INTERNATIONAL JOURNAL OF RESEARCH CULTURE SOCIETY ISSN(O): 2456-6683
Monthly Peer-Reviewed, Refereed, Indexed Journal [Impact Factor: 9.241]
Volume - 9, Issue - 2, February - 2025

DOIs:10.2017/IJRCS/202502002 --:-- Research Paper /

Impact of Artificial Intelligence on Teaching and Learning: A Study

[1]Rasuma C., [2]Dr. Sathish Kumar
[1]Research Scholar, Department of Journalism and Mass Communication
Kuvempu University, Jnana Sahyadri, Shankaraghatta
E-mail: rasuma98@gmail.com

[2]Professor, Department of Journalism and Mass Communication
Kuvempu University, Jnana Sahyadri, Shankaraghatta
E-mail: sathishandinje@gmail.com

Abstract: *The integration of Artificial Intelligence (AI) in education has transformed the teaching and learning landscape. This particular study investigates the impact of Artificial Intelligence (AI) on teaching and learning process and exploring both the benefits and challenges of AI adoption in educational system.*

This study contributes to our understanding of AI's role in education emphasizing the need for critical consideration of its social, cultural and ethical implications. AI is more important in education at present in a under developed country like India where we cannot provide basic requirement for huge population such as teachers for every schools, library, computer and etc. By using AI we can eliminate the human errors which happen because of decision based on individual judgments and biases. By using specific algorithms, machines make decisions based on empirical data.

This particular research paper focuses on advantages of AI in education system for both teachers and students. The government or any other private intuitions need to invest money one time on upgrading available new communication technology tools along with AI features and AI featured devices like mobile phone, laptop, robot etc. They are more durable and they don't feel stress like human beings and these devices don't want rest also. This makes more useful in improving education system in India.

*By using AI in education can bring new and innovative solutions for teachers and students problems. With using AI it doesn't require time off and be available 24*7 for both teacher and students. AI provide good assistant for teachers to teach according to interest of student. By using AI we can prepare syllabus according to the knowledge of students. This particular study tries to spread light on how AI can change entire educational system by proper adoption.*

Key Words: *Artificial Intelligence, Education, Teaching, Learning, Personalization, Tutoring, Grading.*

1. INTRODUCTION:

The traditional education model is facing significant challenges that make it increasingly unsustainable. Rising costs and limited resources are putting immense strain on conventional educational institutions, making it difficult for them to meet students' needs effectively. One of the primary concerns regarding traditional education is the escalating costs associated with it. From elementary school education to universities, the expenses continue to rise yearly. These mounting costs burden students and their families, often resulting in student loan debt that takes years or even decades

to repay. This financial strain can discourage individuals from pursuing higher education altogether, limiting their personal and professional growth opportunities.

Moreover, traditional educational institutions often need more resources. Classrooms are overcrowded, teachers are overworked, and access to necessary materials and technology may be lacking. This scarcity of resources hampers the quality of education and prevents students from receiving individualized attention and support. As a result, some students may need to catch up or feel disengaged from the learning process.

Another challenge faced by traditional classrooms is meeting the diverse needs of students. Each student has unique learning styles, strengths, weaknesses, and interests. However, these differences must be adequately addressed in a one-size-fits-all approach adopted by many traditional educational institutions.

Students who require additional support or those who excel in certain areas may not receive the attention they need to thrive academically. The outdated structure of traditional education contributes to its ineffectiveness in preparing students for an ever-evolving world. The curriculum often focuses heavily on memorization rather than critical thinking skills and practical application of knowledge. In contrast to traditional education's limitations, artificial intelligence (AI) presents new opportunities for personalized learning experiences tailored to individual student needs.

Artificial intelligence is a technology that widely used in all sectors. At present AI is spreading like light in the dark. Artificial intelligence defined as simulation or approximation of human intelligence in machines. Like all other field Artificial intelligence can be used in teaching and learning. Artificial intelligence is based on "knowledge space theory ", Knowledge Space Theory attempts to address shortcomings of standardized testing when used in educational psychometry. Common tests, such as the SAT and ACT, compress a student's knowledge into a very small range of ordinal ranks, in the process effacing the conceptual dependencies between questions.

The knowledge space theory used in Artificial intelligence technology detects the knowledge level and knowledge gap of the students by using particular tests. The result of the test like marks obtained by students in particular subject. Artificial intelligence system finds out area of interest like which subject students had more interest and less interest. By using AI supporting software study materials are created and this will make huge change in student’s education system.

The potential of using artificial intelligence in education to enhance learning, assist teachers and fuel more effective individualized learning is exciting, but also a bit daunting. To even have an intelligent conversation about AI in education, one must first push past imaginary science-fiction scenarios of computers and robots are teaching our children, replacing teachers and reducing the human element from what is a fundamentally human activity.

Following benefits make artificial intelligence effective in education:

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 students individual learning needs and can target instruction based on their strengths and weaknesses.

Tutoring: AI systems can gauge a students learning style and pre-existing knowledge to deliver customized support and instruction.

Grading: Sure, 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.

2. Review of literature:

Many studies were conducted on impact of artificial intelligence on education in computer science department . In areas like social sciences using artificial intelligence is less comparing to computer science. Artificial Intelligence (AI) is present in our lives and is progressing with efficiency in modern times. The start of AI is often derived to the 1956 Dartmouth summer scientific research on computer science. Today, AI work is performed in police investigation cancer, reducing the danger of plane collisions, and developing autonomous vehicles, etc. AI-equipped robots have outperformed human surgeons in stitching up cuts; acting search and rescuing missions; providing take care of kids, seniors, and hospital patients; aiding master card firms with fraud detection.

AI technology has been applied to education within the recent twenty years. The Intelligent Tutoring Systems (ITS) cowl all major AI topics (e.g., data illustration, machine learning, tongue, planning, reasoning, explanation), and therefore the systems has shaped a motivating test-bed to formalize psychological feature theories and to experiment with their operationalization.

AI in education has been applied to numerous domains, like physics, programming, writing essays, and reading yet because the development of educational systems. The foremost typical AI applications within the academic field involve data illustration, intelligent tutoring, tongue process, and autonomous agents.

AI in education has created powerful learning environments and positive interactive experiences for college students over the decades. The fast advancement of technology, like computer science (AI) and artificial intelligence has compact all industries, together with education. A recent report from IBM, Burning Glass and Business education Forum shows that the quantity of job opportunities for knowledge and analytics skills can increase by 364,000 to 2,720,000 in 2020 which means that the gap between offer and demand of individuals with AI skills is growing, with one report showing a worldwide base of AI professionals, however with several opportunities obtainable, and this gap is leading to even higher salaries for those during this field.

Artificial intelligence (AI), generally expressed by the general public as the ability of machines or computers to think and act as humans do, represents the efforts towards computerized systems to imitate the human mind and actions (Wartman & Combs, 2018). In this respect, the basic definition of artificial intelligence can be expressed as the skillful imitation of human behaviour or mind by tools or programs (Mohammed & Watson, 2019). According to Timms (2016), it may be an illusion of the current structure to think that artificial intelligence will come within the computer format used at home.

It could get into our lives within different functions and shapes. Ng (2017) claims artificial intelligence to be the new electricity of this age. Artificial intelligence is a candidate to be presented as the basic building block of the Fifth Industrial Revolution by providing itself to be a powerful factor in ensuring economic development with its potential (Golic, 2019). That could be why investments in artificial intelligence broke a record in China with $40 billion in 2017 (Mou, 2019).

In line with its earnings from AI, China is expected to increase its gross domestic product (GDP) by 26% ($7 trillion) by 2030. North America is expected to have a 14.5% increase ($ 3.7 trillion) in the same timeframe (PwC, 2017). These data make the added value and global impact of artificial intelligence more understandable for the future economy, and in our case, for the future of education, which in turn, directs the economy and workforce, paving the way for the new Industrial Revolution.

The in-depth development of artificial intelligence will affect many situations, from the restructuring of the social order in the broadest sense to the education and administration processes in classes and schools. Schools that are expected to adapt to the digital age and embed 21st century skills in their main agendas are some of the main institutions that could be most affected by the development of artificial intelligence. Karsenti (2019) points out that new forms of technology will fill in our lives and captivate our youth, and this case may leave schools with no choice but to make room for them.

In this regard, how the stakeholders from law, business, education, and engineering perceive this development, and how they foresee artificial intelligence in regard to education form the focus of this study. Thus, the purpose of this study is to examine what the use of artificial intelligence in education means and what kind of implication it can reveal for the future.

Roll and Wylie (2016) highlight Henry Ford's quote, 'If I had asked people what they wanted; they would have said faster horses.' On the surface, it can be said schools have become 'faster classes' that produce results in a shorter time. But, will these 'fast classes' continue to do so or require thinking differently in the 21st century? As we go towards the 22nd century, is it sufficient to provide skills, critical thinking, and metacognition skills? Or should we configure new systems that have never been thought of before for the new age? What opportunities can artificial intelligence offer in education that will differentiate people from robots or smart vehicles and help humans keep their emotional and social aspects? Most probably soon, these topics will be the main agenda of policymakers and implementers in the field; actually, there are already discussions asking if AI can truly replace teachers or not (see, Felix, 2020).

Manyika et al. (2017) emphasize that good teachers will continue to exist in the future, teaching classes designed to boost students' affective intelligence, creativity, and communication. In fact, according to these authors, developments in artificial intelligence and automation will actually make 'people more human.' While addressing educational research on artificial intelligence, Haseski (2019) briefly states the results of these studies as follows: the use of artificial intelligence in education will make learning more individual, provide effective learning experiences, enable students to discover their talents, improve their creativity and reduce teachers' workload. That being said, there are opposite ideas as well.

Transferring the roles of teachers to computers is seen as a danger in the studies on artificial intelligence (Humble & Mozelius, 2019). To prepare for this future, the task of states and nations is to create a teacher profile that will work with these support structures (Wogu, Misra, Olu-Owolabi, Assibong & Udoh, 2018).

Although artificial intelligence studies in education have attracted a lot of attention in recent times, studies about the theory of general artificial intelligence can be traced back to at least the 14th century, and these studies remerged through the work of Alan Turing in 1937 (Humble & Mozelius, 2019). They are now becoming an important point of academic literature and scientific circles.

We see extension of AI studies in organizational management as 'artificial intelligence leadership' has begun to be discussed in the literature (see, Canbek, 2020).With more usage of artificial intelligence in education, major transformations can be foreseen in the education systems and its processes. Based on the study results, Sekeroglu, Dimililer and Tuncal (2019) stated that artificial intelligence could help teachers improve personalized education for their students.

Artificial intelligence can provide access to appropriate and better learning opportunities for excluded people and communities, people with disabilities, refugees, people out of school, and those living in isolated communities (Pedro, Subosa, Rivas, & Valverde, 2019). Research shows how effective individually tailored approaches can be presented with the support of artificial intelligence techniques and intelligent learning environments (Mohammed & Watson, 2019). Although quality education seems to require the active participation of human teachers, artificial intelligence envisages increasing education and quality at all levels, especially by providing personalization (Grosz & Stone, 2018). Pedro et al. (2019) highlight a dual-teacher model with artificial intelligence in terms of individualized education: teachers spend a lot of time in routine and other administrative tasks, such as repeating frequently, answering questions about many topics, but in-class artificial intelligence-supported assistants (secondary teachers) will reduce the time spent on routine procedures, which will help teachers focus on student guidance and one-to-one communication.

3. Method:

This is a qualitative study:-involves collecting and analyzing non-numerical data (ex: text, video, audio etc) to understand concepts, opinions or experiences and which tries to find out Impact of Artificial Intelligence on Teaching and Learning by using secondary data collected from different sources.

4. Result and Discussion:

According to wifitalents (August 6 -2024) artificial intelligence is cost saving if it is implemented in education. AI is expected to save universities $19 billion by 2022 through increased efficiencies.

According to wifitalents (August 6 -2024) AI –driven systems have reduced administrative costs by 25% in higher education. AI-driven analytics have lowered student recruitment costs by 30% in higher education.

According to wifitalents (August 6 -2024) by 2030, 50% of colleges will offer personalized AI tutors to students.The AI in education market is expected to grow by 47.5% annually through 2027, more than 63% of higher education institutions are considering AI implementations within the next year.

According to wifitalents (August 6 -2024) The AI market in education is projected to reach $10.23 billion by 2026 more than 90% of academic papers published in the next five year will mention AI,Universities using AI have seen a 30% increase in student enrollment, by 2025 AI will be integrated in 51% of higher education institutions academic and operations system.

According to wifitalents (August 6 -2024) by 2024 AI in education is projected to be a $7 billion industry globally and AI algorithms have improved student test performance by 18% in science courses and Artificial intelligence can reduce administrative work in universities by up to 50%, AI –enabled systems have improved graduation rates by 30% in some universities.

According to wifitalents (August 6 -2024) AI is used in 90% of universities to automate administrative tasks; AI tools have led to a 30% increase in faculty productivity in higher education.

According to wifitalents (August 6 -2024) AI-powered virtual labs have increased student engagement by 42% in STEM courses, AI chat- bots have reduced response times to student inquiries by 50% in higher education.

According to wifitalents (August 6 -2024) AI has helped reduce dropout rates in universities by 20% through early intervention systems and AI –based virtual mentors have improved student retention rates by 25% in some universities.

According to wifitalents (August 6 -2024) AI-powered plagiarism detection systems have led to a 40% decrease in academic misconduct cases and AI is used in 84% of US colleges for student recruitment and admissions and 59% of US college students are in favor of using AI to improve their performance in school.

According to wifitalents (August 6 -2024) AI based algorithms can predict students performance with 80% accuracy and overall 45% universities are already using AI chat- bots for student services and 85% of students prefer AI-powered tutoring for personalized learning support and More than 81% of universities in the world which use Artificial intelligence system in their education system in their feedback on assignments are more helpful for their learning.

5. Future perception on AI in education:

According to wifitalents (August 6 -2024) report , At present 96% of world universities believe AI will have a significant impact on higher education and 84% of university leaders say AI will augment and enhance the work of education professionals.

According to wifitalents (August 6 -2024) More than 73% of educators believe AI will improve student learning outcomes and 80% students believe AI will help them better prepare for exam and AI has resulted in a 20% increase in student satisfaction with online course content and delivery and 83% of instructors believe AI can provide personalized learning experiences for students.

According to wifitalents (August 6 -2024) AI tools have contributed to a 30% increases in student satisfaction with feedback on assignments and 65% of students believe AI-based peer tutoring systems have improved their learning outcomes , along this more than 76% of academic leaders believe AI will fundamentally change the teaching and learning process.

According to TechReport (May 29, 2024) using Artificial intelligence in education will increase education market worth $88.2 billion by 2032.The market for AI personalized learning is forecast to grow at a CAGR of 44.#% to reach &48.7 billion by 2030 , which up from $5.2 billion in 2022.

According to TechReport (May 29, 2024) using Artificial intelligence 37% of educators state that generating tests and assignments will pivotal to them and using generative AI to develop curricula it is very useful more than 38% of teachers says generating lesson plans is their most important use case for Artificial intelligence.

6. Conclusion:

According Elon Musk artificial intelligence technology is the ultimate at present and if we need to overtake this AI it is only possible by aliens. That's why artificial intelligence is important in education sector. Artificial intelligence based software and robots will work accurately and they will not face stress comparing to humans and AI based teachers will concentrate all students in the class room comparing human it is not possible to concentrate every students in the class room. AI play important role regarding immediate feedback to students related to their query, assignment, reading and learning will become very easy by using AI. Especially in India where more no students are there and resources are very small in number to overcome from this drawback artificial intelligence technology need to make compulsory in education system.

REFERENCES:

1. Acquah, A., Nsiah, T. K., Antie, E. N. A., & Otoo, B. (2021). Literature review on theories of motivation. EPRA International Journal of Economic and Business Review, 9(5), 25-29.
2. Adak, A., Pradhan, B., & Shukla, N. (2022). Sentiment analysis of customer reviews of food delivery services using deep learning and explainable artificial intelligence: Systematic review. Foods, 11(10), 1500. https://doi.org/10.3390/foods11101500.
3. Agee, J. (2009). Developing qualitative research questions: A reflective process. International Journal of Qualitative Studies in Education, 22(4), 431-447.
4. Kothari C R (2004), Research Methodology: Methods & Techniques, (2nd ed.) New Age International (P) Limited: New Delhi.
5. 4.Kumar, Ranjit (2005), Research Methodology: A Step-by-Step Guide for Beginners, (2nd ed.), Pearson Education: Singapore .
6. Acquah, A., Nsiah, T. K., Antie, E. N. A., & Otoo, B. (2021). Literature review on theories of motivation. EPRA International Journal of Economic and Business Review, 9(5), 25-29.
7. Adak, A., Pradhan, B., & Shukla, N. (2022). Sentiment analysis of customer reviews of food delivery services using deep learning and explainable artificial intelligence: Systematic review. Foods, 11(10), 1500. https://doi.org/10.3390/foods11101500.
8. Agee, J. (2009). Developing qualitative research questions: A reflective process. International Journal of Qualitative Studies in Education, 22(4), 431-447.
9. *I in Higher Education Statistics: Transforming universities and student experiences - WiFiTalents*. (n.d.). WiFiTalents. https://wifitalents.com/statistic/ai-in-higher-education/#:~:text=AI%20has%20led%20to%20a,increased%20student%20retention%20by%2035%25.
10. Sukhanova, K. (2024, May 29). AI in Education Market Statistics – Key Trends & Figures For 2024. *The Tech Report*. https://techreport.com/statistics/software-web/ai-in-education-market-statistics-2024/