



ARTIFICIAL INTELLIGENCE: A COMPREHENSIVE LOOK INTO THE FUTURE OF TEACHING

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Paper Received On: 20 MAR 2025

Peer Reviewed On: 24 APRIL 2025

Published On: 01 MAY 2025

Abstract

Progress cannot merely be defined by restructuring or redeveloping conventional/existing methods, alone. When the first automobile was invented, it was done with hopes to revolutionize the way we travel. We didn't focus on making horses go faster, but rather developed machines that could take us to farther distances, with comfort and reliability. Similar hopes surround the idea of innovation, and with that being said, every innovator in our current technological and industrial landscape has been occupied with development and innovation, through the creation of new designs, gadgets and technologies. Amongst such inventions, artificial intelligence (AI) has taken the world by storm, revolutionizing every sector it entered. Here, in this brief exploration, we shall look into the contributions of AI in education and how it reshaped teaching/learning processes, with a special emphasis on the nature and technical features of AI, it's relevance and an outlook on the future of education.

Keywords: *AI in Education, AI in teaching methodology, Future of teaching, Impact of Artificial Intelligence in teaching.*

Introduction

The advent of AI and its inclusion in public-private sectors have highlighted vivid areas (limitations) of manual-human processes. For instance, during conventional times, a teacher could not identify plagiarised content unless he/she is familiar with it. But now, through the assistance of software and AI-driven tools, educators can easily trace out plagiarized content, even from bulk submissions. These technologies have basically turned our dicey or complex (traditional) methods into convenient, time-saving and effective procedures. Further developments of computing systems have given rise to tech-assisted instructions, applications

and learning systems. These applications found wider ground in the educational sector as innovations kept moving forward.

AI basically refers to the machine's capacity of adapting towards new situations. It revolutionised work processes by imitating human-like actions, such as content creation, analytics, decision-making and more, with ease and speed. AI has been able to render human-work with accuracy, drastically minimising the occurrence of errors. As promising as it sounds, it still poses the question, as to whether automated designs and technologies would render manual labour off public-demand in the coming years. While this is a discussion for another paper, here we shall place our keen emphasis on how AI improves the education sector, with a keen emphasis on its technical features.

AI introduced several concepts and tools. For instance, machine learning and deep learning algorithms have enabled computing systems to read, analyse, write and explore the web, as a human would do, with minimal effort and shorter time-periods. AI models are able to access and reflect on expansive databases instantly, whereas human intervention would typically take perhaps days to reach a general conclusion. While there are bugs, and an inauthentic basis of information, regular updates are being designed by developers to improve the inherent flaws and turn AI models into perfectly accurate tools. AI is fostering a better/improved learning environment by shaping new possibilities, providing methods for personalized education, producing cohesive and comprehensive content, creating global learning opportunities and creating an enhanced/integrated administrative system for educational institutions.

Technology's nature

AI tools in education use embedded systems. One of the newest developments are "cobots", which are robots basically designed to assist the educator/teacher with regular tasks like fixing pronunciation or spelling errors, register attendance sheets, understand students' needs and improve elementary knowledge-bases with better/broader insights about the real-world. Educational resource provisions have improved significantly after the usage of online platforms (like google classroom). Online classes have combined several areas to make the educational experience much more profound and holistic. For instance, during initial phases students would often worry about downloading relevant material. But now, while there already is an expanse of material to download from, students can remain in touch with their teachers, classmates and collaborate in groups from the comfort of their homes. Downloading has become convenient as the suggestions from teachers would help tremendously and all sorts of study-material can be accessed anytime and from anywhere on the globe.

There's also a keen focus on tailoring or directing specialized teaching methods to individual students, through the implementation of Deep Learning and Data Mining systems. While we tend to associate AI, typically with computers, its nature and technicalities have transcended the bounds of both hardware and software. Now, AI is being developed and incorporated into sensors, chatbots, smart devices, surfaces, buildings, establishments, computing systems and robots. AI now leads the race of technological development, by creating tools that effectively mimics or showcases human intelligence. Researchers/experts have argued that AI approximates human reasoning and intelligence. To understand this, we must first learn in a simple way, how this technology basically works within educational settings.

AI driven tools tend to excavate databases pertaining to the respective institution. For a college, the AI interface would analyse the institute's historical data-sets, student records, performance statistics, courses, books, study materials and whatever form of data is available, to answer questions or provide meaningful findings. The course of having to go through large amounts of data to provide single answers/solutions leads to the factor of approximation. However, developers are still training AI models with real-time data to enhance its performance, for it to produce accurate depictions or results, with lesser vagueness or approximation. Currently, AI models that are used in the educational sector have been helpful to both teachers and students because, apart from the factor of approximation, it is able to sum up bulk-loads of data/information, altogether providing meaningful conclusions that would otherwise take days through an individual's (manual) effort. It's safe to say that AI is a time and cost-effective solution right now.

AI tends to adapt towards its surroundings and perform tasks that require human-like intelligence. It's now included with mobile devices, watches and smart gadgets, altogether enhancing the utility of said-device and introducing new features, like face-recognition and virtual reality. The advent of VR through AI provides an incessant leap for the education sector, as it facilitates the cause of event-based learning, wherein students can learn in a better way, either through simulated environments or visual representations of subjects/topics. While machine learning requires an extensive amount of computing power to render complex processes, developers have worked on platforms to counter the inadequacies that were prevalent during AI's initial phases. Platforms like Qualcomm's Snapdragon Neural Processing Engine and Android's Neural Networks API have significantly taken remote/online/mobile education to a whole new level. Interactive features have allowed students to create their own

(personalised) learning environments. In other words, students can create a space of comfort and proceed to learn new things. During conventional times, learning wasn't as effective as it is now, because students would feel uncomfortable communicating with teachers, doubts wouldn't get addressed in a large classroom and, truth be told, there were several distractions within the traditional classroom environment. Personalisation now allows students to stay in touch with the classroom, through virtual platforms, access study materials, engage in learning activities and directly contact (individual) professors in their time of need. These methods conveniently allow students to clear their doubts, learn in a better way and produce better results in their academic performances.

Impacts and technical features

AI education systems include content, learning resources, data, algorithms and other relevant materials, which (collectively) are divided into two main parts. First is the System Model, comprising various teaching and knowledge frameworks. This model aids the process of creating data-maps that are crucial for structuring rules and administrative processes. The model aids decision-making processes by analysing large (historical) data-sets of the institution. The system model is also identified as the AI module's core. The second one is the learner model, which is necessary to improve the facilities of independent learning. This model works on the basis of students' behavioural data which is generated throughout their academic session. By analysing patterns and thinking capabilities, this model is able to assess the potential of students and altogether determine the mastery of their skills and knowledge-base. The learner models utilise data pertaining to teaching behaviour, study material and educational resources. It also presents a knowledge structure map that includes mistakes, feedback and misconceptions. So, with both models combined, the AI interface is able to produce a holistic picture, under the basis of which teachers can shape their teaching strategies and students can focus on their methods of learning. In a nutshell, AI improves the conditions for both teachers and students in the currently evolving educational landscape.

AI systems provide support based on built-in teaching theories. For instance, the interface shall monitor the student's progress, emphasising on key inputs through typed content, voice notes, images, animations and so on. Additionally, there are advanced human-machine interfaces that provide AI driven tools like natural language processing, speech recognition and emotion detection. Such insights provide the educator distinct ideas about the learner's position, capabilities, skills and so on. So, by improving and adapting accordingly, the teacher can form better (personalised) methods to teach students who seemingly lag behind in their academic

pursuits. In such contexts, AI helps in shortlisting key areas out, so that educators can focus on specific variables to improve the learning process.

Machine learning, data analytics, data mining, psychometrics and app-based systems have become essentially linked to the educational sector. Analytics focuses on large-scale data and content management. It analyses historical sets to trace observable findings. Large-scale tests can be conducted with ease, and consequent results can be used to improve existing teaching methods. Data mining, on the other hand, uses small-scale cognitive data and relies on intelligent tutoring systems. Machine learning uses training data to assess existing knowledge, and produce structured results and meaningful patterns. For instance, machine learning can analyse data pertaining to a student's academic records, achievements, skill-set, forte, preferences, and suggest universities or higher courses that suit the student's trajectory of educational growth. It further enables teachers to understand how students are comprehending their course material. AI ultimately sheds light on distinct variables, highlighting inadequacies and providing solutions, including hypothetical situations, which would enable educators to improve the teaching process. Nowadays, image recognition systems are also providing an edge in paper assessment methods. Such tools can be used to grade bulk-load of assignments with accuracy, swiftness, altogether minimising the chance of human-errors.

Deep learning have further broadened the scope for innovation, by introducing tools/methods like decision-tree learning, neural networks, reinforcement learning and so on. These are capable of producing meaningful content/data and are structured in layers. Knowledge-field models are used by analytical tools to provide meaningful data on students' characteristics and needs. So, it can very well be said that AI-based methods help educators predict students' competencies, altogether promoting a pro-active solution for institutions to instantly work on. Research and innovation still precedes, to make AI generative tools more powerful and accessible. The goal is to expand the scope of Analytics and cover areas like interpersonal characteristics, humanities, social sciences, art, soft-skill development and so on.

Conclusion

AI has an undeniably vivid impact on the educational sector. It is reshaping conventional methods and improving the areas of administration, classroom management, content management, knowledge resource, content development and teaching. Moreover, the constraints of geographical borders have been reduced because online resources are accessible globally. Anyone can access relevant material from any part of the globe and engage in learning practices. The future of education will no longer be barred by traditional limitations. Processes

will be rendered instantly, starting from administration, to teaching and developing content. With more research and development along the way, the educational sector will transform into an all-inclusive, globally connected, all-accessible and highly effective space for unhindered learning. AI will continue to innovate, eventually putting accuracy and speed at the forefront of work processes

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