

Will AI replace Teacher?

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Abstract:

Teachers are the main part of the process of educational system. Teachers remain at the helm of major instructional decisions, formative assessments involve teacher input, identifying patterns, making predictions, or analyzing alternative decisions. Also, the cycle of recognizing patterns in what students do and selecting next steps or resources that could support their learning identifying patterns, making predictions, or analyzing alternative decisions models, algorithms, and data . We witnessed major advances in AI-powered robotics, quantum computing, and the emergence of generative AI tools moving human-like conversations into the mainstream. What excites me most about this rapid evolution is AI's awe-inspiring potential to drive significant advances in so many fields – especially in making connectivity more meaningful and accessible to everyone. We're also seeing the industry quickly shift from hype to the implementation and maturity of AI-driven products and services. But this warp-speed development leaves little space to reflect on AI's broader societal implications.

1. Introduction

The use of technology to improve teaching and learning and to support innovation throughout educational systems is the main goal for all of us. This paper addresses the clear need for sharing knowledge and developing policies for “Artificial Intelligence,” a rapidly advancing class of foundational capabilities which are increasingly embedded in all types of educational technology systems and are also available to the public. It is important to engage teachers, educational leaders, policy makers,

researchers, and educational technology innovators and providers as they work together on pressing policy issues that arise as Artificial Intelligence (AI) is used in education.

AI can be defined as “automation based on associations.” When computers automate reasoning based on associations in data (or associations deduced from expert knowledge), two shifts fundamental to AI occur and shift computing beyond conventional edtech: from capturing data to detecting patterns in data and from providing access to instructional resources to automating decisions about instruction and other educational processes. Detecting patterns and automating decisions are leaps in the level of responsibilities that can be delegated to a computer system. The process of developing an AI system may lead to bias in how patterns are detected and unfairness in how decisions are automated. Thus, educational systems must govern their use of AI systems. This paper describes opportunities for using AI to improve education, recognizes challenges that will arise, and develops recommendations to guide further policy development.

2. AI in Education

Educators seek technology-enhanced approaches addressing priorities that would be safe, effective, and scalable. They use AI-powered services in their everyday lives, such as voice assistants in their homes; tools that can correct grammar, complete sentences, and write essays; and automated trip planning on their phones. Educators see opportunities to use AI-powered capabilities like speech recognition to increase the support available to students with disabilities, multilingual learners, and others who could benefit from greater adaptivity and personalization in digital tools for learning. They are exploring how AI can enable writing or improving lessons, as well as their process for finding, choosing, and adapting material for use in their lessons. Educators are also aware of new risks. Useful, powerful functionality can also be accompanied with new data privacy and security risks. Everyone in education now has a responsibility to harness the good to serve educational priorities while also protecting against the dangers that may arise as a result of AI being integrated in edtech. The constituents include educational leaders—teachers, faculty, support staff, and other

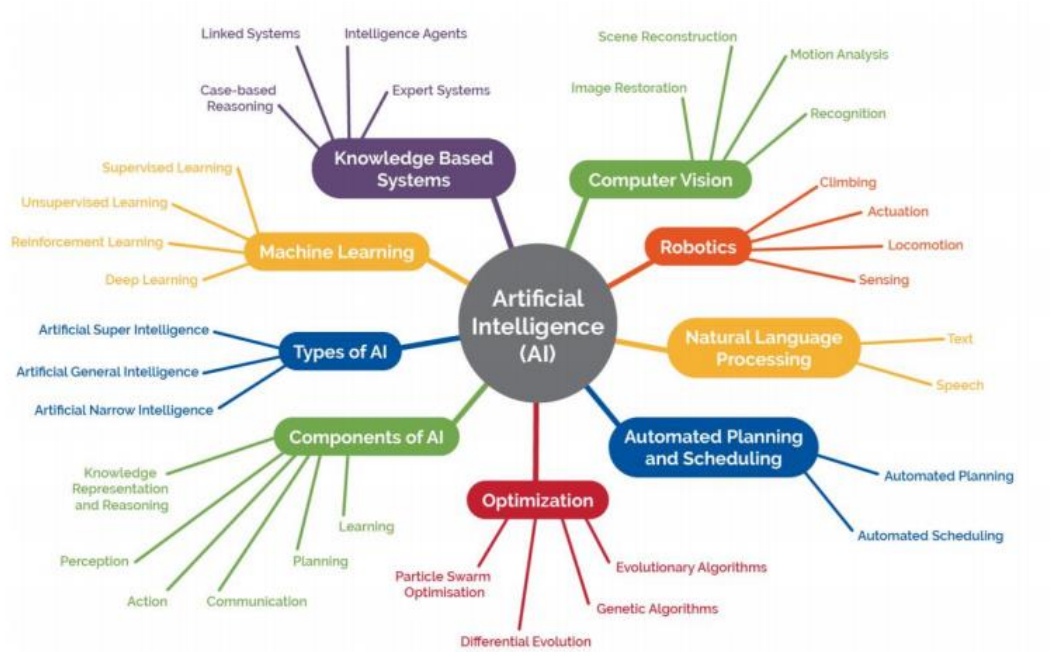
educators—researchers; policymakers; advocates and funders; technology developers; community members and organizations; and, above all, learners and their families/caregivers. Developers of all kinds of technology systems—for student information, classroom instruction, school logistics, parent- teacher communication, and more—expect to add AI capabilities to their systems. The constituents believe that action is required now in order to get ahead of the expected increase of AI in education technology. New generative AI chatbots shows how AI could be used to write essays, create lesson plans, produce images, create personalized assignments for students, and more.

On the other hand, AI may enable achieving educational priorities in better ways, at scale, and with lower costs. Addressing varied unfinished learning of students due to the pandemic is a policy priority, and AI may improve the adaptivity of learning resources to students’ strengths and needs. Improving teaching jobs is a priority, and via automated assistants or other tools, AI may provide teacher’s greater support. AI may also enable teachers to extend the support they offer too individual students when they run out of time. Developing resources that are responsive to the knowledge and experiences students bring to their learning—their community and cultural assets—is a priority, and AI may enable greater customizability of curricular resources to meet local needs. Mapping tools, shopping recommendations, essay-writing capabilities, and other familiar applications, AI may enhance educational services. Examples of discrimination from algorithmic bias are on the public’s mind, such as a voice recognition system that doesn’t work as well with regional dialects, or an exam monitoring system that may unfairly identify some groups of students for disciplinary action. Some uses of AI may be infrastructural and invisible, which creates concerns about transparency and trust.

Also, AI brings new risks in addition to the well-known data privacy and data security risks, such as the risk of scaling pattern detectors and automations that result in “algorithmic discrimination” (e.g., systematic unfairness in the learning opportunities or resources recommended to some populations of students). When AI enables instructional decisions to be automated at scale, educators may discover unwanted consequences. In a

simple example, if AI adapts by speeding curricular pace for some students and by slowing the pace for other students (based on incomplete data, poor theories, or biased assumptions about learning), achievement gaps could widen. In some cases, the quality of available data may produce unexpected results. For example, an AI-enabled teacher hiring system might be assumed to be more objective than human-based résumé scoring. Yet, if the AI system relies on poor quality historical data, it might de-prioritize candidates who could bring both diversity and talent to a school's teaching workforce. So, there are three important themes are explored:

- I. Opportunities and Risks. Policies should focus on the most valuable educational advances while mitigating risks.
- II. Trust and Trustworthiness. Trust and safeguarding are particularly important in education because we have an obligation to keep students out of harm's way and safeguard their learning experiences.
- III. Quality of AI Models. The process of developing and then applying a model is at the heart of any AI system. Policies need to support evaluation of the qualities of AI models and their alignment to goals for teaching and learning during the processes of educational adoption and use.

Figure 3: Components, types, and subfields of AI based on Regona et al (2022).¹²

AI models are like financial models: an approximation of reality that is useful for identifying patterns, making predictions, or analyzing alternative decisions. In a typical middle school math curriculum, students use a mathematical model to analyze which of two cell phone plans is better. Financial planners use this type of model to provide guidance on a retirement portfolio. At its heart, AI is a highly advanced mathematical toolkit for building and using models. Indeed, in well-known chatbots, complex essays are written one word at a time. The underlying AI model predicts which next words would likely follow the text written so far; AI chatbots use a very large statistical model to add one likely word at a time, thereby writing surprisingly coherent essays.

Figure 4. Differences that teachers and students may experience in future technologies.

	Familiar Technology Capabilities	Future Technology Capabilities
Input	• Typing	• Speaking
	• Clicking and dragging	• Drawing
	• Touching and gesturing	• Analyzing images and video
Processing	• Displaying information and tasks	• Assisting students and teachers
	• Sequencing learning activities	• Planning and adapting activities
	• Checking student work	• Revealing patterns in student work
Output	• Text	• Conversations
	• Graphics	• Annotating and highlighting
	• Multimedia	• Suggesting and recommending
	• Dashboards	• Organizing and guiding

The products that would stand out or might hold a prominent place in education with artificial intelligence can be listed as follows:

- Advanced technology software
- Robot assistants and robot teachers
- Smart classes in schools
- Individualized education (pertains to individualization of instruction)
- Simulations for education and lessons
- Scenario and case study-producing systems
- Interest, ability, and needs analysis systems
- Vocational guidance system (for career choice)
- Programs or tools for taking attendance
- Unmanned systems of all sorts
- Learning outcome detection system (for levels of students)

- Personal teaching tools
- Attention and distraction analysis system
- Academic success detection and suggestion system for improvement
- Learning systems in cloud environments and virtual learning environments
- Curriculum editing system
- Systems that perceive and report students' learning patterns

The Main Form of Artificial Intelligence Education Applications:

The most direct result of the application of artificial intelligence in education is the birth of an intelligent teaching system. The intelligent teaching system emerged on the basis of computer-assisted teaching. It is an open human-computer interaction system formed by student-centered, computer-based, and computer-simulated thinking processes of teaching experts. At present, the intelligent teaching system has become the main form of artificial intelligence application in education. Intelligent teaching systems mainly apply artificial intelligence principles in knowledge representation, reasoning methods and natural language understanding. Because it integrates the activities of knowledge experts, teachers and students, correspondingly, the intelligent teaching system is generally divided into three basic modules: knowledge base, teaching strategy and student model, plus a natural language intelligent interface. Specifically, the functions of the intelligent teaching system are as follows: to understand the learning ability, cognitive characteristics and current knowledge level of each student; to select appropriate teaching content and teaching methods according to the different characteristics of the students, and to provide students Targeted individual guidance; allowing students to use natural language to conduct man-machine dialogue with the "computer tutor". The design of intelligent teaching system requires not only knowledge of computer science, but also theoretical guidance of educational science.

Application of artificial intelligence in the field of education. One of the biggest challenges in education is that everyone learns differently. It is difficult for teachers to accurately grasp each student's real learning

situation, leading to the teaching design and teaching process, difficult to focus on each student's real learning needs, resulting in a waste of energy, time and teaching resources. But the artificial intelligence system can provide each learner with a personalized learning style, so that each student can learn in the most suitable way, accurately record the learning status of each student, assist teachers to achieve hierarchical teaching and precise teaching, and effectively solve the core problems of teaching and learning. At present, the application of artificial intelligence in the field of our education mainly includes image recognition, speech recognition, human-computer interaction and so on. Applications mainly focus on tutoring, online learning, classroom teaching and other aspects. Artificial intelligence application in the field of teaching is mainly manifested in the application of Intelligent Tutoring System. Intelligent teaching system is set intelligent class room, intelligent marking, intelligent diagnosis and intelligent treatment, intelligent preview, intelligent operation, intelligent sentiment analysis for the integration of intelligent teaching system is designed to create a good learning environment for students, so that the students can convenient call all kinds of resources, to accept a full range of learning services, to achieve the success of learning. By establishing the subject of teachers, students and teaching management, the corresponding teaching strategies can be formulated and implemented according to the characteristics of different students and personalized teaching services can be provided for students. Distributed intelligent teaching system based on network is the latest development direction of intelligent teaching system. It can make students who are originally separated in different areas learn together in a virtual environment, make full use of network resources, give play to learners' initiative, and bring better teaching effect.

The application of artificial intelligence in the field of education is still in its infancy, and people effectively combine the high efficiency of machines with human intelligence to influence the development of society. In recent years, artificial intelligence technology has always maintained a rapid development speed, and its application in the field of education plays a huge role in education and teaching, and promotes the development of humanized and individualized teaching, and integrates teaching activities.

Closely connected with the development of science and technology, this is a major innovation activity in the field of education. For the application of artificial intelligence in education, there are mainly four specific forms as follows.

I. Smart Assessment

Under the traditional education model, teachers' work content focuses on two aspects, one is classroom teaching, and the other is correcting homework. Among them, teachers need to spend more time and energy to correct students' homework. However, driven by big data technology, text recognition technology, and semantic analysis technology, automatic correction of homework has been realized in reality. Intelligent evaluation can simplify the correction process to a large extent. This is also a major change to the traditional evaluation method. It is faster, more efficient, and very accurate. It frees teachers from heavy homework corrections. Make it more energy in classroom teaching, effectively promote the improvement of teaching efficiency.

II Smart Tutor System

The intelligent tutor system is one of the adaptive learning systems. It is precisely because of the emergence of this system that the one-way instillation mode of teachers to students under the traditional teaching mode has been changed to a large extent, and better teaching results can be obtained. The system can make targeted learning plans according to different students' mastery of learning content, and at the same time highlight students' personalized learning methods, and help students master knowledge points more quickly through richer learning resources to realize specific learning goals. Through the intelligent tutor system, it is even possible to analyze the expressions of the students and understand the learning status of the students from it. Through the feedback mechanism, the teacher can be more aware of the students' mastery of the classroom teaching content, and use an emotional perception to predict and adjust it. In fact, the development of the intelligent tutor system is still immature at this stage. Basically, it has more applications in self-study and Q&A, but it has relatively few applications in classroom teaching. If you want to apply it

better, you still have to pay attention to the improvement and optimization on the technical level.

III. Educational Simulation Game

In modern education concepts, quality education is emphasized. Therefore, the classroom atmosphere should not be lifeless, but should be presented in a more entertaining way. Under the background of the rapid development of artificial intelligence, educational simulation games are not entertainment activities in the traditional sense. They are more targeted. They promote the openness of education and teaching through games, and create some digital games based on the simulation environment. Students can have a higher enthusiasm for learning. Through intelligent simulation games, students can form a new understanding of things, and at the same time, their observation and thinking abilities can also be well exercised, which promotes students to discover and solve problems proactively. Based on the simulation game environment, students can be more involved in learning through playing different roles, and participate in learning activities with great interest to gain new knowledge. The introduction of simulation games in teaching can show some abstract knowledge in concrete forms, so that students can form a more intuitive understanding and feelings, can effectively enhance students' attention, and make students' professional knowledge learning more solid and in-depth.

IV. Educational Robot

Educational robots involve many disciplines. The application of multi-disciplinary knowledge and technology, the role of educational robots developed in assisting teaching is obvious. It can effectively add interest in the classroom, stimulate students' innovative ability, and rely on information technology to enhance students' knowledge and the ability to obtain information. In specific teaching applications, educational robots are an intelligent teaching tool that can form a powerful supplement for teachers to carry out teaching activities. Students can also actively seek answers to questions through this human-computer interaction and promote self-learning capabilities. Educational robots can perceive changes in students' emotions. Educational robots can perceive changes in students' emotions. If

there are more exchanges with students, they can more accurately grasp the learning effects of students, which is conducive to teaching students in accordance with their aptitude, so that students can feel knowledge from the communication with intelligent robots charm. The Problems Facing Artificial Intelligence Education Although current AI education is not perfect, but it has also had a strong impact on all aspects of education. From the field of practice, People are trying to bring education into line with the requirements of the age of artificial intelligence, Our thinking has been changed, the mode has been updated, the behavior F has been changed, the resource development and other aspects have achieved positive thinking and exploration. However, as the current education is still in the early stage, the role of artificial intelligence and the development of artificial intelligence education is mainly reflected in the “technology”, lack of education, and some problems existing in the discipline and artificial intelligence education practice.

3. Artificial Intelligence Education Technology Upgrade

Artificial intelligence is not equal to artificial intelligence education. The core technology of artificial intelligence is to simulate the thinking activities and behavior patterns of human beings in some aspects according to the amount of data collected, algorithm characteristics and computing speed. But artificial intelligence education is by no means a simple way to collect and analyze big data, And the subjective analysis of students’ learning ability, type, style, specialty and a variety of related relations, and then put forward teaching Suggestions or take intervention measures. There are essential differences between man and machine. The simulated intelligence of machines is different from the natural intelligence of human beings. The intelligence of a machine is that the problem is formalized by man and that the computer can do the calculation. Then, Human intelligence is acquired through learning and practice, and has initiative. But the intelligence of the machine does not have the intelligence of the human mode of thinking.

Limitations of Artificial Intelligence Education Interaction Although artificial intelligence has been developed for more than 60 years, it has great

limitations in applied education at present. Education to some extent, education, to some extent, is a means of learning by which people communicate and inspire each other according to their own knowledge, but intelligent teaching system is far from reaching this level. Secondly, machines cannot communicate with students as humans can. Machines only judge students' input information and master students' learning situation, which leads to people's wrong information receiving due to the data generated by "machine intelligence", ignoring the real situation.

Artificial intelligence education system is made into a teaching module based on the data of knowledge level, cognitive ability and learning style provided by different students. Through the test results of this module, students are judged and their learning process is evaluated. The level of each student is different, if according to the formal teaching module teaching, rather than according to the specific situation of each student flexible teaching, in the long run, it is not conducive to the personalized development of students.

Although the introduction of ARTIFICIAL intelligence into education conforms to the development of The Times, it does not mean that all subjects are suitable for artificial intelligence or the current artificial intelligence education is not able to cover the learning of all subjects. There are obvious differences among various disciplines, which are mainly reflected in the differences in research objects, theoretical framework, discipline thoughts, research methods and expression methods, etc. These differences lead to the natural differences in teaching and learning of different disciplines. Analysis of the Limitations of Artificial Intelligence in Education In terms of the current level of development of artificial intelligence and the characteristics of artificial intelligence itself, its application in education also has its limitations.

Conclusion:

Serious challenges and significant questions remain. How will AI impact employment? Will it help or hinder our right to safe and secure digital spaces? Will it widen or narrow existing digital divides as we race against time to rescue the SDGs?

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