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Original Paper

The Issues and Optimization Strategies in the Modernization of Vocational Education in the Era of Chat GPT

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Abstract

The emergence of Chat GPT technology represents a significant breakthrough in natural language processing, revolutionizing human-machine interaction and presenting profound challenges to vocational education modernization in China. In the Chat GPT era, vocational education undergoes transformative changes, including personalized learning reaching new heights, big data-driven intelligent decision-making entering a new phase, and the integration of education resources on unprecedented scales. However, this modernization effort also encounters several critical issues, such as overreliance on technology and the associated risks of unemployment, threats to data privacy and security, erosion of ethical values, and the widening digital divide in education. To ensure the high-quality development of vocational education modernization with the support of artificial intelligence tools like Chat GPT, it is crucial to enhance supervision and regulation of Chat GPT technology applications, promoting its safe and responsible use. Moreover, prioritizing technology ethics and moral education becomes imperative to nurture students' ethical awareness and moral compass in the utilization and development of technology. Lastly, optimizing the distribution of digital educational resources is essential to promote educational equity and bridge the digital divide among students.

Keywords

Chat GPT, modernization of vocational education, issues, strategies

Introduction

In China's pursuit of modernization, the modernization of education plays a crucial role in building a socialist modern country with Chinese characteristics (Xi, 2022). Educational modernization, as a prominent policy discourse, has become a strategic goal for the development of education in the country, with a particular emphasis on modernizing vocational education. The integration of "artificial intelligence + education," exemplified by technologies like Chat Generative Pre-trained Transformer (Chat GPT), is accelerating the modernization of vocational education and presenting favorable opportunities (Shi & Yang, 2022). However, the current state of vocational education modernization in China has not fully aligned with the advancements in artificial intelligence technologies. Therefore, it is necessary to explore how to respond to the impact of artificial intelligence on vocational education modernization in order to achieve significant progress.

Chat GPT is a dialogue generation system based on the Transformer model. It possesses the ability to comprehend and generate human language, making interactions with computers more natural and seamless. In the era of Chat GPT, individuals can acquire information, solve problems, and seek assistance through conversations with machines. No longer constrained by simple keyword searches or predefined instructions, Chat GPT generates contextually relevant and coherent responses based on user queries and requirements. This enables more flexible and intelligent communication with computers, providing personalized and tailored services. The emergence of Chat GPT has brought forth numerous opportunities and challenges across various industries. In the customer service sector, Chat GPT can automate responses to frequently asked questions, offering round-the-clock online support and alleviating the workload of human customer service representatives. In the field of education, Chat GPT can serve as a personalized learning companion, providing guidance and clarification to students. In healthcare, Chat GPT can assist doctors in diagnosis and treatment planning, enhancing medical efficiency and accuracy.

It is essential to discuss the impact of the Chat GPT era in the field of education. While we may not fully grasp the general principles of integrating Chat GPT into the educational ecosystem, it is crucial to approach it with caution. Merely debating whether to prohibit or embrace Chat GPT is inadequate. Instead, we should utilize tools that enhance efficiency rather than outright banning them. Some foreign universities and secondary schools have chosen to prohibit Chat GPT due to concerns about potential negative impacts. However, such restrictions may not yield practical results. Blindly embracing Chat GPT, driven by excessive technological enthusiasm, can lead to a digital "whirlpool". Therefore, we need to thoroughly consider how to respond to the impact of Chat GPT on vocational education, prepare in advance, gain a comprehensive understanding of the changes it brings, and seriously reflect on the potential risks of artificial intelligence in education. We must further explore how to reconstruct the vocational education ecosystem to effectively address the influence of new technologies on vocational education and fulfill education's mission of adaptability and transcendence (Yang & Zhu, 2023).

1. New Features of Vocational Education Modernization in the Chat GPT Era

1.1 Personalized Learning Enters a New Stage in the Chat GPT Era

The concept of individualized instruction has long been an esteemed educational philosophy, and with the advancing development of Chat GPT technology in the education sector, personalized educational experiences are becoming increasingly (Sok & Heng, 2023), through interactive conversations with students, Chat GPT can grasp their interests, skills, and career aspirations, thereby aiding them in career orientation and development planning. Chat GPT can offer tailored career advice, providing insights on industry trends and employment prospects to empower students in making well-informed career decisions and formulating corresponding learning paths and goals. Secondly, Chat GPT can deliver customized learning materials and resources based on students' career needs and learning objectives. By engaging in interactive conversations, Chat GPT can comprehend students' professional domains and skill requirements, offering personalized courses, textbooks, case studies, and practical projects to cater to their learning needs and career development aspirations. Moreover, Chat GPT can adjust the difficulty and pace of learning content according to students' learning progress and proficiency.

Through interactive conversations, Chat GPT can assess students' mastery of various occupational skill areas and adapt teaching content accordingly, ensuring that students can learn at a suitable pace. Furthermore, Chat GPT can provide real-time learning feedback and assessments. Through interactive conversations, Chat GPT can promptly offer feedback on career skills, helping students gauge their learning progress and providing personalized guidance and improvement strategies. Additionally, Chat GPT can simulate professional scenarios and practical projects to facilitate real-time comprehensive assessment and competency certification. Lastly, Chat GPT can serve as students' career counselors and employment supporters, delivering personalized career guidance and job assistance. Through conversations with Chat GPT, students can acquire personalized advice and information on career planning, developing career skills, job-seeking techniques, and employment opportunities, thereby enabling them to smoothly pursue their career aspirations and meet their employment needs.

1.2 Big Data-Driven Decision-Making Opens a New Chapter in the Chat GPT Era

Modern technology has revolutionized the availability of vast amounts of data, which can now be processed and analyzed by advanced technologies like Chat GPT. This technological advancement has ushered in a new era of big data-driven decision-making. To begin with, Chat GPT engages in interactive conversations with students, enabling the collection of extensive learning data and personal information. This data encompasses various aspects such as academic performance, learning progress, preferences, and career interests. By carefully analyzing and mining this dataset, valuable insights can be gained into students' unique learning characteristics and needs, forming a solid foundation for subsequent decision-making processes. Leveraging the collected learning data, Chat GPT employs sophisticated data analysis techniques and machine learning algorithms to recommend personalized learning paths and content tailored specifically to each student. By taking into account their individual learning history and interest preferences, Chat GPT can accurately predict their learning needs and

suggest suitable courses, textbooks, and practical projects that align with their career goals. This personalized approach greatly enhances students' educational experiences and empowers them to achieve their desired professional aspirations.

Moreover, Chat GPT continuously monitors students' learning progress and comprehension in real-time through interactive conversations. By carefully analyzing students' answers, questions, and feedback, Chat GPT can effectively assess their learning status and identify areas of confusion. This enables the system to provide immediate teaching guidance and support, facilitating a deeper understanding and mastery of the learning content. By actively adapting and adjusting based on real-time monitoring, Chat GPT significantly improves learning outcomes for students. Additionally, Chat GPT possesses the capability to assess and certify students' vocational skills by simulating professional scenarios and practical projects. Through interactive conversations, Chat GPT collects data on students' practical operations and problem-solving processes, enabling comprehensive assessment and competency certification. These assessments and certifications offer an objective and accurate evaluation of students' vocational abilities, providing robust evidence for employment purposes. As a result, students can showcase their skills and competencies to potential employers with confidence.

1.3 Education Resources Embrace New Integration

In the era of Chat GPT, vocational education resources have undergone significant diversification. While traditional resources like textbooks, lecture notes, and case studies still hold value, various novel resources have emerged, including online learning platforms, open online courses, virtual laboratories, educational games, and more. These resources go beyond text and images, incorporating multimedia elements and interactivity to enhance learning experiences. The digitization and online trend in educational resources have become increasingly evident. Resources can now exist in digital formats, stored, transmitted, and shared through networks and cloud platforms. Students can access these resources anytime and anywhere through online learning platforms and applications, providing them with flexible and convenient learning methods that cater to their individual needs. Integration and interconnectedness among educational resources have gained importance in the Chat GPT era. Traditional resources, online learning platforms, and educational games can complement and connect with each other, forming a unified educational ecosystem. This integration allows students to seamlessly switch between different resources, obtaining comprehensive and holistic learning experiences and knowledge.

Personalized customization of educational resources has become a defining characteristic in the Chat GPT era. Based on students' personalized needs and learning characteristics, resources can be customized and designed accordingly. Chat GPT can provide personalized learning resources and paths based on students' interests, abilities, and learning history. Such customized resources better meet students' learning needs, enhancing learning outcomes and motivation. Furthermore, the sharing and openness of educational resources have significantly improved. Educational institutions, educators, and students can share their resources, expanding access and benefiting a larger audience. Open online

courses and educational resource repositories provide students with more choices and opportunities, promoting the sharing and accessibility of educational resources.

2. Challenges in the Modernization of Vocational Education in the Era of Chat GPT

2.1 Technological Dependence and the Risk of Unemployment

Excessive reliance on technologies like Chat GPT without possessing the corresponding technical skills and knowledge can indeed pose risks such as technological dependence and unemployment. This is particularly evident in the context of vocational education. If students overly depend on technological tools like Chat GPT to complete learning tasks, it can diminish their ability for independent learning and problem-solving. If they become unable to think critically and solve problems independently, relying solely on technological assistance, they may face difficulties in real professional settings, increasing the risk of unemployment. While Chat GPT possesses intelligent and automated features that simulate human conversation and problem-solving abilities, this also implies that some traditional job positions may be replaced by technology, potentially leading to unemployment for a portion of students.

The pace of technological development, especially in the field of artificial intelligence, is incredibly rapid. In the era of Chat GPT, technology may progress at an unprecedented speed and scale, posing challenges for vocational education to keep up with the changes and demands of technology. If vocational education fails to timely adjust curriculum content and teaching methods to adapt to technological advancements, the knowledge and skills students acquire may become outdated, making it more difficult for them to find employment. Moreover, students' technical abilities have become a crucial factor in employment in the era of Chat GPT. Those lacking technical skills may face stiff competition in the job market. If students fail to master the knowledge and skills related to technologies like Chat GPT and cannot effectively apply technology to problem-solving, they may lose competitiveness in technology-driven professional environments, thus increasing the risk of unemployment.

2.2 Data Privacy and Security Are Threatened

In the era of Chat GPT, the collection, storage, and use of personal data entail a series of security and privacy risks (Sok & Heng, 2023). Firstly, the interaction between Chat GPT and students requires the acquisition of a large amount of personal data, such as students' course records and learning behaviors. However, the collection of these personal data may involve sensitive information, such as names, ages, and genders, thereby facing risks of data leakage and misuse if not properly protected and managed. Secondly, technologies like Chat GPT require the storage of students' personal data in cloud servers or other storage media. If the security of these storage media is insufficient, they may be vulnerable to hacking or unauthorized access. Additionally, there is a risk of eavesdropping or tampering with data during transmission, potentially leading to the leakage or alteration of students' personal data. Moreover, in order to provide better personalized educational services, vocational education institutions

may collaborate with third parties and share students' personal data with partners such as textbook suppliers or advertisers. If these partners fail to adequately protect students' personal data, there is a possibility of data misuse or usage for commercial purposes, such as marketing. Lastly, the misuse of personal data and algorithmic bias can result in unfair evaluation and treatment of students. Technologies like Chat GPT possess intelligent characteristics in personalized learning and assessment. However, the design of algorithms and models may harbor biases and discrimination. If these biases and discrimination are applied to students' educational processes, it can affect their learning experiences and development.

2.3 Ethical and Moral Alienation

Chat GPT is a virtual intelligent assistant generated through machine learning and big data training. Its responses and suggestions are based on existing data and models rather than real human experiences and moral judgments. Therefore, when students interact with Chat GPT, they may be influenced by the information and values it provides. Firstly, the biases of intelligent algorithms can lead to unfair evaluation and treatment of students. These algorithms are based on extensive training data and models, but biases may exist, such as a tendency to recommend certain specific industries or occupations while overlooking other potential choices. Such biases can impact students' career development and choices. Secondly, although technologies like Chat GPT can simulate human conversations and responses, they lack genuine emotional and judgment capabilities. In vocational education, students may require more emotional support and human judgment, rather than solely machine-generated answers. Over-reliance on these technologies may overlook students' needs in terms of emotions and human judgment, thus affecting their learning and development. If students excessively rely on Chat GPT's answers and suggestions while disregarding human moral values and belief systems, they may be guided to engage in behaviors that contradict ethical and moral principles, resulting in the alienation of moral perspectives.

2.4 Exacerbation of the Educational Digital Divide

The educational digital divide refers to the unequal distribution of educational resources and opportunities caused by uneven application of digital technology. In modern vocational education, the application of digital technology brings a series of issues and challenges. Firstly, due to uneven availability of digital devices and internet connectivity, some regions or schools are unable to fully utilize technologies like Chat GPT to provide modern vocational education. This leads to an imbalance in the use of digital technology, limiting opportunities for students and schools to develop. Secondly, even with access to digital devices and internet connectivity, some students and teachers may lack the skills and knowledge to learn and apply digital technology. They may be unfamiliar with how to use these technologies for information access, learning, and communication. Differences in digital literacy prevent some students and teachers from fully utilizing existing technology for modern vocational education.

Additionally, although there is a wealth of digital resources available, their quality and applicability

may vary. Some students and teachers may struggle to find suitable digital resources or to assess their quality and reliability. This leads to issues in accessing and evaluating digital resources, affecting the implementation and effectiveness of modern vocational education. Finally, in traditional vocational education, interaction and collaboration are important learning methods. However, the application of technologies like Chat GPT may limit opportunities for interaction and collaboration. This is because these technologies primarily rely on machine-generated interaction rather than genuine interpersonal engagement. This may reduce cooperation and communication among students, impacting their learning outcomes and skill development.

3. The Way Forward for the Modernization of Vocational Education in the Era of Chat GPT

3.1 Enhancing the Regulation and Standardized Management of Chat GPT Technology Application

Vocational education involves cultivating students' employability and professional qualities, and the application of artificial intelligence technologies like Chat GPT in vocational education can have significant impacts on students' growth and employment. Therefore, strengthening the supervision and regulation of the application of Chat GPT technology becomes particularly important. Firstly, governments and relevant institutions can establish laws, policies, and guidelines to clearly define the scope and limitations of Chat GPT technology application. These laws and policies can cover aspects such as data privacy protection, information security, freedom of speech, and ethical standards to ensure the legal and responsible use of the technology. For example, the General Data Protection Regulation (GDPR) of the European Union provides guidance on the protection and processing of personal data, which is relevant to the data usage and privacy protection of Chat GPT technology. Secondly, dedicated regulatory bodies can be established to oversee and manage the application of Chat GPT technology. These regulatory bodies can establish standards and requirements, review and approve the use of technology, monitor and address any violations, and collaborate with relevant departments and stakeholders. Such bodies can be responsible for the registration, licensing, and supervision of Chat GPT technology to ensure its safety and compliance. For instance, the Federal Trade Commission (FTC) in the United States and data protection regulatory authorities in Europe play important roles in regulating and standardizing the application of artificial intelligence technologies.

Additionally, safeguarding user data privacy is crucial. Regulatory bodies can require technology providers to implement effective data protection measures, including data anonymization, secure data transmission, user consent, and privacy policies. Furthermore, regulatory bodies can establish data protection standards that require technology providers to undergo data security assessments and compliance reviews, ensuring the security and privacy of user data. To ensure the stability and safety of the technology, regulatory bodies can conduct audits and evaluations of Chat GPT technology. This can involve performance testing, vulnerability scanning, collecting user feedback, as well as conducting regular inspections and assessments of the technology's application. By reviewing and evaluating the technology, regulatory bodies can promptly identify and address any issues present in the technology

and ensure its stability and safety. Additionally, regulatory bodies can promote training and educational activities on Chat GPT technology to disseminate relevant knowledge and responsibilities to technology developers, users, and the public. This can involve organizing seminars, training courses, promotional events, etc., to enhance public awareness and understanding of the technology's application. Through education and training, awareness among technology developers and users can be enhanced, guiding them to use and apply Chat GPT technology responsibly.

3.2 Optimizing the Allocation of Digital Educational Resources to Promote Educational Equity

In the era of Chat GPT, the modernization of vocational education requires optimizing the allocation of digital educational resources to promote educational equity. This means ensuring that every student has equal access to high-quality education opportunities through fair distribution and utilization of digital educational resources. To achieve inclusive digital education, several key measures can be taken. Firstly, governments and educational institutions can provide free or low-cost online learning platforms, educational applications, and digital textbooks to ensure equal access to digital educational resources for every student. Collaborating with technology companies, establishing a digital education resource repository can expand the coverage of resources to meet the needs of different students. Secondly, strengthening teacher training and professional development is essential to enhance their digital education capabilities. By offering courses on digital technology training for teachers, online teaching methodology training, and proficiency in educational technology tools, teachers' digital education abilities can be improved. This enables them to better utilize technologies like Chat GPT to provide high-quality educational resources.

Additionally, establishing online learning platforms and communities can provide students with opportunities for communication, collaboration, and learning. These platforms can include subject-specific online courses or open learning resource repositories. Through online learning platforms and communities, students can independently choose learning content, interact with other students and teachers, and share learning experiences, fostering interaction and cooperation in learning. Furthermore, technologies like Chat GPT can be used to provide personalized learning support. By analyzing students' learning data and behaviors, Chat GPT can offer customized learning suggestions and resources based on their interests, abilities, and learning styles. This better meets students' needs, helps them maximize their potential, and promotes educational equity. Addressing the digital divide is also crucial to ensure that every student has access to necessary technology devices and internet connectivity. Governments and educational institutions can provide subsidies, loans, or other forms of support to help students overcome the digital divide. Moreover, establishing assessment and monitoring mechanisms is necessary to evaluate and monitor the use and effectiveness of digital educational resources, ensuring fair distribution and effective utilization of resources. Through assessment of student learning outcomes, collection and analysis of user feedback, and monitoring and analysis of educational data, issues related to uneven resource allocation and educational inequality can be identified and addressed in a timely manner.

3.3 Emphasizing the Education of Technology Ethics and Fostering Students' Moral and Ethical Awareness

In the era of Chat GPT, the modernization of vocational education requires emphasizing the education of technology ethics and morals. This is because it helps students understand and address the ethical challenges of artificial intelligence technology. To achieve this goal, several important measures can be taken: Firstly, vocational education should integrate technology ethics and morals education courses into the curriculum. Students should learn how to correctly use and develop technology, including knowledge of privacy protection, data security, information authenticity, and artificial intelligence ethics. These courses can be offered independently or integrated into relevant vocational courses. Secondly, vocational education should emphasize the analysis of real-life case studies. By analyzing practical technology ethics cases, students can better understand the impact of technological decisions and actions on individuals, organizations, and society. Teachers can guide students in discussing and analyzing these cases, stimulating their thinking about moral and ethical issues, and developing their judgment and decision-making abilities. Moreover, vocational education should focus on cultivating students' critical thinking and moral judgment abilities. Students should be able to examine the consequences of technological decisions and actions and weigh different moral and ethical factors. Through discussions, debates, and case analysis, students can exercise their critical thinking and moral judgment abilities. Additionally, schools and educational institutions should establish guidance and guidelines for technology ethics, providing students with clear behavioral norms. (Liang & Zheng, 2021) These guidelines can include principles of privacy protection, data use and sharing, and information security. By establishing clear ethical guidance and guidelines, students can be guided to maintain moral and ethical awareness in technology use and development.

Vocational education should also integrate with other disciplines to cultivate students' interdisciplinary thinking and collaborative abilities. Students should understand the complexity of technology ethics issues and need to apply knowledge and methods from different disciplines to solve them. Through collaboration with other disciplines, students can have a more comprehensive understanding of and response to technology ethics challenges. Lastly, providing practical opportunities and internship projects for students allows them to apply their knowledge of technology ethics in real-life situations. These practical opportunities can be industry collaborations or simulated scenario training. Through practice, students can gain a deeper understanding of technology ethics challenges and develop their moral decision-making and behavioral abilities.

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