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Revisiting Educational Issues in the Age of Generative Artificial Intelligence

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Abstract: The emergence of generative artificial intelligence (AI) has had a huge impact on all areas of life, including the field of education. AI can assist teachers in cultivating talents and promoting personalized learning and teaching, but it also prevents individuals from thinking independently and creatively. In the era of generative AI, the rapid development of technology and its significant impact on the field of education are inevitable. There are many educational issues related to it, such as teaching methods, student training goals, teaching philosophy and purposes, and other educational issues, that require re-conceptualization and review.

Keywords: Generative artificial intelligence; Educational philosophy; Training objectives; Creative thinking; Personalized learning

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1. Introduction

With the release of ChatGPT, generative artificial intelligence (AI) has had a huge impact on our daily lives. This includes the field of education, where traditional education concepts and student training methods may no longer be applicable to this new intelligent era. Thus, related educational issues deserve to be re-examined by educators, including the relationship between teachers, students, and education itself and generative AI.

2. Zeitgeist and generative artificial intelligence education

2.1. Generative artificial intelligence era

In November 2022, Open AI Company in the United States released the third generation of chat generative pre-trained transformer model, referred to as ChatGPT. In the media field where text, images, and video are the main output products, various generative artificial intelligences that have been invested have played a larger role. Harvard Business School's survey on the application effectiveness of ChatGPT in law, consulting, and other industries shows that ChatGPT can improve text productivity by 12.2% and text processing quality by 40% [1]. All in all, generative AI is a tool that can be a convenience to people.

UNESCO's Guidelines for the Application of Generative Artificial Intelligence in Education and Research, released in September 2023, defines generative AI as an AI technology that automatically generates content based on cues expressed by humans with the help of a system of symbolic representations of thought. Users help expand and train the database model while using this system. Unlike previous web searches, which simply extracted and rearranged existing content, generative AI already has the ability to create new things that have never been seen before, such as new images and videos. Moreover, the user can provide a simple piece of text and code, and briefly describe the requirements. Subsequently, the generative AI generates the product that the user needs by following the requirements as closely as possible. The core technology of generative AI is a generative pre-trained transformer model that can learn and grow by itself, but it cannot comprehend the reality behind the knowledge it learns and the complex social relationships that may be involved. Therefore, most of the generative AI may not be an accurate and reliable technology at the moment [2].

In the course of mankind's development, the iron law of capital increasing density requires that all fields of social production work toward automation, and the speed of progress is getting increasingly faster, which also leads to more and more jobs being replaced by artificial intelligence. With the continuous development of computer technology and the expansion of mathematical models, intelligent production models of more advanced and efficient automated technology that gradually replace the human physical and mental work will occur in all areas of society applications [3]. In recent years, the issues between AI and education, and the substitution of AI in education have also sparked a heated debate among scholars.

2.2. Generative AI education

In addition to generative artificial intelligence, this era is also accompanied by the Internet of Things, cloud computing, big data, and other technologies that are developing rapidly, too rapid technological revolution and iteration cannot help but impact our traditional forms of education. ChatGPT set off a "huge wave" in the field of education, leading to scholars competing to explore the impact of such generative artificial intelligence in the field of education.

Since the concept of artificial intelligence was put forward, many "artificial intelligence +" expansion concepts have arisen, including "artificial intelligence + education." In order to better clarify the concept of education, we return to the education policy itself. In 2018, the Ministry of Education issued the "Action Plan for Artificial Intelligence Innovation in Higher Education," which points out that it is necessary to accelerate the innovative application of artificial intelligence in the field of education, and to utilize intelligent technology to support the innovation of talent cultivation mode, the reform of teaching methodology, and the improvement of the ability of education governance. The document clearly affirms the innovative leading role of AI technology in education and the supporting role of colleges and universities in AI, and AI education can improve efficiency and better cultivate scientific and technological educational talents [4].

However, generative AI is still immature in the field of education, even answering simple math questions in a mess, especially proof-based questions. Undoubtedly, generative AI is constantly progressing, and perhaps someday it will be able to solve these problems well. However, it also reflects the fact that there are still many problems with AI at the current stage, and we need to hold a scrutinizing attitude towards the results it generates, rather than blindly believing it. In addition, how to apply this tool in teaching is a question worth exploring.

3. The relationship between generative artificial intelligence and education

3.1. Status quo of generative AI in education

Currently, in China, the utilization of AI in education is still very limited. The education sector is traditional and difficult to keep up with the times; they tend to stick to the traditional ways and implement a set of teaching methods for decades, not only among teachers at the grassroots level but also among policymakers, which, to a certain extent, has led to a lack of major breakthroughs or changes in education content, methods, or processes. Restricted to a large number of students and efficiency issues and other considerations, China's pedagogy is still dominated by the lecture method, and students' individualized development and creative thinking have been inhibited. However, generative AI seems to be able to solve this problem. Thus, how to integrate the emerging generative artificial intelligence into teaching and realize the interprofessional and intraprofessional integration of education, so that education can better cultivate the comprehensive development of talents for today's society, is an important issue worthy of consideration and thinking.

New technology will inevitably have an impact on education and teaching, both in terms of educational theory and practice. The application of generative artificial intelligence in the innovation of intelligent teaching tools and theories can lead to a novel teaching mode and teaching management. Generative artificial intelligence in the cloud computing application of data and information can not only share quality educational resources but also effectively solve the problem of learners' information silos, to a certain extent, it can be said to reduce the class barriers caused by poor information [5]. In today's digital teaching environment, students have a single source of knowledge; generative artificial intelligence can build diversified knowledge acquisition channels so that students can take what they need. With the development of technology, knowledge will become more diverse, and at the same time, learning is no longer a unilateral form of indoctrination by the teacher. Therefore, students have more opportunities for independent learning and innovation, which further promotes the personalized and overall development of the students.

3.2. The dilemma of generative AI education

It cannot be denied that China's generative AI education is still immature, and it is easy to form a situation in which developed and underdeveloped regions are cognitively cut off from generative AI education. Research shows that there is a huge gap between the level of AI education in various regions of China, which requires standardization of related education policies.

On the other hand, over-reliance on generative AI technology can also have an adverse impact on education. For example, generative AI for chat services inevitably poses a number of risks to minors who have not yet reached the lower limit of self-protection in terms of their moral judgment and ability to act socially; after all, generative AI is a virtual product, and minors' behaviors may be influenced by unhealthy content in chat conversations. In this regard, the Guidelines recommend that the minimum age for independent use of GUI (Graphical User Interface) platforms for chatting be set at 13 years old, and consider further adjusting the age limit upwards.

Generative artificial intelligence, according to the user's prompts, carries out recognition and analysis of various types of materials to generate text, images, video, and other results; they are considered content-prepared dishes, that is, pre-prepared content with low nutritional value. The results can be either the final results or semi-finished products for the user to further edit and refine. Due to the lack of factual knowledge and the narrow knowledge base, students in the lower grades cannot correctly judge the authenticity of the information given by generative AI. If there is a lack of timely correction by adults or teachers, it will have a negative impact on the construction of their values, thus emphasizing the need for adults to provide guidance in a timely manner.

4. The relationship between generative AI and teachers

4.1. The current state of the generative AI-teacher relationship

Generative artificial intelligence is becoming a powerful tool to assist people in their daily lives, bringing a boom to all walks of life, including the teaching profession. Teacher professional development is the process by which teachers continue to grow, acquire new knowledge, and improve their professional competencies. In this process, teachers continually update and expand their subject knowledge, pedagogical skills, etc., through independent learning, reflection, and inquiry [6].

Generative artificial intelligence can help teachers better assess the effectiveness of teaching and the formation of teaching experience. In the end of a learning stage, teachers can use generative artificial intelligence to assess the effectiveness of the current stage of learning, such as allowing it to analyze the class results, the performance of individual students, and so on. On the basis of the combination of the assessment requirements, teaching experience, and the actual situation of the comprehensive improvement of their own teaching programs, it allows teachers to better take into account the needs of each student. In the teaching process, generative artificial intelligence only plays a supporting role as opposed to the leading role of the teacher.

4.2. Generative AI for teachers

In addition, teachers need to actively carry out self-assessment, but in reality, it is always difficult to assess themselves objectively and fairly. At this point, the introduction of generative artificial intelligence to assist in self-assessment is a good solution. The model provided can be used to identify the areas of improvement and strengths, which is relatively more objective, and better allow teachers to discover their teaching deficiencies. At the same time, teachers can also share their learning experiences and results with the generative AI, and the process materials that may be generated during this interaction may also be helpful for teaching [7].

The relationship between generative AI and human subjects in education should not be a simple competition or substitution. Teachers should make full use of this digital tool for better curriculum resource development and subject integration, and achieve a more efficient application model, i.e., using generative AI as enhanced “arms and legs,” while teachers themselves focus on value judgment and high-level thinking and creative activities. This model is a highly efficient form of human-computer collaboration. Although teaching is a complex human interaction and does not provide personalized teaching in every aspect, generative AI can be used in those uniform, repetitive teaching sessions, such as grading assignments, as a tool to help teachers improve the quality of their teaching. In this aspect, generative AI can play a great role in freeing teachers from the tedious process of teaching.

Although generative education should not be enough to shake the core of education, its immediate and long-term impact on the updating of pedagogical skills and the goals of curricula and teaching has become a fundamental issue to be addressed by all countries.

5. The relationship between generative AI and students

5.1. The impact of generative AI on students

Existing generative AIs do not understand values, but in the process of training transformers, if the writers of the training dataset hold a certain ideology or value, words and phrases that match that value may be output as answers, which may easily have a negative impact on students who are still at the stage of constructing their values and who have unstable outlooks. Although it is not the original intention of generative AI to suppress or

output certain values, the words, pictures, and videos generated will still project certain "value answers" in a way that is hard to resist and detect, which will subconsciously infiltrate young people and affect their judgment of events, as well as easily cause immature young people to develop the problem of AI dependency.

Artificial intelligence dependence refers to the phenomenon where individuals rely excessively on intelligent technology in their daily work and study, resulting in a reduction or neglect of the importance of their own thinking and creativity. This leads to a situation where individuals regress instead of advancing in the era of AI advancement, a trend that will undoubtedly have a serious negative impact on both individuals and societies, especially when this phenomenon occurs in minors who are considered to be creative. Generative AI has evolved on the basis of search engines, providing people with interactive services in the form of conversations, which greatly improves the efficiency of learning. However, this efficiency and convenience is also gradually changing the way we learn and memorize, leading to a greater reliance on generative AI to deal with problems rather than through their own subjective initiative and creativity. This is detrimental to the development of individual students and limits the development of innovative thinking. Secondly, interactive artificial intelligence lacks emotional interaction, although it can provide students with a large amount of learning materials, but students at that stage have a greater need for emotion, and the reduction of interpersonal interaction also affects the creativity of students [8].

5.2. Students' rational use of generative AI

Generative AI often relies on fixed standards and answers for student assessment, and are inflexible, which is contrary to the diversified evaluation system we advocate. When students rely too much on AI tools, they will inevitably become inert, neglecting the cultivation of their own interests and skills. Furthermore, the information provided is often one-sided, limiting students' thinking and leading to the inability of students to be flexible and adaptable. Classes can cultivate students' creativity through team brainstorming, and generative artificial intelligence is undoubtedly inconducive to students' independent exploration and learning [9].

Therefore, we must maintain a rational and prudent attitude, and carefully introduce generative artificial intelligence into the field of education, especially for students. We should grasp the principle of moderation, emphasizing the sustainable development of the technology, while at the same time ensuring that the technology develops in the direction of the needs of social development and is conducive to the development of students' education. It has been mentioned that the incorrect use of generative artificial intelligence may lead to students becoming "slaves of technology," which will have a negative impact on the long-term development of society. Therefore, education must make appropriate changes, and actively absorb the benefits and convenience of generative artificial intelligence, while looking for problems within itself and respond to the rapid development of artificial intelligence through self-transformation. In response to the rapid development of artificial intelligence, the overall development of students can be promoted by changing the way of training students, focusing on the cultivation of students' creative thinking, promoting the reform of education evaluation, and finally, promoting the reform of the concept of education.

6. Conclusion

Open artificial intelligence has been introduced for just over a year and has had a huge impact on all areas of our lives, including education. Although generative artificial intelligence is still insufficient to shake our core educational concepts, but in this era, a number of related educational issues require attention. We cannot eliminate all the negative impacts brought about by the development of the technology, but we can actively look for our own changes to cope with the impact of artificial intelligence on our society and education on the basis

of absorbing a series of open and universal intelligence to bring a series of convenience to education.

Disclosure statement

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