

Artificial Intelligence and its Impact in Education

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ABSTRACT

Due to Increasing in computational power and availability of massive amounts of data have made Artificial Intelligence (AI) and Machine Learning (ML) a changer of productivity for many industries. In Education, AI has seen rapid progress in recent years as it aims to develop new teaching and learning solutions to improve education quality, increase efficiency, and promote educational equity.”

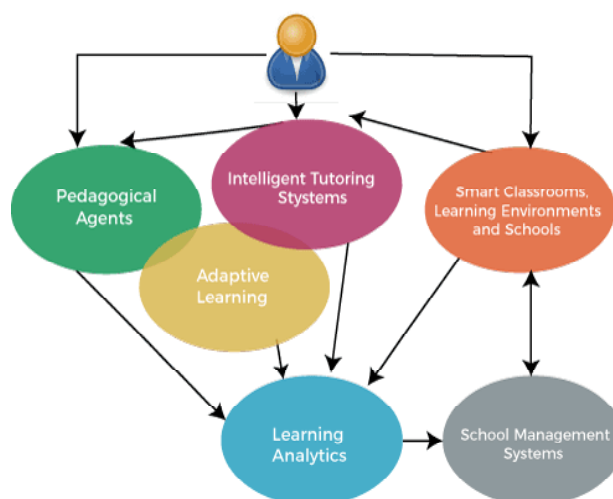
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Education is an integral part of everyone’s life, and a good education always plays a vital role to have a successful life. Improvement in education system for the students, there are always a lot of changes happening around the world, ranging from the way of teaching to the type of curriculum. Artificial Intelligence is being used in almost every field and is changing the world.

Artificial Intelligence (AI) is a simulation of human intelligence into a computer machine so that it can think and act like a human. It is a technology that helps a computer machine to think like a human. The aim of Artificial Intelligence is to mimic human behaviour.

Artificial Intelligence in Education is developing new solutions for teaching and learning for different situations. Now a day, AI is being used by different schools and colleges across different countries. AI has given a new perspective to teachers, students, parents, and educational institutions.

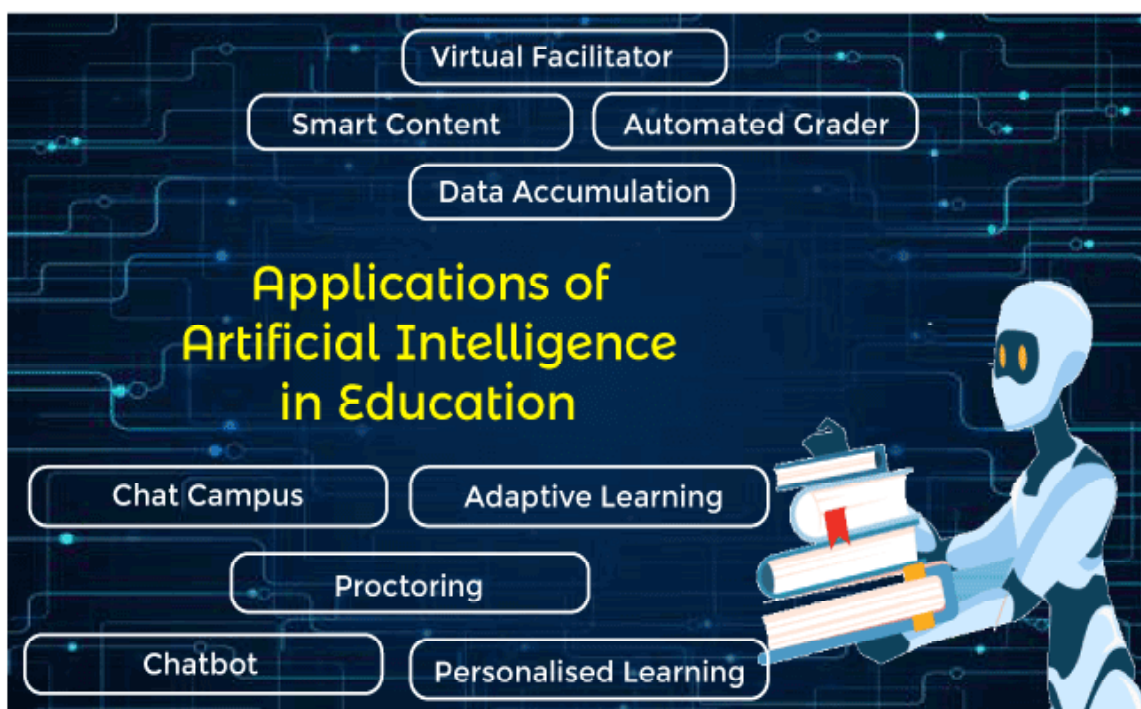
Artificial Intelligence in Education has used in 1970 as a specialist area to cover new technology to teaching & learning in higher education. The main aim of Artificial Intelligence in Education is to facilitate the learners with flexible, personalized, and engaging learning along with the basic automated task. Some popular trends in Artificial Intelligence in Education include intelligent tutor systems, smart classroom technologies, adaptive learning, and pedagogical agents. The given diagram shows the relationship between all these trends.



Artificial Intelligence in Education has become a hot topic because it changes how we learn quickly. So what does this mean for children? Is there any shift for children due to AI being incorporated into their learning process? Artificial Intelligence in education has the potential to be a game-changer for every child. Many schools are already using AI across the country, and you must know how AI can benefit your child.

Roles of Artificial Intelligence in Education:

Technology has always played an important role in education, but its current use is more prevalent than ever thanks to the increased availability of smart devices and web-based curriculum. With the rise of Artificial Intelligence in education, there are many different ways it is being used to help students learning. Here I am discussing a few technologies with AI that are already affecting and will affect education in every way:



1. Chat GPT: Chat GPT is a computer program that is designed to understand and respond to human language in a natural and human. Think of it like a virtual assistant or a Chatbot that can understand and respond to written or spoken language. It's been trained on a large dataset of text from the internet and it can be used for a variety of tasks such as answering questions, translating languages, and even writing creative text. It could be used in education to create an intelligent tutoring system that can understand and respond to student's inquiries, or in customer service to help people with their questions.

2. Chatbots: Chatbots are examples of AI educational apps. These are being increasingly implemented into classrooms where kids use iPads or laptops to chat with bots designed to help them understand specific topics such as math or reading comprehension. It's possible Chatbot tutors could do more than just help students learn new concepts. Chatbots are the future of all technical roots. It reduces the cycle of tasks assigned to teachers. Chatbots used in classrooms could also replace email communication between teachers and parents while parents meet also.

3. Virtual Reality (VR)

Virtual reality is recent innovation in education, which is being used for everything from teaching history to help in math to the students. Virtual Reality is a 3-

D computer-generated environment that people can explore and interact with. VR is a great way to help students feel connected to each other. The long distance learners can communicate safely while they are in different classrooms but using the same virtual reality program. With help of Virtual Reality students can explore things that they may never have the opportunity to see or learn about in real life. Teachers can also find much more engaging ways of teaching for their students. By using VR they will feel much more immersive than sitting in front of a screen or being inside a computer-generated environment.

4. Learning Management System (LMS)

In the era of technology, one of the most important things is to stay up-to-date with advancements in education. One of these advancements is the use of Learning Management Systems. A learning management system provides a centralized, intuitive system for managing all of a school's on-line activities. These tools can be used for a variety of purposes, namely:

- Assign course work
- Communicate with students and parents
- Track student progress
- Generate reports on student performance

These systems allow all aspects of a course to be contained within one space, from lessons and assignments to assessments and grading. This means that teachers can provide feedback on any assignment or assessment at any time. Students have instant access to their grades without waiting until the end of a semester. A lot of topics can be learned by using these LMS with AI software. A learner can get help by using an AI-powered intelligent digital tutor, which helps them with their problems and provides them with the correct answer to solve their problem. With Artificial Intelligence, one can even build a learning management system that is able to understand how students are thinking and help them learn better. There are now LMS systems that can help teachers in creating content, helping parents in monitoring their child's progress in the system, and assessing them with an AI engine. This has helped teachers reduce classroom management time, assisting parents in understanding their child's progress better and lessening teachers' work load. LMSs are an invaluable tool for both teachers and students alike.

5. Robotics

Robotics with Artificial Intelligence in education has increased over the last few years. It is now being used for both teachers and students to help in education, which can be seen to improve student engagement and safety. With AI's current development, robotics in education is inevitable. Robots can be an excellent resource for learning for both students and teachers – a way to explore a topic in-depth without getting bored. For teachers, this means robots can provide a way to have more one-on-one time with students who need additional help. It also allows them to experiment with new ways of teaching, which is essential when trying to reach different types of learners. For students, it's a chance to teach themselves something new without the pressure of being the only person in class or having their peers judge them for making mistakes. Robots can offer that space where they don't feel embarrassed if they don't get something right away. Robotics is vital for students because they can teach them that engineering is more than just solving problems on paper or drawing on a mat. They can see the outcome of their efforts and the final result.

Teachers can also use robotics as an instructional tool to teach lessons about current events

or even math concepts like fractions. As technology evolves, it will undoubtedly play an essential role in people's lives.

6. Duolingo: a language learning app that uses AI to personalize lessons for each user

7. ALEKS: an AI-powered math learning platform that provides adaptive assessments and personalized learning plans

8. Coursera: which uses AI to recommend courses to students based on their interests and previous learning history.

9. Question Pro:

Recently, Question Pro has announced QxBot, a feature that will allow you to create surveys and evaluations in seconds. Here's a quick demonstration of this amazing feature that will be a huge help in your next academic research:

Characteristics:

1. Automate basic activities in education.
2. Save time in grading tests and home works.
3. Generate MCQ, fill in the blanks and evaluate responses.
4. Support for students with AI tutor (Not Real).
5. Student can learn complex problems without presence of real teacher.
6. Helpful feedback to students and teachers with AI-driven programs .
7. Easily find the wrong responses when a group of students are submitting assignment.
8. Immediate system generated response, which help students to understand a concept and remember their mistakes, and also how to do it correctly the next time around.
9. Instant feedback to learners instead of waiting for feedback from the professor,
10. Artificial Intelligence can automate different tasks such as grading, reports, help students while learning, and may also be an option of real-world tutor
11. AI systems can be programmed to provide personalized learning to students.
12. With personalized learning, each student can have their own way of learning as per their level of understanding and need.
13. By understanding the needs of every student, teachers can come up with a tailor-made study

plan for every student. As AI is developing day-by-day, it is possible that machines can identify the facial expressions of students while learning the concepts can understand if they are finding any difficulty in learning, and according to that make changes in the way of teaching.

14. Ensure Access to Education for Students with Special Needs. Such as deaf or hard of hearing, visually impaired, etc. These students do face various difficulties while learning and studying.
15. One of the great uses of Artificial Intelligence in education is universal access to study material. Each student has his own grasping capability, and with the use of universal access, they can learn from anywhere and anytime. Students can explore things whenever they want to learn without waiting the teacher. Moreover, students get the facility of high-quality courses and material from all over the world at their place only without travelling away from their home.
16. We can Generate Smart content with help of AI, in three ways:
 - a. **Digital Lessons:** with the growth of technology everything is becoming digital, either education or other field of education. Digital learning is being preferred in colleges with customization options, e-books, study guides, audio-visual lessons, and many other things with the help of AI.
 - b. **Information Visualization:** Visualizing things rather than listening is much more efficient to understand in a better way and keep in mind for a long time. With Artificial Intelligence, the study information can be perceived in new ways of visualization, simulation, web-based study environment.
 - c. **Updation of Learning content:** AI also helps in preparing the content of lessons, keeping information up to date, and make it adaptable as per different learning curves.

Merits and demerits of Artificial Intelligence in Education

Merits:

1. 24x7 access to Learning
2. AI can make their learning easier effective and productive.
3. With AI-driven digital Learning, students can learn anywhere, anytime.

4. AI can grade papers and essays much faster than a human can.
5. AI will give teachers more time to work with students on critical thinking skills and critical analysis skills.
6. Allow teachers to focus on individual students who would benefit from their guidance.
7. With AI-driven programs and personalized learning, students feel less pressure of studies.
8. AI can be used to create personalized quizzes and games that help students to engage with the material in a fun and interactive way.
9. AI-powered tools and technologies are helping to enhance the learning experience for students in ways we never thought possible.
10. AI can help educators to create customized lesson plans and assessments that align with each student's unique strengths and weaknesses.
11. AI can provide insights about student learning styles and giving hands-on feedback for students who need more practice with specific topics or skills.
12. AI-enabled virtual assistants help the students whenever they ask a question, with a complete explanation.
13. It reduces traditional learning methods, a student needs to ask queries in class in front of everyone, which might hesitate some students, and these issues can be resolved with the help of virtual assistants.
14. AI doesn't get tiring, doesn't have mood swings, and doesn't have a life outside of education.

Demerits:

1. A robot might not be as good a teacher as a human can be.
 2. AI in education may not always be successful in teaching.
 3. AI does not feel emotions of students.
 4. This is an emerging field, and it's being studied at universities worldwide where professors are working on developing AI technologies that improve our lives.
- “ AI in education is not about humanoid robots as a teacher to replace human teachers, but it is about using computer intelligence to help teachers and students and making the education system much better and effective.” -
(A report)

Future of AI in Education:

As per the researches, AI in education will step in three main ways, which are:

1. It will be possible to create personalized curriculum with the development of AI technology. The new innovations and solutions in AI help the teacher to track, measure, and monitor the progress of learners. It provides a complete journey of the learning of a learner across the platform.
 2. AI in education will find new solutions that can evaluate work and tests exams using established criteria in order to eliminate bias.
 3. AI will assist Professors or teachers in their jobs. Usually in higher education professors have masters in their field and have a degree in specific areas of development. But lack of administrative knowledge they often become frustrate. AI in education can solve this problem in the future with smart classrooms with AI assistance that can provide necessary help to the teachers to give their best.
- CBSE introduced AI curriculum for class VIII & IX from session 2023-24. The main objectives of CBSE to introduce this curriculum are:
1. Identify and appreciate Artificial Intelligence and describe its applications in daily life.
 2. Relate, apply and reflect on the Human-Machine Interactions.
 3. Identify and interact with the three domains of AI: Data, Computer Vision and Natural Language Processing.
 4. Undergo assessment for analyzing their progress towards acquired AI-Readiness skills.
 5. Imagine, examine and reflect on the skills required for the futuristic opportunities.
 6. Unleash their imagination towards smart homes and build an interactive story around it.
 7. Understand the impact of Artificial Intelligence on Sustainable Development Goals to develop responsible citizenship.
 8. Research and develop awareness of skills required for jobs of the future.
 9. Describe the potential ethical considerations of AI.
 10. Develop effective communication and collaborative work skills.
 11. Gain awareness about AI bias and AI access and describe the potential ethical considerations of AI.
 12. Learn problem scoping and ways to set goals for an AI project and understand the iterative nature of problem scoping in the AI project cycle.
 13. Brainstorm on the ethical issues involved around the problem selected.
 14. Foresee the kind of data required and the kind of analysis to be done, identify data requirements and find reliable sources to obtain relevant data.
 15. Use various types of graphs to visualise acquired data.
 16. Understand, create and implement the concept of Decision Trees.
 17. Understand and visualise computer's ability to identify alphabets and handwritings.
 18. Understand and appreciate the concept of Neural Network through gamification and learn basic programming skills through gamified platforms.
 19. Acquire introductory Python programming skills in a very user-friendly format.

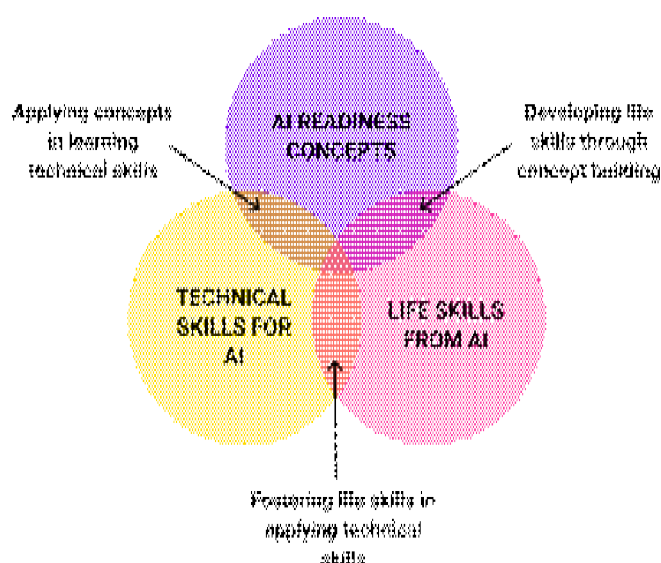
Challenges of AI in Education:

The challenge of learning how to use technology is for the students and the teachers. In most cases, the problem is that teachers are not being trained on how to use the new technology in their classrooms. As a result, they have to figure it out themselves or find someone they already know. Teachers need help in understanding how these tools can be used in order to provide students with an engaging learning experience.

Quality: When a teacher do certain practices many times in class, they become better for him. But AI-based never do better with the teaching process.

Stimulate Technology Addiction:

The school has been traditionally a place where students have to take out their mobile phones and tablets and have to open old textbooks. With implementation of technology in every class, students would not be able to conceive their future lives without it. On behalf of that, after few decades, society will get huge of technology-addicted and socially un-adapted adults. All of this will happens because AI can stimulate technology addiction.



High Cost : The major challenge with implementing AI in school education is planning and strategizing the budget of schools. Most of the time budget becomes very difficult to forecast. Another negative point regarding this challenge is the electricity supply which is not a renewable resource. This is also a challenge to decide which AI-based learning tool is available and beneficial to the students.

Unemployment: Teaching is a noble profession. If all the teachers are replaced with AI robots or another system, there will occur unemployment. The situation that occurred in the industrial revolution is a better example for this. There were strikes and protests when people were replaced by machines having the same functions. Like it, teachers have the capabilities of starting movements and protests. So this unemployment is a major challenge that can be occurred in the future.

Misuse : If the system is hacked, hackers would get the ability of spreading violence, wrong information, and broadcast. Due to this, students and teachers would not be able to get the right information at the right time.

Dependency: If AI is applied for school education, humans will get more assistance from machines and it will shrink their own abilities. Therefore there is a risk that people will use machines not because it is more competent, but because of they can't do it using another method.

No Alternative Teaching Methods

Teachers can apply different methods to solve

a specific problem. If a student can use one approach, the teacher will come up with an alternative one. It develops the flexibility of students' minds. However, a robot will offer an accepted and accurate solution but without alternative variants.

Spread Wide Gap Between Rich & Poor

Some AI-based tools including e-content, bots require students to have a laptop or a tablet. But every student may not in an economic situation to have such devices. This will create a gap between students who have those devices and not having them as soon as the government takes the responsibility of funding all the technological implementations. It is also again a challenge.

Unclear Ability To Learn With A Virtual Assistant

It is still an unsolved problem whether students would be invested in education and motivated for studying while teachers are not there for supervising. Sometimes there may be an expectation to impress a specific teacher that makes students eager to prepare for the lessons. But it is not sure whether that excitement remains with a robot as an assistant. It is unclear. That situation is also a challenge and a risk for the ongoing education process if AI is implemented.

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