Empowering Education and Teacher Development with Artificial Intelligence Technology

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Abstract. Artificial intelligence(AI) not only gives education a new mission, but also provides strong support for promoting fair, quality and personalized education. However, the development of AI has also caused people to worry about whether AI will replace teachers and how to play the role of AI in education. This paper first analyzes the impact of AI on education, then puts forward the reasons why AI will not replace teachers, and finally puts forward the methods for teachers to use AI to maximize the effectiveness of AI.

Keywords: AI education, teachers, teaching with AI.

1 Introduction

As a driving force for future development, artificial intelligence (AI) is profoundly changing the way people produce, live and learn. Education has always been an important application area of AI [1]. Computer vision, machine learning, knowledge graph, natural language processing and other artificial intelligence technologies are increasingly integrated with education， AI + education is becoming an important starting point and innovation engine to promote the equalization of educational resources, personalized services and modernization of education.

Mankind's greatest piece of intelligence is the invention of education. We developed language, letters and symbols, which laid the foundation for contemporary civilization. Education can pass the recorded knowledge from generation to generation, the information of knowledge will pass on as the human race breed and thrive. The repeated evolution of information makes humans more intelligent. The system of education itself marks the biggest wisdom of mankind. The promotion of AI technology is about making machines behave intelligently as we do. In the past, human intelligence invented education. Presently, AI technology again advances education. The current technological revolution is history's life of circle. In the age of farming, people passed on knowledge by word of mouth in the private schools. For example, Confucius, the great educator, also taught through the establishment of private schools. In the era of industrial revolution, education was industrialized and standardized. Through this standardized classroom, education can form an industrial system, and the education industry can be formed. In the internet era, education was freed from the restriction of distance and the online education system was formed. AI allows people to have more choices in education, and people

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have the ability to choose better teachers, and they can get the maximum amount of information. Now in the era of intelligence, we can achieve elite, personalized education. At this time, personalized education is no longer the right of a few people as in the past, but can be carried out on a large scale in the Internet era according to the ability, personality, interest and other specific circumstances of the student. For today, industrial education is often about producing technical people who are punctual, manageable, and calm. However, such forms of education often ignore the cultivation of people's creativity, ignore the personality of people, and ignore the human nature of each person. This is actually the biggest drawback of industrial education. In the past, we didn't have the Internet, we didn't have AI, so we had a huge problem of not being able to scale education. Why can individualized education be done on a large scale now? Large-scale education is achieved through the Internet. With the help of AI, we can understand the needs of each educated person and tailor an education system for each educated person. In this sense, today's education is actually a return to the personalized elite education we received thousands of years ago. The big difference is that in the past elite education was only available to a small number of people. We can now make such individualized, personalized, and large-scale education through the Internet. Primary and secondary school students are young and lack the ability of self-learning and self-restraint, and college students have the ability of self-learning, so AI is much less of a threat to primary and secondary school teachers than it is to university teachers. Therefore, this paper aims to examine the different impacts of AI on education and university teachers, and to analyze how teachers are responding to the challenges posed by AI.

2 The impact of AI on education

Now AI has been integrated with classroom teaching and education, and in the process of integration, teaching methods have produced an unprecedented change. It is divided into three stages according to the degree of integration of AI and classroom teaching. The first stage is the primary stage of the integration of AI and teaching. At this stage, classroom teaching has realized data support for teaching through AI technology. For example, students' learning level and learning basis can provide data support for the selection of teaching objectives and teaching content, and provide judgment basis for teachers' decision-making. In this way, the teaching is scene-based and personalized at this stage, AI still exists in the form of a tool used by teachers in classroom teaching. It is worth noting that the generation of classroom effect and the achievement of utility also lie in the teachers' rational application of data and information provided by AI technology. The second stage is man-machine cooperative teaching. At this stage, its most prominent feature is the co-existence and co-teaching of man-machine. AI will replace most of the work of teachers, such as teacher teaching, interaction evaluation, and individual tutoring between teachers and students. In form, the teacher becomes the assistant of AI. The third stage is man-machine integrated teaching. At this stage, AI technology is not only integrated with our classroom teaching, but also with people.

The application of AI in classroom teaching has caused a lot of confusion. On the one hand, in the era of AI, people get lost in teaching time and space. In the age of AI, remote presence learning has become the norm in life. How to construct the time and space of teaching all the time can ensure the good interaction between teaching and learning. How to construct to ensure the good interaction between teaching and learning, so that teaching and learning can

be carried out in an orderly way？ It can be seen that in the era of AI, the continuous pursuit of the essence of education is still a concern of people. On the other hand, people are confused about the teaching content. Without memory and accumulation, information and knowledge are already present in the brain, and are constantly updated. But at the same time, we also face many questions, the knowledge that has not been examined by the physiological brain is stored in the intelligent brain of people, can the knowledge of the intelligent brain constitute human intelligence? Although the intelligent brain has the memory-like function of storing information and knowledge, the human brain does not transfer the memory function. At the same time, people have difficulties in teaching methods. In the era of AI, does the teaching method only point to individual individuation and diversification, and is personalization and diversification the only value pursued by education in the era of artificial intelligence?

3 The impact of AI on teachers

On November 30, 2022, Open AI launched ChatGPT, and all walks of life have shown great interest in ChatGPT, especially in the field of education [2]. Some individuals are very strongly in favor of ChatGPT. They think ChatGPT is a new technology that will soon disrupt our education and change our classrooms. Larry Ferlazzo, an educator in the United Kingdom, recently shared 19 innovative ways to incorporate ChatGPT into middle school classrooms. Some individuals are alarmed by ChatGPT. For example, graduate students can use ChatGPT to complete their graduation thesis. So what is the value of students' degree? Therefore, many schools have completely banned the use of ChatGPT. Others are dismissive of ChatGPT. Some individuals exhibit a tendency to disregard ChatGPT. They think we can look at this new technology in the same way that we looked at past technologies. For example, the use of calculators in mathematics class has also triggered a fierce discussion, but it has not caused a bad impact on teaching through regulating the use of calculators.

The global education response to ChatGPT has been polarised. In fact, students using tools are not only available today. Calculators, the Internet and mobile phones have already entered the classroom. Even AI technologies like ChatGPT are already used in teaching at home and abroad. For example, Photo Math developed in the US, has been downloaded 300 million times. Photo Math is a smart camera calculator software that can quickly display the answer by taking a picture with phone. The calculation questions that Photo Math can calculate contains four operations, linear equations and so on [3]. The use of Photo Math has a certain impact on mathematics teaching. The Homework Help APP developed by China, a software that allows students to search for homework answers through mobile phone photos, has also entered students' lives. We should admit that this is an era of strong technology. Technology is pushing our lives forward. People are talking about whether AI will replace the teaching profession.

Therefore, the contradiction of AI in education is transformed into the contradiction of whether future education needs teachers [4]. University teachers are particularly worried about being replaced by AI. This paper argues that AI is unlikely to replace the profession of teachers, but teachers who can use new technologies such as AI will replace teachers who cannot use technology. Since the outbreak of the Industrial Revolution and the day when machine production first began to create profits for businesses, humans have begun to worry

endlessly. Now, AI is improving, and human anxiety and fear have changed from being killed by robots to being replaced by robots. Some people say that with AI coming, teachers and schools will die. The British BBC has made a report that in the next 20 to 30 years, a large number of jobs will be replaced by AI. More than 55 percent of jobs will be lost, according to Oxford University researchers and the U.S. Bureau of Labor Statistics. Some researchers have even warned that millions of workers in the United States will be replaced by robots by 2035. Based on data from Cambridge University researchers Michael Osborne and Carl Frey, the BBC analyzed 365 occupations for their likelihood of becoming obsolete in the future. Although their analysis is only of the prospects of these jobs in the UK, and is based on local data, the analysis is also useful for us. Teachers were replaced only 0.4 percent of the time. Teachers can never be replaced. This conclusion runs counter to fears. But in the new era, teachers must always "reset". If you don't learn, you will be eliminated. If you don't keep learning, you will fall behind.

It is undeniable that AI has been integrated into our lives, and the key to how to play the greatest role of AI lies in the people who use it. Teachers use AI to train talents to master AI. If the quality of teachers does not achieve high-quality development, then the educational ideas and methods based on AI will be greatly discounted, and all other educational model reforms will be empty. Therefore, we believe that teachers are the first important element in integrating AI into education. Teachers are the backbone of education, and high-quality teachers lead to high-quality education. No matter how advanced the technology is, it is useless without the guidance of the teacher. A quality education system is largely measured by the continuous improvement and enhancement of the quality of tens of millions of teachers and hundreds of millions of students. The main contradiction of education in many countries in the world is high-quality hardware resources, content resources and teacher resources. The most important of these three types of resources is the teacher, but also high-quality hardware resources or high-quality content resources, which need teachers to teach students to apply.

4 Teachers' Approach to Responding to AI Education

Many teachers, under the impact of AI, neglect to cultivate students' critical thinking and problem-solving skills [5]. Education is not only to impart knowledge, but also to help students establish a correct world view and values, understand the difference between right and wrong, honor and disgrace, and learn to constantly improve themselves. Education is about humanity and people-oriented issues, which cannot be simply replaced by AI. AI just provides a convenient tool and carrier for human beings, and cannot surpass the dominant position of human beings. Based on the teaching practice, this paper puts forward several suggestions to give full play to the advantages of AI.

4.1 Attitude

Adhere to the basic position of cultivating students to promote their all-round development. AI is no substitute for education. AI can facilitate students' acquisition of knowledge, but it cannot achieve the goal of cultivating students [6]. When ordinary logical reasoning, comprehensive analysis, and other abilities are suddenly quickly acquired by AI, what kind of abilities should students develop? Or what should teachers teach? The diversity of thinking mode will determine the diversity of human wisdom. Instead of trying to make students master

more knowledge, we need to train them to have more diverse minds. We must develop new evaluation tools and methods. Those exams that can easily find the perfect answer through AI will gradually be abandoned. Mindset, empathy, creativity, and cooperation are the ultimate pursuits of educators.

4.2 Ability

Cultivate students' problem awareness, information discrimination and higher order thinking ability. Chatbots like ChatGPT search for existing massive amounts of text, which depends on the question the user has entered. Asking truly meaningful questions can only be human work. ChatGPT can write papers and poems, but the material it uses to write papers depends on the literatures that have been published. ChatGPT can only write generic, formatted articles, such as job summaries. But when it comes to writing innovative, creative essays and personalized poems, ChatGPT is powerless. Because ChatGPT's creativity comes from the training of mass information, rather than true originality. We need to develop students' ability to ask questions, test truth and correct errors. We need to develop students' critical thinking skills and correct values.

4.3 Software Application

Construct stratified and personalized work to really reduce the burden and increase the efficiency. Teachers stratify students' learning by analyzing the data of in-class exercises, homework and tests. The process uses relevant algorithms of AI. The students with similar knowledge integration ability, knowledge transfer ability and knowledge mastery degree, are divided into one layer. Of course, student stratification is not fixed, but dynamically updated with data. See Figure 1 for an example of ChatGPT's application in education.

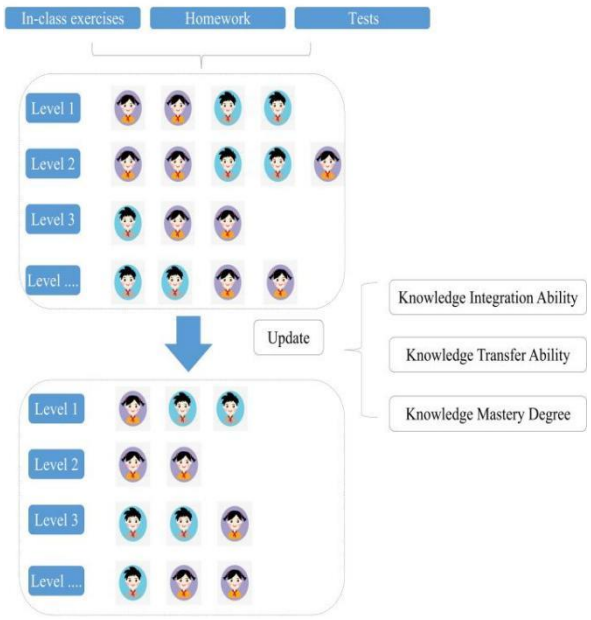

Fig. 1. Example of ChatGPT's application in education

ChatGPT will analyze the problems of students at each level according to the massive database, and then recommend appropriate teaching strategies to provide intelligent reference for teachers. For example, in terms of homework setting, students at different levels have different weaknesses, and ChatGPT will design different question quantity and difficulty ratio for them. Suppose ChatGPT divides students into four or more layers based on their problems. ChatGPT will propose measures based on the problems students have at each level. We briefly listed two measures corresponding to the problems of students at each level.

Problems existing at Level 1: Carelessness.

Measure:

Select the same type of wrong questions to strengthen the practice by ChatGPT;

Provide knowledge cards by ChatGPT.

Problems existing at Level 2: Knowledge Transfer.

Measure:

Provide extended special topics by ChatGPT;

Strengthen the connection between old and new knowledge by ChatGPT.

Problems existing at Level 3: Knowledge Consolidation.

Measure:

Push classic questions by ChatGPT;

Combining test questions according to students' situations to consolidate exercises by ChatGPT.

Problems existing at Level ....:Learning Method.

Measure:

Provide a variety of learning methods according to the different needs of students by ChatGPT.

ChatGPT helps students move from generic homework to personalized homework. As a result, students have less homework burden. The application of ChatGPT in teaching can promote the cultivation and development of individual ability. In the next step, we will develop ChatGPT from designing individual homework to multi-dimensional and multi-angle homework, such as group homework, class homework, school homework and city homework. ChatGPT can also create an automated learning evaluation system that monitors students' learning progress and understanding in time. This provides immediate feedback and suggestions for teachers and students to adjust their learning plans accordingly

4.4 Emotion

Attach importance to emotional education and humanistic care. The more intelligent the era, the more emotional and humanistic care is needed in education. Therefore, facing the application of AI, education needs to reaffirm the concept of humanistic care [7]. AI can replace part of the work of teachers and liberate teachers from knowledge labor. Teachers can

have more time for emotional communication with students, focus on the human side of education and promote the emotional development of students.

5 Conclusion

Education cannot stop the development and application of technology. When someone asks with AI, do we still need teachers, do we still need learning, do we still need education? These questions are the same as whether we need to learn to walk after we have cars. Human beings' simple labor and general intelligent labor can be replaced by AI, which forces human beings to change the way of education and learning, and puts forward higher requirements for human development. Man's creativity is always beyond the reach of intelligent machines. Therefore, this paper analyzes several different opinions and influence of AI on education, and puts forward several possibilities for teachers to apply AI in teaching. We look forward to discovering more functions of AI in education and fully releasing the technological dividends of AI in teaching.

References

[1] Dignum, Virginia.: The role and challenges of education for responsible AI. London Review of Education. pp.1-11 (2011)

[2] R. Dale: GPT-3: What's it good for? Natural Language Engineering. vol. 27, pp. 113–118 (2011)

[3] O. Zawacki-Richter, I. M. Victoria, M. Bond, F. Gouverneur: Systematic review of research on artificial intelligence applications in higher education -where are the educators? International Journal of Educational Technology in Higher Education. vol. 16, pp. 1-27 (2019)

[4] Kim J, Lee H, Cho Y H.: Learning design to support student-AI collaboration: Perspectives of leading teachers for AI in education. Education and Information Technologies. vol. 27, pp. 6069-6104 (2022)

[5] How M L, Hung W L D.: Educing AI-thinking in science, technology, engineering, arts, and mathematics (STEAM) education.Education Sciences. vol. 9, pp. 184 (2019)

[6] Schiff D.: Education for AI, not AI for education: The role of education and ethics in national AI policy strategies. International Journal of Artificial Intelligence in Education. vol. 32, pp. 527-563 (2022)

[7] M. Carmona-Halty, M. Salanova, S. Llorens, W. B. Schaufeli: Linking positive emotions and academic performance: The mediated role of academic psychological capital and academic engagement. Current Psychology. vol. 40, pp. 2938-2947 (2021)