Research on the Opportunities and Challenges Brought by ChatGPT Technology to the Teaching of University Physics Experiment Course

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Abstract: To accelerate the digital transformation of education and promote the high-quality development of education, the opportunities and challenges brought by ChatGPT technology to the teaching of university physics experiment courses were discussed. This paper uses the research methods of literature and logical analysis to sort out and analyze the opportunities and challenges facing the teaching reform of university physics experiment courses under the application scenario of ChatGPT. The research results show that the opportunities are: the application of new technology brings more possibilities for teaching, can improve students' learning interest, and improves teaching effect; The challenge is that teachers need to constantly upgrade their skills and knowledge to adapt to the application of new technologies, while also facing the problem of inadequate educational resources and tight funding for education. Conclusion: It is necessary to increase financial investment in physics experiment education, strengthen teacher training and the development and sharing of educational resources, and deepen curriculum research and development and teaching reform, to better adapt to the reform of physics experiment teaching in the intelligent era.

Keywords: ChatGPT; University physics experiment; Teaching reform

1. Presentation of the problem

In 2022, OpenAI launched the Generative Pretrained Transformer(" ChatGPT "), which immediately attracted wide attention and hot discussion from all walks of life. ChatGPT technology (Generative Pretrained Transformer), as a natural language processing technology based on artificial intelligence, can generate high-quality language text and has shown high performance and adaptability in tasks in different fields. ChatGPT was created in the context of the pursuit of natural language processing technology to improve the quality and efficiency of natural language generation and provide better ways for humans to communicate and communicate.

The emergence of ChatGPT technology provides a variety of material support for the development of education, and technology also promotes the innovation and reform of teaching methods, which brings new opportunities and challenges to the current teaching reform. For the transformation of teaching, ChatGPT technology has great potential for application in the field of education. It not only automatically generates high-quality textbooks, tests, and practice questions, but also provides real-time feedback and AIDS in learning. In addition, ChatGPT technology can also provide a virtual learning environment for teachers and students to conduct simulation experiments and interactive communication, to improve the learning effect and teaching quality.

2. Opportunities brought by ChatGPT for the reform of university physics experiment teaching

2.1 Provide more targeted course teaching to meet the personalized experimental teaching

Students are in the main position in the process of school education and teaching activities, and it is the specific requirements

of school physics experiment teaching activities to meet students' personalized teaching. In the field of education, ChatGPT can automatically generate personalized teaching content by analyzing students' language and expression, which means that students can obtain teaching content suitable for themselves according to their learning style and ability level. This personalized approach to teaching can increase students' interest and engagement, thereby improving their learning outcomes.

2.2 Enhance the communication between teachers and students to provide real-time feedback for physics experiment teaching

Teaching feedback is the collection of information about two-way activities of teaching and learning by teachers in the teaching process. It is to test the transmission and exchange of information between teachers and students, to constantly adjust teaching methods, improve teaching modes, and improve teaching effects. ChatGPT is a natural language processing (NLP) --based technology that allows chatbots to engage in more intelligent and natural conversations with users and provide feedback on sentiment analysis, language analysis, speech recognition, and conversation interactions.

2.3 Provide a variety of teaching methods and tools, and introduce more diversified teaching methods and contents

In the reform of school physical education under the background of quality education, the diversification of teaching methods and contents is the key factor for the transformation of school education from exam-oriented education to quality education. In the reform of physics experiment teaching, ChatGPT technology can help students better master skills and knowledge and improve their learning effect and motivation by introducing more diversified teaching methods and contents.

3. Challenges brought by ChatGPT to the reform of university physics experiment teaching

3.1 Promote the reform of teaching, but it is easy to cause dependence on professional technical equipment

ChatGPT is a highly cohesive program with good maintainability. This also means that ChatGPT is less coupled to other interpreting devices. This shows that: First, ChatGPT technology needs to operate and interact with computer systems and network equipment, so its dependence on computer systems and network equipment is very high, which also means that physics experiment courses need to have corresponding computer systems and network equipment to fully play the role of technology. Second, the application of this technology in the field of education requires the use of a large amount of language data for training and model optimization. Hence, the dependence on big data storage and processing capabilities is also very high. Hence, the physics experiment course needs to have the corresponding big data storage and processing capabilities to meet the data requirements of ChatGPT technology.

3.2 The role positioning of physics teachers is impacted, but the information literacy of physics teachers is insufficient

As facilitators of student learning, ChatGPT helps teachers design and develop online courses and learning resources, providing personalized learning resources tailored to students' cognitive patterns and individual differences. Based on the new challenges brought by the emergence of ChatGPT artificial intelligence technology, teachers should closely track the development trend of the integration of information technology and education and teaching under the premise of people-oriented education, to continuously improve and enhance the teaching quality and efficiency of higher education.

3.3 Privacy and security risks exist based on a large amount of language data

Although the newly introduced technology can promote change in education and teaching, ChatGPT technology requires a large amount of language data for training and model optimization, which may contain user's personal information and sensitive information. Therefore, if these data are leaked, it will bring great privacy and security risks to users.

3.4 The lack of quantitative data support makes it difficult to quantify and evaluate the teaching effect

Physics experiment teaching is a long-term educational activity, and it is very important to collect learning behavior data in the teaching process and optimize the design of teaching activities based on the learning behavior data. However, for a long time, traditional physical education teaching relied too much on the teacher's experience, which led to the lack of quantitative data support in the improvement of teaching design, and the teaching was not sufficiently targeted and in-depth. The model output of ChatGPT technology can often contain vague or subjective descriptions, which makes it difficult for teachers to quantify and assess student learning.

4. Teaching reform strategies of physical education curriculum under ChatGPT

4.1 Increase investment in education and improve teaching quality

With the application of ChatGPT technology, physics experiment teaching has changed. Increasing education input is the key to improving teaching quality. Purchasing advanced teaching equipment and equipment is an important means to improve the teaching effect. Educational institutions should increase the purchase of sports teaching equipment and equipment, purchase advanced sports equipment and equipment, and improve the quality and effect of teaching.

4.2 Strengthen teacher training and improve the quality of teachers

The teacher is the leader of teaching activities and the guide for students to acquire sports knowledge and skills. Therefore, strengthening the training of teachers in teaching change so that they understand how to use ChatGPT technology to teach is a very important link. This training can include online courses, seminars, and workshops to help teachers master the fundamentals and operation of ChatGPT technology.

4.3 Develop appropriate teaching programs to meet the individual needs of students

The teaching scheme is to the classroom teaching, just as the combat scheme is to the battlefield fighting, which has important strategic value and is the basis of AI-enabled teacher education. Personalized teaching programs based on ChatGPT technology can be developed according to the individual needs and interests of students. Teachers can use ChatGPT technology to analyze students' learning data and develop personalized teaching plans according to students' characteristics and needs to better meet students' learning needs.

4.4 Establish a scientific evaluation system to promote the development of physics experiment teaching

The teaching system is the organic combination of teaching in the school education system. school education activities provide a well-defined teaching framework, so that they can better grasp the whole process of classroom teaching, to improve the teaching effect. Therefore, based on the application background of ChatGPT technology, establishing a scientific education and teaching evaluation system is the key to improving teaching quality. Schools need to formulate reasonable teaching objectives and evaluation standards according to the age, ability, and development stage of students to ensure a scientific and accurate evaluation system.

5. Sum up

The application of ChatGPT in physics experiment teaching shows great potential and prospects. As an advanced language model, it can serve as an intelligent learning partner for students, providing immediate programming communication and guidance. ChatGPT can answer student questions, explain concepts, and provide experimental video resources to help students solve difficult problems and deepen their understanding. It can also provide personalized learning support and adaptive instruction. Future research can focus on improving the semantic understanding and generative ability of models, realizing personalized learning and sentiment analysis, and exploring multi-modal learning and social learning.

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