



# Concept, Uses, Advantages and Limitations of Artificial Intelligence in Education

Guide

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## Abstract

The contribution of computer science (AI) to the field of education is always important. From robotic learning to the phenomenon of automatic systems answer sheet analysis, AI has always helped every lecturers and students. In present study, the researcher studied different literature and past research papers conducted on Artificial Intelligence in Education, the researcher also analyzed latest research on applications of Artificial Intelligence in Education and then constructed this paper. In this paper, the researcher focused on concept of Artificial Intelligence, uses of Artificial Intelligence in education,

**Key words:** Artificial intelligence, education, uses of AI, advantages of AI, limitations of AI.

## Introduction

The emergence of big data, cloud computing, artificial neural networks and machine learning have enabled engineers to create a machine that can emulate human intelligence. Based on these technologies, this study refers to machines that are capable of perceiving, identifying, learning, reacting and solving problems as artificial intelligence (AI). AI is currently seen by many as a driver integral to the fourth industrial revolution, and it may trigger a fourth revolution in education. Learning about AI is also starting to become part of the school curriculum. However, just as the emergence of television and computers were once regarded as education game changers, they have in fact been shown to increase access to information without significantly altering core educational practices. However, educators are obligated to review current AI capabilities and

identify potential ways to optimize learning. Given the increased attention, it is timely to review recent AI research in education to provide educators with an updated understanding of the field as preparation for potential changes.

## Artificial Intelligence in Education

The International Artificial Intelligence in Education Society (AIED) is an interdisciplinary community at the border of the fields of computer science, education and psychology. The International AIED Society was launched on 1st January 1997. It brings together researchers by organizing the International Journal of AI in Education (IJAIED) and the AIED Conference Series.

In general, there are four areas of AIED in educational support services, and organizational and administrative services such as profiling and prediction, assessment and evaluation, adaptive systems, personalization and intelligent tutoring systems. The field of AI is both innovative and derivative.

Artificial intelligence is an emerging technology that has begun to transform educational tools and institutions. Education is a field where the presence of teachers is essential which is the best educational practice, the advent of artificial intelligence has changed the job of the teacher which is irreplaceable in the education system. AI mainly uses advanced analytics, deep learning and machine learning to monitor the movement of a particular person among others.

As solutions in AI continue to reach higher levels it helps identify gaps in teaching and learning and enhances teaching excellence. AI can streamline efficiency, personalization and administrative tasks so that teachers have the time and freedom to provide understanding and adaptability – uniquely human capabilities where machines would struggle. A combination of machines and teachers is possible to get the best results from the students.

## Uses of Artificial Intelligence on Education

Artificial intelligence enabled solutions and tools in the education sector empower teachers and students with a wide range of learning and teaching opportunities in various formats.

### 1. Administrative Task Automation

AI's advents have automated most of the administrative tasks resulting in teachers and organizations having more time to communicate with students, plan for class or focus on other essential activities.

### 2. To Improve Grading System

Teachers often spend a lot of time grading exams, reviewing homework, and giving feedback to their students. AI can be helpful here. Using AI, teachers can automate grading for multiple-choice and almost all types of open-blank tests.

### 3. Smart Content

Traditional courses were enabled by AI to create customized textbooks. Such textbooks are being digitized, creating new learning interfaces to help students of all academic standards.

### 4. Smart Tutorials

The Smart Tutoring System allows for customized online tutoring that suits students' learning styles and preferences. Such programs cater to the needs of students by placing more emphasis on those subjects, reinforcing what students have not learned. It also allows students to work at their own pace.

### 5. Personalized Learning

A number of educational programs have been developed that optimize the speed of learning and instructional methods for each learner's needs. These AI-powered apps allow students to customize learning where their teachers provide personalized and tailored feedback.

## Advantages of AI

Nowadays youngsters spend a lot of time using their smartphones or tablets. This gives them an opportunity to study for ten to fifteen minutes in their free time using AI applications. AI helps us understand the mood or ease of a student during a lecture using gesture recognition technology. As AI becomes more sophisticated the machine reads the student's facial expressions or gestures and uses it to know if the student is having trouble understanding the lecture and change the lesson so the student can follow along easily.

The advantages of AI are as given below:

- Customization of educational curriculum can be done by AI powered machines.
- AI tools can make possible global classrooms that include people with visual or hearing impairments.
- AI provides many resources for people who speak different languages or have hearing or visual difficulties.
- Admission and enrollment processes may also be powered by AI in the future and its full potential is not yet out.
- AI can help students with their homework or test preparations at home.
- AI can create groups among students that are suited for specific tasks. This is known as adaptive group formation.
- Artificial intelligence in education is a computer-based technology that provides personalized, adaptive and intelligent learning.
- The voice assistants based on AI for example, google assistant, Cortana from Microsoft, Apple's Siri and Alexa from Amazon help students to converse directly with the educational material that are present on the internet.

### The benefits of AI for students:

A student's main goal is to absorb as much useful information as possible in the shortest possible time in order to earn a degree and join the workforce.

AI can help students to improve education by:

- Providing access to the right courses.

- Improving communications with the teachers.
- Freeing up more time to focus on other aspects of life.

### Benefits of AI to the faculty

A major point of contention for teachers and faculty is lack of time. Some of them want to focus more on research while others want more time for some work with students.

AI can help faculty by:

- Automating a variety of tasks.
- Analyzing students' performance.
- Bringing education gaps to teachers' attention.

### Limitations of AI

Although it has added numerous benefits to the educational sector, the use of artificial intelligence in education has its pitfalls. Here are the potential cons of using this technology in education.

- **Expensive**

The cost of AI technology is a significant drawback for its use in education. It is expensive to set up and maintain as most leading educational institutions have access to it. The fact that many regions do not have access to this technology also hinders its implementation in learning.

- **Poor Personal Connection**

Humans are social creatures that need to develop social bonds. Excellent physical communication and interaction between students is an integral element needed to prepare students for the world beyond the university or college.

Students miss the opportunity to develop their communication skills and form new bonds. Lack of personal connections also creates the risk of poor rapport between teachers and students. Such a situation can cause teachers to miss critical points or dilemmas in their students' experience.

- **Reduction in the Demand for Tutors**

One disadvantage of artificial intelligence in education is the potential to reduce the demand for tutors. Many teaching assistants fear losing their jobs due to becoming irrelevant in the classroom. The number of students that teachers can take the course has increased significantly. Also, higher education can maintain efficiency levels regardless of class size when using AI-powered tech.

- **Addiction**

As we rely on machines to make everyday tasks more efficient, we risk technology addiction.

- **Efficient Decision Making**

Computers are getting smarter every day. They show not only the ability to learn, but also the ability to teach other computers. However, it is debatable whether they can implement intuition-based decision making in new situations, which often arise in the classroom.

- **Loss of Information**

When the inevitable happens and the AI needs repairs, some information might be lost.

### Final Thought

Given the rapid growth of AI, there is an urgent need to understand how educators can best use AI technologies for student academic success. This paper reviewed AI in education research from 2010 to 2020. It is found that the research to date can be classified into three dimensions: the development dimension including classification, matching, recommendation and deep learning; dimension of extraction including feedback, reasoning and adaptive learning; and the application dimension which includes affection computing, role playing, immersive learning and gamification. Additionally, based on the research questions and related AI techniques, four research trends were identified. It is an assessment of the impact of AI in Internet of Things, Swarm Intelligence, Deep Learning and Neuroscience as well as Education. The challenges of AI in education were also clearly seen in terms of technical perspective, roles of teachers and students and socio-ethical

issues. These findings can be a valuable reference for academic researchers, students and AI developers who plan to contribute to related studies. Additionally, it seems clear that educators need to work with AI engineers to bridge the gap between technique and pedagogy.

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