

A Path Towards Child-Centric Artificial Intelligence based Education

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Abstract

Learners of all capacities struggle to keep up with a conventional schooling framework, and instructors have always been given more work than they can handle. Artificial Intelligence (AI) is transforming industries, including education. Education has already benefited from digitization in terms of accessibility and time management. In the near, this technology could revolutionize the way teachers educate children. AI, on the other hand, will eliminate this barrier by making learning available 24/7. AI can give real-time translations for students all across the world, allowing for integrated, global education. Along with the potential benefits of AI in education in this paper, we presented challenges in AI based education and also suggested a path way for child-centric AI based education

Keywords: *Artificial Intelligence, Student's centric, Education, machine Learning, Challenges.*

1. Introduction:

Artificial Intelligence (AI) is transforming industries, including education. In the near, this technology could revolutionize the way teachers educate children. In reality, it's already taking place. While not yet at the level of worldwide adoption that will be achieved in decades, schools throughout the world are incorporating AI programmes into their curricula to aid enhance teaching and learning.

AI is a strong technology that may be used to supplement existing educational systems. When it comes to education, it has long been hurdles to entry. Learners of all capacities struggle to keep up with a conventional schooling framework, and instructors have always been given more work than they can handle.

Education has already benefited from digitization in terms of accessibility and time management. However, as AI advances and expands, it will extend its reach even further. According to Market Research Engine, the AI in education market is anticipated to reach \$5.80 billion by 2025.

Recently, growing number of interactive instructional technologies have gained popularity. Teachers employ numerous learning systems like Moodle, Power school, Edmodo, and Google Classroom, while student uses tablet instead copybook. Massive Open Online Courses (MOOCs) such as coursera.com are available for online learning. Growing number of people taking MOOCs means that society supports digital and distant learning methods. And some of the courses may provide students with the

possibility to earn an actual degree from a prestigious university. Simultaneously, current breakthroughs in Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR), and their applications for education was observed. Many augmented reality (AR) education apps may be utilized to learn very abstract subjects. The primary purpose of this study is to assess the possible impact of artificial intelligence on learning process and to foresee changes in the educational landscape. A roadmap for artificial intelligence in child-centered education was presented.

2. A overview of the literature on Artificial Intelligence in Education

AI-Assisted Tutoring Some research [1,2] propose that the development of ITS is tied to human "natural language processing systems and learning analytics." All of those system is built on idea of efficient procedures that provides high-quality feedback to enhance and, in some cases, replace the activities of the instructor. Given the huge range of complicated activities that students may develop, recognizing that these systems provide tailored replies is a big step forward.

AI will have the biggest influence on customized education owing to automated support, according to [1], especially in the context of virtual contact. According to [3] one of the sectors related with computer-based technology that has significantly higher educational usefulness is personalized tutoring feedback. These researchers looked at a web-based smart educational environment for correcting assignments and keeping track of students' math progress. They led to the realization that feedback efficacy varies by gender, with women benefiting more from tutor feedback settings. Guys enhanced their inner drive faster than females, but girl's improved, emotions of competence faster then boys.

[4] shows how AI may be used for formative teaching, evaluation, and feedback by combining machine learning with checklist. Findings show that utilizing automated replies to assess student progress and identify area where clinical procedures may be improved was a successful method. [5] is particularly intriguing since the authors employ artificial intelligence (AI) to offer a collaborative teaching experience. The authors proposed "Collaborative Logical Framework (CLF)" based on AI for promoting debate and cooperation in the same way that traditional school learning approaches do. This intelligent aid was employed by the authors to monitor student conduct, which relieves teachers of some of their obligations. It's the adaptive guidance system to "e-learning platform (dotLRN)" which helps with student collaboration control and management.

Intelligent tutors already had actually offered encouraging help and assistance on several subjects from one's reasonable origins, like coaching in chemistry, genetics, programming, computing, medical diagnosis, circuits and geography, according to a survey of Ai technologies in higher education [1], and would be common tools for improving web learning in future. Some feedback and teaching systems, like [6] and [7], is also used for evaluation.

[8] AI was used in medical simulation training, and a Virtual Operative Assistant was built to offer learners with automatic feedback based on performance criteria. They categorize pupils based on the technical performance requirements using virtual reality and artificial intelligence, and the technology gives feedback to make them develop. [8] The findings in [9] may be found in the same medical sector. They look at how artificial intelligence may be used to design tests for e-learning platforms and develop clever algorithms for selecting questions for online exams.

According to the authors of [10] digital feedback system for learning situations had various issues, including inducing negative sentiments (discomfort, disinterest, aggravation, uncertainty, and a demand for confirmation) among higher education students. They used the qualitative method on the narrative dialogue technique, with the ultimate conclusion being that the design of digital interfaces should provoke positive emotions.

[8] studied the continuous monitoring and assessment of engineering student, and AI is utilized for providing tailored feedback and evaluates performance using qualitative and quantitative data. Furthermore, the authors of [11] concentrates "adaptive learning systems and self-assessment". In near future, people may expects adaptive digital learning system to combine manual and automatic strategies for elicit user interactions requests and offer accessibility. For persons with disabilities, including pupils with blindness, hearing, and physical impairments, normal students, they coupled a tailored framework with self-assess along with use of learning materials. The findings suggests a

procedure allow learners, impaired and normal students, for accurately assess, reveal their preference for accessing e-learning resources. However, they noticed that a few pupils with vision impairments experienced some interaction challenges. [13,14] authors discussed importance of AI in online exam, remote learning. AI may assist in the research and identification of plant diseases [12], covid-19 detection [15], and a variety of other tasks.

3. AI opens up possibilities in the Education sector

AI will boost a wide range of application cases in schools all across the world. While some are yet to be envisioned, there are a few areas where prospects are already apparent. AI benefits in education is shown in figure 1.

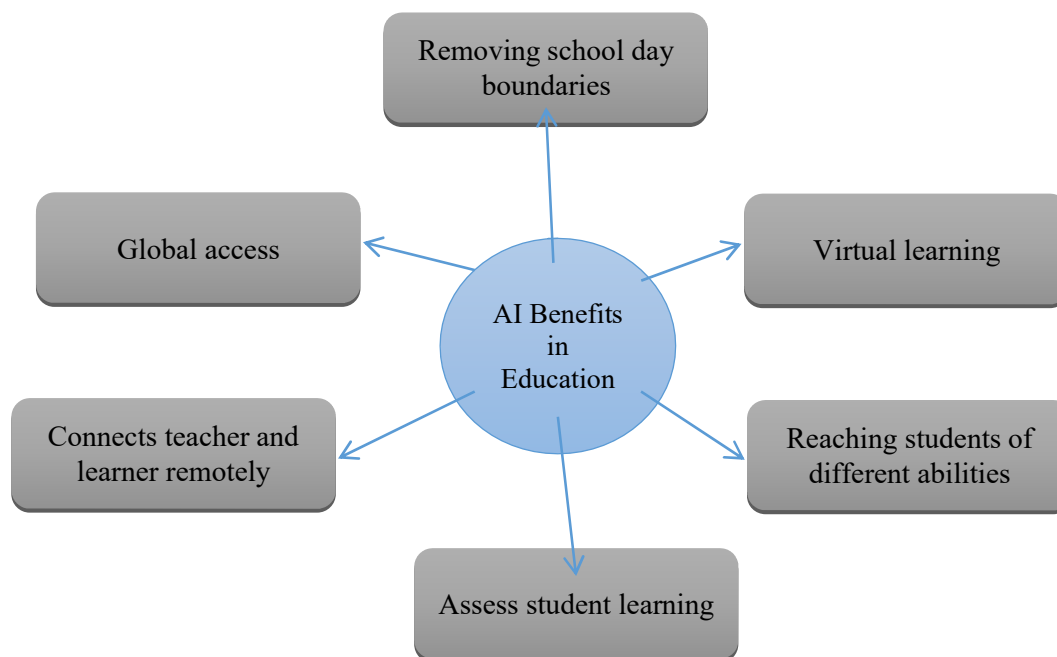


Figure 1. Benefits of AI applications in classroom

3.1 Removing the limits of the school day

Students must currently wait until the end of the school day to ask their instructor any questions. Being confronted with the reality that their child has forgotten how to calculate a Middle school arithmetic sum is every parent's greatest dread. AI, on the other hand, will eliminate this barrier by providing learning available 24/7. Student able to take help with the subject they have troubles with just when needed, by using chatbots. While early versions of these chatbots exist, they are still in their infancy and lack the seamless resemblance to a human instructor.

3.2 Increasing the reach of virtual learning

As a result of the COVID-19 epidemic, virtual learning has taken off years ahead of anticipated. Virtual learning has been proved to help increase educational chances for a wide spectrum of learners, and AI will aid even more in this sector. This isn't to say that in-person classes are going away. It will, however, assist in bringing virtual learners into classrooms who are unable to attend in person. AI can give real-time translations for students all across the world, allowing for integrated, global education. It will also aid in the creation of an interactive learning environment through the use of apps.

3.3 Reaching out to students of all abilities

Education is now designed towards the lowest common denominator. As a result, pupils with learning disabilities such as ADHD, autism, and dyslexia must either take specialist medication or attend a school specifically tailored for them to comply to the present framework. However, the use of AI might allow students of various abilities to attend the same school without having extra support. Users able to study based on curriculum at their learning speed, using AI apps which adapt to their

learning level and style, instead forcing kid for meeting set grade level, and permitted to developed according to their learning speed.

4. AI's challenges in Education

While there are advantages to AI, there are also risks when it is implemented in schools, refer figure 2. These concerns must be handled before they become an issue, since we can already see this technology being used in schools. Identity protection for kids utilizing these programmes, protection from hazardous information, and protection from location detection are all issues that need to be addressed. Along with security concerns, there are also questions regarding how AI may effect child development outside of the classroom. Because students will no longer be required to spend a whole day in a classroom together, the new setup will present issues such as social development.

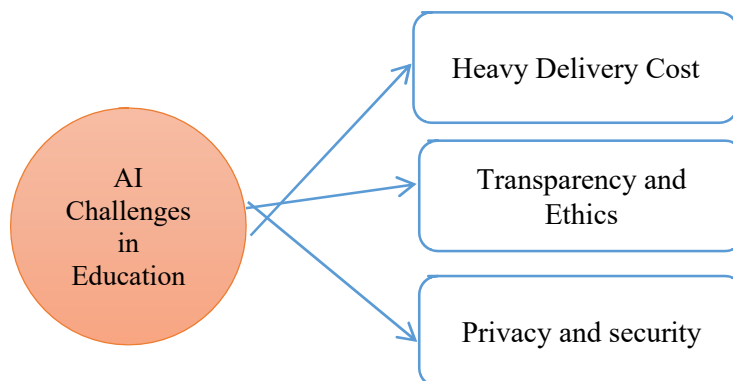


Figure 2. Artificial Intelligence challenges in Education

4.1 The hefty delivery cost

Financial planning and strategy are most difficult aspects of implementing AI in the education. Almost all of the times, budget is quite difficult. As instance, if every school is allowed to get a robot assistant, then quantity of power required would rise. As a result, countries would've been required to spend a big budget in order to satisfy their obligations. Another drawback is that power is not really a natural resource. For close this gap, you must first know what Intelligence learning techniques can be applied and how they can aid students.

4.2 Transparency and ethics

Certain societal and ethical issues must be considered while using AI. Technology advances at a breakneck pace, what really is presently unthinkable could become possible tomorrow. The very first subject which pops up in any discussion on digital ethics is information security and privacy. Problem is for using personal data that ensuring privacy choices and personally identifiable data of individuals were protected. Expressed and informed permission, openness, and justice must support data collection and usage.

5. Suggested path for Artificial Intelligence based child-centric education

This section suggested few Artificial Intelligence methods can be implemented in education sector, which helps children to grow a lot. The summary of features that AI provides for child centric education is shown in figure 3.

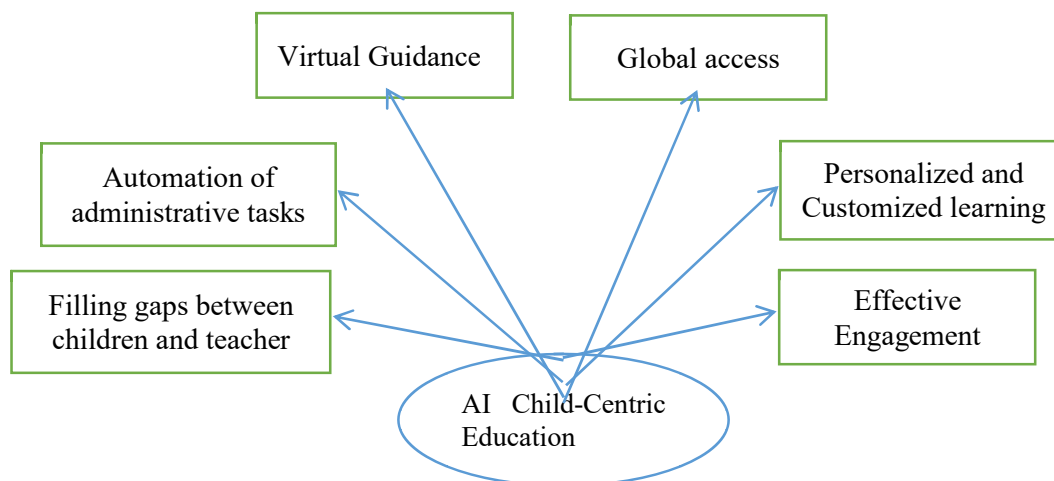


Figure 3. Features that AI provides for child centric education

5.1 Admin tasks can be automated.

An teacher's time is valuable when it comes to grading assignments and exams. AI can swiftly handle these responsibilities also while improves decision making on where to bridge in gaps in learning. Robots could now grade multiple-choice tests, and works on the way to scoring written responses. Teachers have more time to interact with every student as AI eliminates administrative duties. AI gives a plethora of possibilities for speeding up the registration and admission processes.

5.2 All students have global access to resources

Artificial intelligence technology helps make world classrooms more available to students, especially many who speak multiple languages or even have sight or hearing impairments. Presentation Translator causes real translations about what the teacher is saying. It also gives youngsters that are unable to return to school due to illness or who really need to learn at a greater level or in a subject which is not provided at their present school more possibilities. AI can help to bridge the gap among school and traditional grade levels.

5.3 Personalized and customized learning

Education has long valued personalizing learning to every student's specific needs, however AI will bring a level of difference which teachers will find difficult to accomplish with 50 participants in each session. As AI advances, this may be possible for a robot to scan a child's expression when they are experiencing difficulties understanding a subject and alter the teaching appropriately. Customized curriculum to match the needs of individual students is not currently possible, however will be the future for Intelligence robots.

5.4 Outside-the-classroom tutoring and support

Tutor and study methods are progressing thanks to artificial intelligence, then they will eventually be even more available and able of reacting to range of learning approaches. Many additional Ai systems for education are being developed, such AI advisors for learners, intelligent content generation, as well as an unique strategy to self improvement for teachers in virtual conferences. Although the use of machine learning and artificial intelligence in education is delayed than other disciplines, progress is being made and will remain.

Intelligent Tutoring Systems (ITSs) were computers which seek to provide students with individualized constructive feedback without a human teacher, often employing AI technology. ITSs had sparked a lot of attention due to their ability to provide a one-on-one education. Deep learning methods allow computers to offer personalized study plans to individuals.

With recent study, including work from Carnegie Mellon University this year, ITSs are becoming more successful. New ways for creating ITSs that can teach a number of courses, including mathematics, language, problem solving, fraction addition, and chemistry, were demonstrated by the researchers.

5.5 Virtual Learning Environment

virtual classroom seems to be a teleconferencing platform that enables students and teachers to engage with each other along with learning material. Virtual classrooms differ from standard teleconferencing systems such that they offer extra important features inside a learning environment.

Instructors can use virtual classroom software to:

- ✓ Control student engagement
- ✓ Show instructional resources such as papers, slide decks, or multimedia files
- ✓ Enhance the learning experience with screen-sharing and virtual whiteboard features
- ✓ Divide the audience into breakout areas where the teacher can join
- ✓ Engage the audience with polls and quizzes
- ✓ Keep a record of the meetings

5.6 Chatbots and social networking sites

Through social media sources, social networking site (SNS) link student and instructor. Researchers have underlined the value of using social networking sites (like Facebook) to extend learning opportunity outside of classroom, monitoring students' discipline, and strengthen teacher-student relationships [16]. Several researchers have looked at the influence of social media on student and teacher learning as well as academic communication. They claim that incorporating social media into the classroom helps promote active learning, collaborative skill, and connection with communities outside of classroom [17].

Chatbots may also be found on social networking platforms, thanks to various AI system, and called as conversational agents[21]. Chatbots are useful because they can react naturally and in a conversational tone. At Georgia State University, for example, the text-based chatbot named "Pounce" is deployed to assist students with financial assistance, admissions and registration process, and other administration activities [18].

5.7 Predictive analytics and facial recognition systems

Face detection and recognition software is used to collect and analyze students' facial movements. Such tools provide teachers with information on their students' behaviors during the learning experience, enabling them to engage or take some action, as well as create student-centric practises and increase student participation.

Predictive analytics algorithm methods are usually used to detect and recognise patterns in students based on the statistical. Such analytics could be used to discover students at risk of failure or inability to complete a program, for instance. To use these recognition, teachers may engage and then get students the help need [22].

5.8 Automated evaluation systems

Notable and promising uses of ML in K-12 education is automated assessment systems [20]. Scoring systems were being created to address need for grading students' essays, tests, and assignments, as well as teacher-assigned duties. Assessment algorithms can help teachers reduce their burden and increase their capacity and productivity by providing course assistance and management tools. These systems, in theory, may give students with various degrees of help because their writings can be assessed promptly [22].

Automated scoring engines have been embedded into the learning platforms of largest free online course providers, like EdX, Coursera, to score writings of 100's of students [20]. Over 500 colleges, on the other hand, have adopted a technology called "Gradescope" to build and expedite scoring and evaluation [19]. The programme assists educators by eliminating human grading time and effort by identifying incorrect responses and marking correct ones. As a result, automated assessment systems treat essay marking and feedback considerably differently than quantitative assessments, which

examine correct and incorrect test responses. These scoring system has capacity to deal with complexities of instructional environment while also assisting students in their learning process by offering feedback and suggestions on how to enhance and edit their writing.

6. Conclusion

Students of all abilities struggle to keep up with traditional schooling, and teachers are always given more work than they can handle. Artificial Intelligence (AI) is revolutionizing a variety of areas, including education. In terms of accessibility and time management, education has already profited from digitalization. This technology have potential to transform the way teachers educate students in the near future. Artificial intelligence, on the other hand, will remove this barrier by making learning available around the clock, seven days a week. For students all across the world, AI can provide real-time translations, allowing for integrated, global education. Heavy delivery cost, ethics, transparency, privacy and security are the problems in AI-based education and specified a roadmap for child-centric AI-based education in this study, along with the possible benefits of AI in education.

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