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Exploration on the Empowerment of AIGC Technology in Higher Vocational Education Teaching Modes

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Abstract: This paper focuses on the application of AIGC (Artificial Intelligence Generated Content) technology in higher vocational education teaching modes. It deeply explores the significant meaning of AIGC in empowering higher vocational education, and analyzes the existing problems when AIGC technology is applied to such teaching modes, covering aspects like technology application, teaching staff, students' adaptability, and educational management. Meanwhile, it puts forward targeted and effective paths for AIGC technology to empower higher vocational education teaching modes, including optimizing technology application, strengthening teacher training, improving students' literacy, and perfecting educational management. The paper aims to promote the in-depth integration of AIGC technology and higher vocational education, realize the innovation and high-quality development of higher vocational education teaching modes, and provide theoretical references and practical guidance for cultivating high-quality technical and skilled talents who meet the needs of the new era.

Keywords: AIGC technology; Higher vocational education; Teaching mode; Educational reform; Talent cultivation

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1. Introduction

In the current era of rapid technological development, AIGC (Artificial Intelligence Generated Content) technology, with its strong content generation capability and intelligent features, is gradually penetrating various fields. As the cornerstone of national development, education is also actively exploring integration with new technologies to achieve the innovation and upgrading of educational modes. Higher vocational education, as an essential part of China's higher education system, undertakes the important mission of cultivating high-quality technical and skilled talents for society. Empowering higher vocational education teaching modes through AIGC technology is expected to break the constraints of traditional education, improve teaching efficiency and quality, and promote the personalized development and all-round growth of students. Therefore, in-depth exploration of the empowerment of AIGC technology in higher vocational education teaching modes has important

theoretical value and practical significance. This paper will elaborate on the significance, existing problems, and implementation paths of AIGC technology empowering higher vocational education teaching modes.

2. The significance of AIGC technology empowering higher vocational education teaching modes

2.1. Enriching teaching resources and improving teaching efficiency

AIGC technology can generate diverse teaching resources quickly and efficiently, including texts, images, audio, and videos. Teachers can use AIGC technology to create customized teaching materials—such as courseware, case studies, and exercises—based on teaching content and students' needs. This significantly saves lesson preparation time while enhancing the richness and targeting of teaching resources. For instance, in computer programming courses, AIGC technology can generate a large number of programming exercises and project cases at different difficulty levels, helping students better master programming skills [1]. Meanwhile, AIGC technology can also conduct intelligent classification and management of teaching resources, facilitating quick search and use for both teachers and students. This improves the utilization efficiency of teaching resources and further enhances overall teaching efficiency.

2.2. Enabling personalized teaching to meet students' diverse needs

Each student has unique learning styles, learning paces, and levels of knowledge mastery. AIGC technology can analyze students' learning data to understand their learning characteristics and needs, then provide personalized learning plans and guidance. For example, based on data such as students' performance in online quizzes and learning duration on e-learning platforms, AIGC technology can identify students' weak knowledge points and push targeted learning content and exercises to them. Additionally, AIGC technology can simulate different teaching and learning scenarios, satisfying students' diverse learning needs and promoting their personalized development. This allows every student to make progress at a learning pace suitable for themselves [2].

2.3. Enhancing teaching interaction and stimulating students' learning interest

In traditional higher vocational education teaching modes, teaching interaction is often limited to classroom questioning, group discussions, and other single forms. The application of AIGC technology brings new methods and experiences to teaching interaction. For example, virtual intelligent teaching assistants can conduct real-time conversations with students to answer their questions and guide them to think; virtual reality (VR) and augmented reality (AR) technologies can be used to create immersive teaching scenarios, allowing students to participate in learning in a "real-life" way and enhancing the fun and interactivity of learning [3]. Furthermore, AIGC technology can support collaborative learning among students. Students can complete project tasks together through online platforms, share learning experiences and achievements, which stimulates their learning interest and enthusiasm, and improves their learning effects [4].

3. Problems in the empowerment of AIGC technology in higher vocational education teaching modes

3.1. Limitations in technology application

Although AIGC technology has great application potential in higher vocational education teaching, the technology itself still has certain limitations currently. On one hand, there are issues with the accuracy and

reliability of content generated by AIGC. For example, when generating highly academic teaching content, it may contain factual errors or logical confusion, which affects teaching quality. On the other hand, the compatibility between AIGC technology and existing higher vocational education teaching management systems, online learning platforms, etc., is insufficient. This leads to problems such as poor data transmission and ineffective function integration. In addition, the use of AIGC technology has high requirements for hardware equipment and network environment. Due to limitations in funds and technical conditions, some higher vocational colleges cannot provide good basic support for the application of AIGC technology, which restricts its wide application in higher vocational education teaching.

3.2. Insufficient adaptability of teaching staff

The application of AIGC technology puts forward higher requirements for the teaching ability and information technology literacy of higher vocational college teachers. However, at present, many higher vocational college teachers have a low level of understanding and mastery of AIGC technology, and lack the ability to effectively integrate AIGC technology with teaching content. Some teachers are accustomed to traditional teaching modes and methods, and have a certain resistance to accepting and applying new technologies. They are unwilling to spend time and energy learning and exploring the application of AIGC technology in teaching. Moreover, the AIGC technology training system for teachers in higher vocational colleges is incomplete. The training content lacks pertinence and practicality, and the training methods are single, which makes it difficult to meet the actual needs of teachers. As a result, teachers face many difficulties when applying AIGC technology in teaching, and cannot give full play to the advantages of AIGC technology [5].

3.3. Students' adaptability issues

The cognition and application ability of AIGC technology among higher vocational college students are uneven. Some students are curious and enthusiastic about new technologies, and can quickly accept and master the application of AIGC technology in learning. However, a considerable number of students feel unfamiliar and unadaptable to AIGC technology, and lack independent learning and the ability to use AIGC technology to acquire knowledge. In addition, AIGC technology may cause students to develop a dependent mentality to a certain extent. They may over-rely on the content generated by AIGC, while ignoring the cultivation of their own thinking and innovative abilities [6]. For example, when completing homework and papers, some students may directly copy the content generated by AIGC without independent thinking and research, which affects the improvement of students' comprehensive quality.

3.4. Imperfect educational management and evaluation system

The application of AIGC technology brings new challenges to the management and evaluation of higher vocational education. In terms of educational management, a large amount of teaching resources and students' learning data generated by AIGC technology need to be effectively managed and analyzed. However, the current educational management systems of higher vocational colleges lack corresponding functions and mechanisms, and cannot collect and process these data comprehensively and accurately. In terms of teaching evaluation, the traditional teaching evaluation methods mainly focus on test scores and homework completion, which are difficult to adapt to the teaching mode under the application of AIGC technology. The personalized learning and diversified teaching methods supported by AIGC technology make students' learning processes and achievements more diversified. It is necessary to establish a more scientific, comprehensive, and

personalized teaching evaluation system to accurately assess students' learning effects and teachers' teaching quality. However, the research and practice in this aspect are still relatively lagging behind at present [7].

4. Paths for AIGC technology to empower higher vocational education teaching modes

4.1. Optimizing technology application and breaking through technical bottlenecks

Higher vocational colleges should establish a long-term mechanism for cooperation with technology enterprises, forming an innovation model of in-depth integration of industry, university, and research. Taking Shenzhen Polytechnic as an example, the college has jointly built artificial intelligence education laboratories with enterprises such as Tencent and SenseTime, and co-developed AIGC teaching platforms suitable for vocational education scenarios [8]. Through university-enterprise cooperation, aiming at the accuracy problem of AIGC-generated content, a "human-machine collaborative review" mechanism is adopted. First, the teacher team formulates review rules based on professional knowledge, then uses algorithms to conduct preliminary screening of AIGC-generated teaching content, and finally conducts manual review by subject experts. For instance, in the production of teaching courseware for the mechanical and electrical integration major, this mechanism reduces the content error rate from the initial 12% to below 3%, ensuring the professionalism and reliability of teaching resources. In terms of system compatibility development, higher vocational colleges can introduce microservice architecture and API interface technology to achieve seamless connection between AIGC technology and existing educational administration management systems and online learning platforms. Changsha Social Work College has adopted this method to directly push personalized learning tasks generated by AIGC to students' learning terminals, and collect students' learning behavior data in real time to feed back to the teaching management system, forming a closed loop of "teaching-learning-management." At the same time, for the optimization of hardware equipment and network environment, a "hierarchical construction and gradual upgrading" strategy can be adopted. The basic layer ensures that the campus network bandwidth reaches more than 1000 Mbps to meet the needs of daily teaching data transmission; the advanced layer builds a cloud computing platform, such as Huawei Cloud Education Solution, to provide elastic computing support for the operation of AIGC technology; the innovation layer introduces edge computing technology and deploys edge servers in key teaching areas such as training rooms to reduce data transmission delay and improve the fluency of AIGC applications such as virtual reality and augmented reality.

4.2. Strengthening teacher training and improving teachers' abilities

A sound AIGC technology teacher training system needs to cover three dimensions: "cognition-skill-innovation." At the cognitive level, higher vocational colleges can offer a series of general courses and invite experts in the AIGC field to give special lectures to help teachers understand the underlying logic of AIGC technology and its educational application potential. For example, Jinhua Polytechnic launched the "Artificial Intelligence and Educational Reform" lecture series. By analyzing educational application cases of mainstream AIGC tools such as GPT and Stable Diffusion, teachers gain an intuitive understanding of the technology. Second, skill training should adopt a "modular + project-based" model. Modular training focuses on specific application scenarios of AIGC tools, such as using Midjourney to generate teaching materials and designing interactive teaching Q&As through ChatGPT; project-based training takes actual teaching projects as carriers and requires teachers to form teams to complete curriculum design based on AIGC technology. Wuxi Vocational Institute of Technology organized teachers to participate in the "Virtual Simulation Training Course Development" project. After three

months of practice, teachers not only mastered the application of AIGC technology in virtual scene construction, but also produced 12 high-quality virtual training courses. In addition, to broaden teachers' horizons, a three-in-one exchange mechanism of "domestic and foreign exchanges-inter-college visits-enterprise practice" can be established. Every year, backbone teachers are selected to go to developed countries in vocational education abroad to learn experience in AIGC technology application; regular AIGC teaching seminars between domestic higher vocational colleges are organized; teachers are arranged to take temporary positions in technology enterprises to understand the latest development trends of AIGC technology. In terms of incentive mechanisms, the application of AIGC technology is included in the teacher performance evaluation system. "AI Teaching Innovation Awards" and "AIGC Curriculum Development Special Funds" are set up. Teachers who have made outstanding achievements in AIGC teaching application are given preferential treatment in professional title evaluation and selection of excellent teachers [9].

4.3. Improving students' literacy and promoting independent learning

Cultivating students' AIGC technology literacy should start from three aspects: the curriculum system, teaching methods, and practical activities. In terms of curriculum design, in addition to offering general courses such as Fundamentals of Artificial Intelligence, optional courses on AIGC technology application can be developed for different majors. For example, AIGC Image and Video Creation is offered for the digital media art major, and AIGC Marketing Copy Generation and Optimization for the e-commerce major. These courses enable students to master the specific application skills of AIGC technology in their professional fields. In terms of teaching method innovation, a "problem-oriented + critical thinking training" model is adopted. For instance, in marketing courses, teachers assign a product promotion task and require students to use AIGC to generate marketing plans. Then, students are organized to conduct critical discussions on the plans from perspectives such as target audience analysis and marketing strategy feasibility. This guides students to recognize the limitations of AIGC-generated content and cultivates their independent thinking ability. At the same time, "blockchain + digital watermarking" technology is used to track the originality of students' assignments, curbing plagiarism from a technical perspective [10]. In addition, practical activities can be carried out based on the "competition-project-club" platform. Students are organized to participate in the National Vocational College AIGC Innovation Application Competition to stimulate their learning enthusiasm; they are encouraged to take part in AIGC practical projects of university-enterprise cooperation. For example, students from Hangzhou Vocational and Technical College participated in the AIGC customer service robot optimization project of Alibaba, improving their ability to solve practical problems in practice; students are supported to establish AIGC technology clubs, which regularly hold technical sharing sessions and creative workshops to create an atmosphere for independent learning and innovation.

4.4. Improving the educational management and evaluation system

Building an educational management system adapted to the application of AIGC technology needs to focus on solving two major problems: data management and teaching evaluation. In terms of data management, big data analysis technology can be used for reference to establish an AIGC education data center. This center can integrate multi-source data, such as teaching resource data, students' learning behavior data, and teachers' teaching process data, and conduct in-depth analysis through machine learning algorithms to provide support for teaching decision-making. For example, by analyzing data such as the time students spend on completing assignments with AIGC tools and the number of revisions, the degree of students' knowledge mastery and

learning attitude can be judged, and teaching strategies can be adjusted in a timely manner. The improvement of the teaching evaluation system should follow the principles of "diversity, process-oriented, and personalization." In terms of evaluation indicators, in addition to the traditional knowledge mastery, indicators such as AIGC technology application ability and innovative thinking ability are added; in terms of evaluation methods, a "360-degree evaluation + dynamic portrait" model is adopted. It comprehensively integrates teacher evaluation, student self-evaluation, peer evaluation, and AIGC learning behavior analysis results to generate a personalized learning portrait for each student. For example, the AIGC teaching evaluation system developed by Jiangsu Vocational College of Agriculture and Forestry can record students' operation data and problem-solving processes in virtual simulation training in real time, generate evaluation reports through intelligent algorithms, provide improvement suggestions for students, and at the same time provide a basis for teachers to optimize teaching. In addition, blockchain technology can also be introduced to ensure the immutability and traceability of evaluation data and improve the fairness and credibility of the evaluation.

5. Conclusion

AIGC technology provides new opportunities and impetus for the transformation of higher vocational education teaching modes. It holds great significance in enriching teaching resources, realizing personalized teaching, enhancing teaching interactivity, and facilitating vocational skills training. However, the current empowerment of AIGC technology in higher vocational education teaching modes still faces many challenges, such as limitations in technology application, insufficient adaptability of teaching staff, students' adaptability issues, and imperfect educational management and evaluation systems. By means of paths including optimizing technology application, strengthening teacher training, improving students' literacy, and perfecting the educational management and evaluation system, we can effectively promote the in-depth integration of AIGC technology with higher vocational education teaching, and realize the innovation and high-quality development of higher vocational education teaching modes.

Disclosure statement

The author declares no conflict of interest.

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