHEAD

Dr Himanshu Rastogi[1]

[1]Professor, Amity Business School, Amity University Uttar Pradesh – Lucknow Campus India.

ABSTRACT

Artificial Intelligence (AI) technology has become integral to student learning in the digital era. Artificial Intelligence (AI) is changing the way we interact with technology and the way we live our lives. It has the potential to revolutionize the field of education, especially teacher education. This research paper aims to investigate the role of AI in teacher education, including its potential benefits, drawbacks, and challenges. The paper explores how AI can improve the quality of teacher education, enhance teachers' skills, and facilitate personalized learning. The research also highlights the ethical, social, and cultural implications of AI in teacher education. The paper concludes that AI has the potential to transform teacher education, but it requires careful implementation and ethical considerations. The main aim of this paper is to study the need of AI in the field of education and find out the different challenges therein. An attempt has also been made to explore AI from the perspective of NEP 2020. The study is qualitatively done by reviewing various articles on Artificial Intelligence (AI).

Keywords: Artificial Intelligence, Education, Technology, NEP2020, Personalized Learning.

1. INTRODUCTION

Artificial intelligence (AI) refers to the attempts made to create computerized systems that can mimic human thought and behavior. The public defines AI as the capacity of robots or computers to think and behave like humans (Wartman & Combs, 2018). Accordingly, the fundamental concept of artificial intelligence is the ability of tools or programs to accurately mimic the thought processes and behaviors of humans (Mohammed & Watson, 2019).

The modern arena of education has massively revolutionized and overturned in digitally driven world, on such technology that has slowly paved its way inside the world of education is artificial intelligence. Technology has overturned the world of learning as education materials, especially during the pandemic of Covid 19. it becomes more accessible to all with the use of smart phones and computer. These allow facilities to invest more time for the students. facilities can get the opportunity for close evaluation of students their aptitude, attitude, interest etc. Firstly, AI enabled hyper personalization helps in developing customized learning in an environment based on ability performed mode of learning and experience. Secondly the use of smart assistants (Amazon Alexa, google home, Microsoft Cortana) and associated technologies offer significant potential to help students. Universities are already using voice assistants to help answer common questions about campus, students schedule and courses.

The rapid advancement of technology has propelled Artificial Intelligence (AI) to the forefront of education, transforming the learning sphere of students. It has now become an essential part of everyone's lives, changing the way we learn and teach. With the help of AI, the education system has progressed greatly, supporting both students and academic professionals. AI is a software system that completes tasks that require human intelligence, like decision-making and data analysis. One of the prime benefits of AI in education is that it provides a personalized learning experience for students.

Considering the significance of AI, the NEP 2020 asserts that technology, including AI, will fundamentally alter how children learn in schools. However, this requires a significant amount of technological and academic research. The Prime Minister of India has started several initiatives in honor of NEP 2020's first anniversary. 'AI for All' is one of the major initiatives that was started. AI for All is an online course designed to give every member of the nation a fundamental understanding of artificial intelligence (AI). It is obtainable in eleven different vernacular languages. A student, a parent who stays at home, a professional in any sector, or even an elderly citizen can benefit from this four-hour, self-paced, micro-learning program.

2. METHODOLOGY

The paper is exploratory in nature and the information is gathered by reviewing various articles on Artificial Intelligence (AI) drawn from articles available on journals, magazines and other internet resources. In all the paper is based on secondary sources of information.

3. OBJECTIVE OF RESEARCH

- To study the need of AI in Education.
- To have an insight regarding important AI tools applied in education.

- To understand the need and benefits of AI in the education sector.
- To understand the role of AI for educators.
- To explore AI from the perspective of NEP 2020.
- To find out the different challenges of AI in education.

4. LITERATURE REVIEW

Sapna Saklani (2024) explained the potential applications of artificial intelligence in the field of education. The 21st International Conference on Artificial Intelligence in Education (AIED), which took place in 2020, stated that one of the newest areas of educational technology is AIED. It is still unclear to educators how to employ AI more broadly for pedagogical purposes and how it can affect teaching and learning in higher education. Here are the effects of AI on education along with some of its drawbacks. Additionally, it outlines a particular approach to creating an AI-enabled educational platform, and lastly, it discusses the consequences of AI in education. Artificial intelligence (AI) is becoming more and more important in all spheres of business, including higher education. The idea of "Artificial Intelligence in Education (AIED)" has advanced significantly in the previous several years. This study looked at the effects of employing artificial intelligence (AI) in higher education as well as how the idea can be used to teaching and learning in this setting. It looks at how often changing technologies affect teaching and learning, including how much and how how they are used. AI makes it possible for services related to higher education to become incredibly accessible very quickly, both within and outside of the classroom.

Bidisha Borchetia, Mridula Hazarika (2024) suggested that how AI is being applied to examine enormous quantities of data to find trends and insights that might guide the creation of new educational policies and plans. Focus was in NEP 2020 and use of AI in education.

Afiya Jamal (2023) in her research paper aims to investigate the role of AI in teacher education, including its potential benefits, drawbacks, and challenges. The paper explores how AI can improve the quality of teacher education, enhance teachers' skills, and facilitate personalized learning. The research also highlights the ethical, social, and cultural implications of AI in teacher education. The paper concludes that AI has the potential to transform teacher education, but it requires careful implementation and ethical considerations.

Sadiku, M. N., Ashaolu, T. J., Ajayi-Majebi, A., & Musa, S. M. (2021) explain the concept of artificial intelligence as the ability of a computer system to perform human tasks (such as thinking and learning) that can usually only be achieved through human intelligence. AI technology in education provides a degree of flexibility and adaptation that has never been possible before. This is revolutionizing schools and classrooms, making the job of a teacher much easier. AI is ready to revolutionize education. The paper considers different applications of AI in education.

Joshi, S., Rambola, R. K., & Churi, P. (2021) first state that the use of AI is now observed in almost all areas of our lives. Artificial intelligence is an advanced technology that transforms all aspects of our social interaction. In education, it will develop new learning solutions that will be tested in a variety of situations. Educational goals can be better achieved and managed by new educational technologies. The paper analyzes how AI can be used to improve teaching outcomes, providing examples of how AI technology can help teachers use data to improve equity and education rankings in developing countries. It aims to examine the perception of teachers and students about the use and effectiveness of AI in education. Further research on the generational and geographical diversity of teacher and student perceptions can contribute to the more effective implementation of AI in Education (AIED).

Kengam, Jagadeesh. (2020) describes how artificial intelligence can be used and how it is used in the education sector. According to the 21st International Conference on Artificial Intelligence in Education held in 2020, AIED is one of the currently emerging areas of educational technologies. The use of AI by teachers remains unclear on how to achieve pedagogical advantage on a broader scale and how AI can influence teaching and learning in higher education. The paper presents the impact of AI in education and its advantages and disadvantages. The author also describes a specific way of developing a platform for education based on AI, and finally the additional effects of AI in education.

Lee, A. V. Y. (2020) states that the use of AI in education is no longer science fiction but is becoming a reality in these times of unprecedented dynamic change. This field encompasses a wide range of techniques, algorithms, and solutions that can solve current adversities and problems in today's classroom. The paper discusses how an existing world-supporting AI can be extended to the fields of education and addresses the existing challenges of using AI in classrooms across Singapore.

5. AI TOOLS IN EDUCATION

5.1 Grammarly – AI-Powered Writing Assistant

Grammarly has emerged as an essential tool for students seeking to elevate their writing proficiency. This AI-driven writing companion not only rectifies grammatical inaccuracies but also provides insights to refine style, tone, and

coherence. By incorporating functions such as plagiarism detection and vocabulary enrichment, Grammarly guarantees that students present refined and authentic content, rendering it invaluable for crafting essays and research papers.

5.2 QuillBot - AI-Driven Paraphrasing Tool

QuillBot is designed to refine and restructure text, enhancing its clarity, fluency, and readability without compromising the intended message. QuillBot helps writers of all skill levels to fine-tune their writing by providing several tools, including Grammar Checker, Paraphraser, Plagiarism Checker, Citation Generator, AI Detector, Translator, etc.

5.3 Evernote

Evernote is note-taking software that helps teachers and students to create and organize digital notes—and keeps them synced across all their devices. Evernote helps to keep all the study materials in one place from lecture notes to assignment tracking and access notes from any device.

5.4 Notion AI

Notion AI is a collection of AI features embedded into Notion's workspace, including an AI assistant one can chat with to get answers about one's documents and a text generator that can prompt to do things like create, edit, summarize, and translate content—even within databases.

5.5 Otter AI

Otter AI is an American transcription software company based in Mountain View, California. The company develops speech to text transcription applications using artificial intelligence and machine learning. Its software, called Otter, shows captions for live speakers, and generates written transcriptions of speech. One can transcribe meetings and take voice notes with Otter.

5.6 Canva – Online Graphic Design Platform

It is a user-friendly graphic design platform with a drag-and-drop interface for creating diverse visual content like presentations, posters, and social media graphics. It provides templates, photos, fonts, and design elements for professional designs without necessitating advanced skills.

5.7 ChatGPT

ChatGPT has turned out to be an indispensable tool for students, valued for its adaptability and capacity to aid in various academic endeavours. From generating essay prompts to tackling intricate mathematical equations or elucidating complex concepts, ChatGPT stands out as a dependable academic companion. Its advanced natural language processing features empower it to produce responses akin to those of a human, fostering seamless interaction and promoting effective learning among students.

6. NEED AND BENEFITS OF AI IN EDUCATION

- Using artificial intelligence, a personalized study schedule can be generated for each learner that considers any knowledge gaps. AI makes it easier to determine what a learner understands and fails to comprehend.
- AI can change the curriculum and content, making it more interesting and relevant for students. AI can recommend and create content that interacts with learners by analyzing enormous amounts of data regarding student preferences, interests and learning outcomes.
- AI has the potential to expand and increase the educational experience for students by giving unique methods of accessibility as well as personalized learning catered to each student.
- To provide personalized and flexible learning experiences for students, AI involves combining systems with intelligence, computations and data analysis techniques. The purpose of AI in education is to enhance learning results, encourage student involvement and give students the support they need.
- It can improve teaching and learning by using multimedia tools to bring abstract concepts to reality. Conventional responsibilities can be undertaken by it, and allowing teachers to concentrate more on teaching and the specific requirements of each student.
- AI can assist educators in developing specific plans for instruction and evaluations that are aligned with each student's particular strengths and weaknesses, which can enhance their involvement and inspiration and ultimately result in better academic outcomes.
- AI makes it easier for students to access top-notch learning materials, regardless of their location or financial situation.
  It can help teachers give students more thorough and accurate feedback by evaluating their performance data and identifying areas in which they require development.

7. ROLE OF AI FOR EDUCATORS

7.1 Make Administrative Tasks Simpler

The application of artificial intelligence involves assignment grading, class scheduling, student attendance, and many more that are repetitive. This relieves the teachers from much of the responsibility of organising the activity as it allows them to spend more time with the students and in the development of their lessons.

7.2 Personalizing Lesson Plans

The use of AI can still help educators prepare different lesson plans depending on the student's performance. Whereas data on the ways a student learns can be processed by AI and generate suggestions to teach the student, the methods can be altered to better suit the learning process.

7.3 Streamlines Assessment

AI systems include programmable task and exercise solutions to use in grading issues such as multiple choice, essays, and homework assignments. This saves teaching time, which would otherwise have been employed in evaluation, and helps the educators to give feedback to the student faster hence improving the learning results.

7.4 Curriculum Development

AI improves curriculum implementation since one can determine what is of benefit to the learners when implementing certain techniques and resources. It can advise changes to curriculum based on the rate of success, learning behaviour of the students.

7.5 Improves Efficiency

AI increases general performance across learning institutions. Some of the activities such as assignment of resources, planning, and delivery of lessons, and supervision of learners become easier, thus minimising paperwork among teachers.

8. CHALLENGES AND NEGATIVE IMPACT OF AI IN EDUCATION

Artificial Intelligence (AI) is rapidly transforming various sectors, and education is no exception. The integration of AI in education is revolutionizing traditional teaching and learning methods, offering new possibilities for personalized learning, enhancing teacher-student interactions, and making education more accessible and efficient.

While AI has significant potential to transform education, its integration also presents a range of challenges. These challenges need to be addressed to ensure that AI's benefits are realized without compromising the quality and integrity of education.

8.1 Data Privacy and Security

AI systems in education often require access to vast amounts of personal data, including students' academic records, learning habits, and even biometric information. This raises significant concerns about data privacy and security. If this data is not properly protected, it could be vulnerable to breaches, leading to unauthorized access or misuse of sensitive information. Ensuring robust data protection measures and adhering to privacy regulations are crucial to maintaining the trust of students, parents, and educators.

8.2 Bias and Fairness

AI algorithms are trained on data, and if this data is biased, the AI system may perpetuate or even exacerbate these biases. In education, this can lead to unfair outcomes, such as biased grading, unequal access to learning resources, or the reinforcement of stereotypes. For example, an AI system might favour students from certain demographic backgrounds over others, leading to disparities in educational opportunities. Addressing bias in AI requires careful selection of training data and ongoing monitoring to ensure fairness.

8.3 Lack of Human Interaction

Education is not just about knowledge transfer; it is also about fostering social and emotional development. Over-reliance on AI in education could reduce face-to-face interactions between students and teachers, which are crucial for developing communication skills, empathy, and critical thinking. While AI can assist in many aspects of education, it cannot fully replace the human elements of teaching, such as mentorship, encouragement, and personalized feedback. Striking a balance between AI and human interaction is essential to maintaining a well-rounded educational experience.

8.4 Cost and Accessibility

Implementing AI in education can be expensive, requiring significant investments in technology, infrastructure, and training. This can create a digital divide, where only well-funded schools or institutions can afford to integrate AI, leaving underfunded schools and students from low-income backgrounds at a disadvantage. Ensuring that AI in

education is accessible to all students, regardless of their socio-economic status, is a critical challenge. There is a need for policies and initiatives that promote equitable access to AI-powered educational tools.

8.5 Teacher Resistance and Training

Many educators may resist the adoption of AI due to concerns about job displacement, a lack of understanding of the technology, or skepticism about its effectiveness. Additionally, teachers need proper training to effectively integrate AI tools into their teaching methods. Without adequate professional development, the potential of AI to enhance education may not be fully realized. Overcoming resistance and providing comprehensive training are necessary steps in ensuring that AI is successfully integrated into the educational system.

8.6 Ethical Considerations

The use of AI in education raises several ethical questions, such as the extent to which AI should be involved in decision-making processes that affect students' lives. For instance, should AI systems be allowed to determine a student's academic path or make decisions about their future based on predictive analytics? There is also the concern of transparency—students and educators need to understand how AI systems arrive at their conclusions and recommendations. Ensuring ethical use of AI requires clear guidelines, transparency, and accountability in AI applications.

8.7 Dependence on Technology

As AI becomes more integrated into education, there is a risk that both students and educators could become overly dependent on technology. This dependence might reduce critical thinking and problem-solving skills, as students may rely too much on AI to provide answers and solutions. Additionally, technological failures or limitations could disrupt the learning process. It is important to ensure that AI complements rather than replaces traditional educational methods, allowing students to develop a broad range of skills.

8.8 Content Quality and Relevance

AI systems are only as good as the content they deliver. Ensuring that the educational content provided by AI tools is accurate, up-to-date, and relevant to the curriculum is a significant challenge. There is also the risk of homogenization, where AI might promote standardized content at the expense of diverse perspectives and critical thinking. Educators must carefully curate and monitor the content used by AI systems to maintain educational quality.

9. NEP 2020 AND ARTIFICIAL INTELLIGENCE

The National Education Policy 2020 incorporates all the technological components, with a strong emphasis on artificial intelligence (AI). The policy promises to develop instructional software based on artificial intelligence that will be made available in all local or regional languages. These software or programs will be widely accessible and beneficial to students, even those who attend school in extremely rural areas or have special needs.

The NEP 2020 recognizes that children have a range of learning styles, interests, and aptitudes, which focus on the need for individualized learning. By analyzing data about each student's learning styles, interests, and aptitudes, AI is enabling individualized learning.

The NEP 2020 also states that AI technology will help in the development of smart classrooms that will permit online interactions and collaborations with students from various schools across the world, online exams, applications with quizzes, and information that can develop the students.

The NEP 2020 acknowledges the value of experiential learning and skill development in preparing students for employment opportunities of the twenty-first century. Students have access to courses that emphasize skill development through AI-powered learning platforms and remote learning tools.

Besides these, a digital platform i.e., National Teacher's Portal is a repository of all the e-content created by all state boards viz., CBSE, NCERT, ICSE, ISC, and others. These contents help the teachers in their professional development.

10. FUTURE TRENDS OF AI IN EDUCATION

On the same note, the future of AI in education holds a greater perspective on transformative changes. AI is finally positioned to revolutionically make learning flexible, individualized, and open. Here are some key future trends:

10.1 Immersive Learning with AR and VR

New directions for the presentation of learning materials are brought by such technologies as Augmented Reality (AR) and Virtual Reality (VR). These are important because by making concrete experiences, the technologies put into otherwise abstract practice concepts. Regardless of whether students are virtually dissecting a frog or exploring space, it is more interactive because of augmented and virtual reality.

10.2 AI-Powered Adaptive Learning Systems

In future learning systems, it will be possible to learn from the style and pace of each learner and provide additional learning resources and recommendations for improvement immediately.

10.3 AI-Assisted Collaboration

Interactive learning will have a more significant use of AI to help connect the students so that they can collaborate. Features of automated discussion forums and group study applications will ensure that students collaborate regardless of where they are located.

11. CONCLUSION

Everyone interested in the subject and in education in general has nothing to lose but a lot to gain in the context of the development of AI in the future. Education is one sector where the advent of AI can revolutionize the way it is currently delivered to students.

However, as with any powerful technology, challenges and ethical concerns must be addressed to ensure that AI serves as a tool for inclusion and innovation in education. With its advances in the future, the introduction of AI is expected that it will expand newer horizons, making an education environment much more liberal, progressive, student centered, and globally interconnected.

12. REFERENCES

[1] Sapna Saklani, Role of Artificial Intelligence in Education: An Overview, International Journal of Multidisciplinary Research and Development, Volume 11, Issue 7, No. 2024, pp. 115-118

[2] Bidisha Borchetia, Mridula Hazarika, Artificial Intelligence in Education: An Overview, Journal of Emerging Technologies And Innovative Research, Volume 11, Issue 2, No.2024, pp. 424-428

[3] Afiya Jamal, The Role of Artificial Intelligence (AI) In Teacher Education: Opportunities & Challenges, International Journal of Research and Analytical Reviews, Volume 10, Issue 1, No. 2023, pp. 139-146.

[4] Sadiku, M. N., Ashaolu, T. J., Ajayi-Majebi, A., & Musa, S. M., Artificial Intelligence in Education, International Journal of Scientific Advances, Volume 2, issue 1, No. 2021, pp. 5-11.

[5] Joshi, S., Rambola, R. K., & Churi, P., Evaluating Artificial Intelligence in Education for Next Generation, International Journal of Physics: Conference Series, Volume 1614, Issue 1, No. 2021.

[6] Kengam, Jagadeesh. (2020). Artificial intelligence in education 10.13140/RG.2.2.16375.65445

[7] https://timesofindia.indiatimes.com/education/web-stories/top-10-ai-tools-for-students-amp-teachers/photostory/104441238.cms

[8] https://www.igauge.in/blog/detail/ten-most-sought-after-knowledge-seeking-ai-tools-for-students/192

[9] https://www.21kschool.com/in/blog/future-of-ai-in-education/

[10] https://www.ed.gov/sites/ed/files/documents/ai-report/ai-report.pdf