ChatGPT Empowers Teacher Education Change: Advantages, Challenges, and responses

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Abstract: The emergence of ChatGPT, an advanced artificial intelligence tool, has spawned a new pattern for teacher professional development. ChatGPT not only provides advantages and opportunities for teacher education, but also brings various risks and challenges. Teachers are the main body of teaching work, the arrival of ChatGPT will certainly have a certain impact on their professional development. This paper focuses on the three dimensions of teaching practice, learning evaluation and scientific research, which have the most profound impact on education technology, deeply analyzes the opportunities and challenges brought by ChatGPT to the reform of teacher education, proposes action research on effective teaching integration and exploration, moves toward the quality-oriented teaching evaluation, establishes academic ethics and accountability system and other coping strategies. It attempts to provide theoretical and practical reference for integrating artificial intelligence into the educational environment, improve teacher identity, enhance teacher professional development, boost the digital transformation of teacher education, and promote the intelligent technology reform of teaching practice.

Keywords: ChatGPT; Teacher Work; Teacher Literacy; Challenge; Transform

1. Introduction

Open AI, a Us-based artificial intelligence research laboratory, launched ChatGPT, a new type of artificial intelligence tool, in November 2022. Since it was put into use, ChatGPT has quickly sparked heated discussions in education, medicine, science, academic publishing and other fields. Throughout the history of education technology, the emergence of emerging technologies, such as radio, television, computer, Internet, mobile communication, social media, virtual simulation, etc., will arouse people's strong curiosity about the reform of teaching, and the argument of the end of traditional education has been repeatedly discussed. It is worth noting that in today's world, when discussing the impact of artificial intelligence and chat technology on education and society, this technology is still developing and improving at a rapid speed. Microsoft, Google and other technology companies are trying to combine the powerful language function of ChatGPT with search engines to create a richer search and learning experience. New ways of intelligent exploration are roaring out of the education space.

In this context, neither technological determinism nor "Luddism", which blindly opposes new technology, is advisable [1]. For theoretical researchers in the field of education, it is particularly necessary and urgent to gain insight into the significance of ChatGPT in teacher education and make critical review and wise evaluation to optimize teacher professional development. As the most advanced chatbot in the world to date [2], what are the technical advantages of ChatGPT itself, what impact will it have on teacher education, and how will the existing model of teacher education respond to these challenges in educational practice? This study will focus on three dimensions of teaching practice, learning evaluation and scientific research, which have the most profound impact on education technology, and try to respond to these questions.

2. Artificial Intelligence Promotes the Digital Transformation of Teacher Education

Traditional teacher education has separated educational technology as an isolated curriculum. But different from any previous technological innovation, ChatGPT, as the

most influential intelligent tool, has posed a severe challenge to traditional teacher education, and we will have to rethink teaching and learning in teacher education.

2.1 Intelligent Technology Revolutionizes Teaching Practice

In many cases, the introduction of ChatGPT has freed teacher educators and students to focus on critical, innovative aspects of teaching. The extraordinary ability of ChatGPT to perform complex tasks in the field of education may transform and innovate existing educational practices, and may promote and catalyze deep changes in teachers' professional philosophy [3]. With the help of ChatGPT, teacher educators can be freed from tedious routine work, have more time to develop new teaching techniques and teaching innovations, reprocess and modify the generated curriculum materials in a more creative and engaging way, and design more creative and advanced, student-centered learning experiences. To better meet the learning needs of normal school students. Secondly, in terms of learning, ChatGPT, as an artificial chatbot, can respond to language and text in time, and carry out intuitive and natural dialogues, even discussions on various topics, so as to enrich and develop normal students' subject ontology knowledge, teaching practice knowledge and conditional knowledge. In man-machine interaction, with the help of the virtual intelligent tutoring service provided by ChatGPT, normal students can get instant feedback and answers. Most importantly, they can obtain valuable resources and information anytime and anywhere, improve time utilization and effectiveness, and enhance the ability of normal students to create new insights on the basis of existing experience. This way can effectively improve the learning ability of normal university students. In personalized learning, they experience a unique educational approach that fully meets their needs and abilities. Finally, in classroom teaching, the introduction and exploration of ChatGPT's use in teaching can maximize the teaching benefits from inquiries about it. For example, how to design teaching plans, how to carry out teaching management, how to design situational survey questions and what teaching mode to adopt, etc. ChatGPT can provide cases and relevant materials in real time, and

teaching is no longer a boring knowledge transfer. It can help teachers, educators and normal students brainstorm and form ideas to improve their in-depth understanding of education and teaching issues and enhance their creative thinking.

2.2 Teaching is Rooted in Intelligent Learning Assessment

Learning assessment can establish the relationship between the teaching effectiveness of teachers and teachers and the learning goals of normal students. It is a very important aspect of the integration of teaching and learning process, and also a key link to ensure the training quality of normal students. In addition, learning assessments can provide useful feedback on how well they have accomplished their teaching tasks. However, in the current teacher education system, the learning assessment for normal university students is still relatively weak. In terms of learning assessment of normal college students, ChatGPT can be used to set and evaluate the traditional formative and final assessment techniques, such as multiple choice questions, judgment questions, short answer questions and essay questions in real time. For other, more complex forms of assessment, including research surveys, academic essays and various forms of assignments, "ChatGPT enables semi-automated grading of student work by identifying the strengths and weaknesses of the problem tasks being analyzed."[4]. With the help of ChatGPT, teachers and educators can develop open questions consistent with the curriculum objectives to develop different levels of education knowledge and skills of normal students, consolidate their basic knowledge of education and teaching, design an automatic scoring system with feedback, reduce the time for teachers and educators to compile tests, so as to relieve their pressure in education evaluation. At the same time, on the basis of the analytical data generated by this evaluation model, teachers and educators can accurately analyze the learning disabilities and development difficulties faced by normal students, give formative and summative feedback in time, and formulate effective individual counseling strategies to better help the development of normal students.

2.3　Intelligently　Assist　the　Education

Research of Normal University Students

The scientific research literacy of teachers is the inevitable need to cope with the technological change in the field of education and the realistic requirement to realize the professional development of teachers, which is of great value to improve the teaching ability of teachers. Countries all over the world have always attached great importance to teachers' scientific research literacy and regarded it as an important standard for training teachers. But in practice, it is a very challenging task to cultivate the research literacy of normal university students. For the education research of normal university students, ChatGPT is mainly reflected in the following aspects: First, the acquisition of educational research materials. As an advanced intelligent tool, ChatGPT can realize the rapid collection and processing of information and materials, provide useful information and resources to obtain the knowledge needed to complete the project, and improve the possibility of completing academic activities, which is difficult for human cognition to achieve. For normal university students, limited by knowledge accumulation and relatively weak understanding of the subject, "ChatGPT can provide suggestions for books and articles related to the topic under discussion."[5], by paying attention to the recommended key books and articles, normal students can lay a solid foundation for carrying out follow-up research work. Second, the analysis of research data. Under the requirements provided by normal students, ChatGPT can sort out existing research literature and generate key points to realize the brainstorming on the research content of this topic, which is of great benefit to quickly grasp the existing research progress and perceptively capture the future research trends. At the same time, it can also provide reference research ideas and frameworks for the follow-up research and writing of normal students. This brings great convenience for the smooth development of follow-up research and writing. Third, to assist research planning. Educational research is a systematic project, which needs scientific planning and orderly progress in steps. ChatGPT can provide suggestions on how to better manage time and tasks for normal students, so as to help normal students just entering the research field to better plan their time and improve the efficiency and quality of project research.

3. Application Risk and Ethical Crisis in Teacher Education

Professor Melvin Kranzberg, a famous American historian, once put forward a law of science and technology: "Technology is neither good nor bad nor neutral."[6] In essence, the key to the quality of technology does not lie in the technology itself, but in the way it is utilized, which carries the value judgment of good and evil. In the initial stage of use, such sophisticated advanced artificial intelligence tools can indeed bring significant positive effects on teacher education reform. However, while there are many possible educational advantages, there are also potential application risks and ethical crises.

3.1 Create a Dependency on Smart Technology

Ai technology can shape the way people learn, think, decide, and act. First, ChatGPT is a natural convenience for normal school students in completing tasks, and lazy and action procrastinators may resort to this tool to complete corresponding work tasks. However, ChatGPT is detrimental to the development of analytical thinking, innovative thinking, critical reflection ability, interpersonal skills and decision-making ability of normal college students. As these thinking qualities and abilities play an extremely important role in the future teacher career of normal university students, their lack will bring unpredictable negative impact on education and teaching activities. Secondly, for educators, over-reliance on artificial intelligence to make course plans will mean giving up a lot of meaningful educational ideas. They are likely to directly apply the automatically generated lesson plans to successfully complete the teaching task, ignore the processing and regeneration of knowledge, and lack a deep reflection on the adaptability of teaching. Finally, it will lead to errors of knowledge and damage of values. The text generated by ChatGPT often contains wrong answers and even reasoning errors. If learners have limited discriminating ability, they will acquire wrong knowledge without realizing it. For teachers, educators and normal students, if the established knowledge is not critically

examined, but directly used, it will lead to the transfer of false knowledge, which is not conducive to the generation of professional quality of teachers in normal schools.

3.2 Unfair Evaluation of Academic Performance

ChatGPT's ability to perform tasks based on a restrictive set of prompts raises profound concerns about the authenticity of assignments. Especially in the grading stage, the quality of evaluation will be seriously reduced, because it is difficult to judge the understanding of education subjects and the real teaching literacy and ability of normal university students through written assignments. Another cause of unfair academic evaluation is the availability and actual utilization of technology. Students who utilize technological tools can produce higher quality work than others, and such an unfair advantage can lead to an unfair evaluation process. Normal students who are more familiar with artificial intelligence technology will revise the work produced by artificial intelligence several times to make it more perfect before submitting the assignment. Teachers and educators will grade the fake work of normal students, with the consequence that it is extremely unfair to normal students who are not familiar with the technology. As far as educational evaluation is concerned, the most direct purpose of many teacher educators using evaluation is to distinguish through evaluation, that is, to judge the academic quality level of normal students. Normal students who use advanced intelligent programs to complete assignments and projects are likely to get higher scores than those who do not use them, which will lead to educational inequality, and then arouse normal students' dissatisfaction with educational equity.

3.3 Cause Academic Integrity Crisis

Advances in artificial intelligence have made it easier than ever to cheat. In the current context, despite the tools available to identify plagiarism, accurately identifying AI-generated content remains an unsolved problem, and as systems iterate, identifying created content will become increasingly difficult. Internal and external factors such as individual, situational, and institutional factors are highly likely to induce normal students to engage in cheating, including competition, pressure, poor management of time and resources, poor academic background, and the desire to achieve good grades [7]. In the field of teacher education, ChatGPT can not only assist in designing assessments, writing essays and translating languages, but also enable users to ask and answer questions, summarize texts, and interact with peers. "This model can demonstrate its creativity in writing on almost any topic, from a single paragraph to a whole research paper, and can be seen as convincing or nearly convincing." But in the content provided by ChatGPT, there will also be obvious common-sense errors and biases, and even plagiarism, which has to raise concerns among educators. Scientific studies have shown that "the information generated by ChatGPT is likely to contain factual errors."[8] ChatGPT will even fabricate quotes and references that appear to be true but do not actually exist [9]. This will lead to the sharing of deceptive knowledge, which is not conducive to the dissemination and learning of educational knowledge. The accuracy of users' prompts, the quantity and quality of data "fed" in the training corpus and the limitations of the application program are all factors influencing the creation of false information by ChatGPT. In particular, ChatGPT has its own limitations, which are highly likely to produce inaccurate answers. Teachers, educators and normal students are all at risk of being misled by information. Since ChatGPT can output text according to various prompts, if normal students do not correctly mark the source and source of the data cited, it means that it is highly likely to be used unethically, which will lead to violation of academic integrity and lead to academic trust crisis.

4. ChatGPT Empowers Teachers with Coping Strategies for Education

Whether ChatGPT is a "Pandora's box" or an "Aladdin's lamp" depends on how teachers and students in the field of teacher education understand and act on the technology. "Throughout the history of educational technology, many technological innovations have been seen as the end of traditional education, often the result of people's rapture and irrational fascination with technology." [10]History tells us that while ChatGPT can change the form of teacher education, it can

never change the nature of teacher education.

4.1 Action Research: An Exploration of Effective Teaching Integration

ChatGPT will never be the end of teacher education, because educators in the classroom do much more than disseminate information and teach the basic facts of education, but it will pose a substantial challenge to the traditional way of teacher education. "If a machine can do what a teacher does, it can replace a teacher," he says. [11] If the teacher educator's teaching activities are limited to the dissemination of knowledge, then the teacher educator will eventually be replaced by ChatGPT. To this end, we should be wary of the convenience of teaching brought by artificial intelligence, and avoid becoming a vassal of teaching machines. In order to test the scientific and effective application of ChatGPT in the field of teacher education, it is necessary to conduct effective teaching integration and exploration based on action research in teaching practice. ChatGPT should be viewed as an adjunctive tool for interpersonal interaction and achievement of academic goals, rather than as a substitute for teacher educators. Specifically, action research based on man-machine collaboration can be carried out in teaching practice to explore feasible ways for ChatGPT to empower curriculum reform, and to form typical lesson examples with reference value. First, in the teaching concept, from the cultivation of knowledge and skill type "technician" to the cultivation of quality type "research teacher". It is necessary to deepen the identification of teacher identity, which is the subjective perception of teacher's status, role, responsibility and function both individually and collectively [12]. In the teaching process, teachers should not only exert their own instrumental value, but also reflect their own educational value. If the normal students trained by teachers are only low-order mental workers with basic knowledge and skills, they will eventually be replaced by artificial intelligence. Second, from the perspective of knowledge, explore a new way from knowledge possession to knowledge application. The application of ChatGPT in the classroom can partially replace the implementation of the knowledge and skills-oriented curriculum in the existing classroom, so that normal students can turn to the understanding and application of knowledge and skills. Thirdly, from the perspective of students, the exploration from passive learning to active learning, normal students from passive learners to active investigators of education and teaching problems, to become active learners, thinking decision makers and problem solvers in classroom teaching.

4.2 Evaluation Method: Toward the Quality-oriented Teaching Evaluation

In the use of ChatGPT, automatically generated text is one of the most common forms. One of the most common concerns in teacher education is the way written tasks typified by course papers are evaluated. This is because normal students can outsource tasks to ChatGPT and stand out in the existing evaluation system. "Pay special attention to the fact that some students struggle to cope with their coursework, assignments, essays and examinations at short notice. Thus, poor preparation for assessments and poor time management skills can also tempt students to misbehave." [13] In the face of the challenge of AI, it is essential to prevent unfair evaluation of teaching. In the assessment of students' academic performance, it is necessary to avoid the traditional forms of homework and tests which cannot be determined whether they are completed by computers or not, and move towards the literature-based teaching evaluation which focuses more on process and real problem-solving ability. On the one hand, emphasis should be placed on process assessment. Observation, open-ended activities, project-based assignments, activity performance records, peer or self-evaluation and portfolio have been proven to resist the influence of ChatGPT, and they can all be used as important ways to evaluate normal students. On the other hand, emphasis should be placed on evaluation task design. "Authentic, performance-based and constructivist assessments are listed as alternative assessment tools."[14] This assessment is different from the previous final assessment. Instead, it emphasizes the combination of process assessment and final assessment, reduces standardized tests and investigation based solely on course paper writing, and requires the emphasis on students'

analytical, critical, collaborative and creative problem-solving abilities, and pays more attention to the development of students' higher-order thinking. The specific assessment activities can be based on students' debate, group discussion, speech, presentation of research reports and other contents based on materialized research results, so as to make the evaluation more process based, expressive and higher-order. This evaluation method can effectively resist the influence of ChatGPT on the existing evaluation methods.

4.3 Applied Ethics: Ethics and Academic Accountability

Calculators have not taken away the ability to calculate, but have become a part of today's mathematics education. "As with any other tool in information technology, whether it helps or displaces people's work depends entirely on the way it is used." [15] In order to prevent academic misconduct, abuse of ChatGPT for plagiarism and ghostwriting, and effectively maintain academic integrity, the importance of abiding by academic ethics should be instilled in normal students in the process of daily application of ChatGPT. As far as the code of ethics is concerned, the violation of academic integrity should first be clarified. "According to previous research, there are several typical forms of academic dishonesty: plagiarism, reuse or resubmission of the same paper, cheating on exams, fabricating information, collusion or illegal cooperation, contract fraud, imitation, plagiarism and ghostwriting." Teachers, educators and normal students should have in-depth communication on the use of tools, clarify the various situations that are considered plagiarism as well as non-plagiarism, and jointly develop academic integrity policies. In addition, teachers and educators should make it clear to normal students that ChatGPT, as an artificial intelligence machine, is not an independent individual and therefore cannot be held legally responsible independently. Any signatory can be held responsible for the work, but it is clear that AI cannot be held responsible. It has no real moral feelings or moral judgment, and the person responsible for its abuse can only be defined as its offending user. For the abuse of ChatGPT to commit academic fraud, strict punishment measures should be formulated, a

lifelong academic accountability system should be established, and once found, academic misconduct should be held accountable.

5. Conclusions

With the continuous improvement and application of ChatGPT in the field of education, teacher education will surely usher in more changes, opportunities and challenges. Artificial intelligence and education is a topic that needs to be discussed for a long time. Teachers should think calmly and objectively about ChatGPT technology, re-identify the identity of teachers, clearly position their own value, use technology in a dialectical and innovative way to enable teacher education reform, build a safe and stable education paradigm, and promote the digital transformation and upgrading of education.

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