

Practice and Exploration of AI-Empowered Mental Health Education in Higher Vocational Colleges

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Abstract: With the rapid development of artificial intelligence (AI) technology, its application in various fields has deepened, and the field of mental health education is no exception. As an important position for cultivating high-quality technical and skilled talents, higher vocational education sees students' mental health directly related to the quality of talent training and social stability. Currently, mental health education in higher vocational colleges faces numerous challenges, such as insufficient teachers, narrow service coverage, and lack of targeted intervention. This paper aims to explore the application practice of AI technology in mental health education of higher vocational colleges. By analyzing the advantages of AI in mental health education, such as precise screening, personalized counseling, and real-time monitoring, it elaborates on the specific paths of AI-empowered mental health education in higher vocational colleges combined with practical cases, including the construction of intelligent evaluation systems, the application of virtual counselors, and the establishment of mental health big data analysis platforms. Meanwhile, it discusses potential ethical risks, data security, technical adaptation and other issues in the application of AI, and proposes corresponding countermeasures, hoping to provide reference for improving the scientificity, effectiveness and pertinence of mental health education in higher vocational colleges and promote the innovative development of mental health education in higher vocational colleges.

Keywords: Artificial intelligence; Mental health education in higher vocational colleges; Practice and exploration

Online publication: September 26, 2025

1. Introduction

1.1. Research background

In recent years, China's higher vocational education has ushered in a period of rapid development, with the enrollment scale of higher vocational colleges expanding and the number of students increasing continuously^[1]. However, with the increasingly fierce social competition, accelerated pace of life and increased employment pressure, higher vocational students, as a special group, face many puzzles and challenges in psychological development^[2]. Most higher vocational students are between 18 and 22 years old, a critical period for physical and mental development. They not only have to face academic pressure such as professional knowledge learning and skill training, but also cope with interpersonal relationships, emotional issues and the uncertainty of future employment. These factors are likely to trigger various mental health problems, such as anxiety, depression and inferiority.

According to relevant survey data, the detection rate of mental health problems among higher vocational students in China has been on the rise year by year, and the importance and urgency of mental health education have become increasingly prominent^[3]. However, the current mental health education in higher vocational colleges is facing many difficulties. On one hand, the number of mental health education teachers is seriously insufficient. The number of mental health education teachers in many higher vocational colleges is far lower than the teacher-student ratio standard stipulated by the Ministry of Education, resulting in excessive workload of teachers and difficulty in meeting the mental health service needs of all students. On the other hand, traditional mental health education mainly takes the form of classroom teaching and psychological counseling room consultation, with narrow service coverage, lack of pertinence and timeliness, and inability to timely detect and intervene in students' mental health problems.

Against this background, the rise of AI technology has brought new opportunities for mental health education in higher vocational colleges^[4]. With strong data processing ability, learning ability and adaptive ability, AI can realize precise identification, personalized counseling and real-time monitoring of students' mental health status, effectively making up for the shortcomings of traditional mental health education and providing new ideas and methods for the innovative development of mental health education in higher vocational colleges.

1.2. Research significance

1.2.1. Theoretical significance

This study explores the integration path of AI technology and mental health education in higher vocational colleges, enriching the theoretical system of mental health education. Traditional mental health education theories are mainly based on psychology, education and other disciplines. The introduction of AI technology combines the theories of computer science, data science, artificial intelligence and other disciplines with mental health education theories, expanding the theoretical perspective of mental health education and providing useful exploration for building a theoretical framework of mental health education in higher vocational colleges adapting to the requirements of the new era. Meanwhile, by analyzing the application mode and mechanism of AI in mental health education in higher vocational colleges, this study also provides a reference for subsequent theoretical research in related fields.

1.2.2. Practical significance

From a practical perspective, the development of this study can provide practical solutions for mental health education in higher vocational colleges. By building AI-based intelligent evaluation systems, virtual counselor service platforms and mental health big data analysis platforms, the work efficiency and quality of mental health education in higher vocational colleges can be effectively improved, the service coverage can be expanded, and early detection and early intervention of students' mental health problems can be realized^[5,6]. In addition, this study can provide new working methods and tools for mental health education workers in higher vocational colleges, helping them better carry out mental health education and promote the physical and mental health development of students. At the same time, the results of this study can also provide reference for educational management departments to formulate relevant policies, promoting the wide application and popularization of AI technology in the field of mental health education in higher vocational colleges across the country.

2. Advantage analysis of AI-empowered mental health education in higher vocational colleges

2.1. Precise screening to improve the efficiency of mental health problem identification

Traditional mental health screening of higher vocational students mainly adopts questionnaire surveys, psychological assessment scales and other methods, which are not only time-consuming and labor-intensive, but also easily affected by students' subjective factors. AI technology can effectively solve the shortcomings of traditional screening methods and realize precise and real-time screening of students' mental health problems^[7-9]. AI can collect students' mental health-

related data through various channels, such as students' remarks on campus social platforms, academic performance, attendance records, consumption data, sports data, etc., and then use natural language processing, machine learning and other technologies to conduct in-depth analysis and mining of these data to extract characteristic indicators that can reflect students' mental health status.

AI can establish a mental health risk assessment model based on students' historical data and real-time data to conduct real-time assessment and early warning of students' mental health risk levels. When the system detects that a student's mental health risk level is high, it will promptly send an early warning signal to mental health education teachers and counselors, so that they can intervene in a timely manner to conduct further assessment and intervention on the student. This precise screening method not only greatly improves the efficiency and accuracy of mental health problem identification, but also realizes dynamic monitoring of students' mental health status, providing strong support for subsequent personalized counseling and intervention.

2.2. Personalized counseling to meet students' diversified mental health needs

Higher vocational students' mental health needs are diverse and personalized. Different students have differences in growth background, personality traits, life experiences and problems faced, so they have different needs for the content and methods of mental health education^[10,11]. Traditional mental health education adopts a "one-size-fits-all" model. Both classroom teaching and group counseling are difficult to meet the personalized needs of each student, resulting in unsatisfactory educational effects.

AI technology can provide personalized mental health counseling services for each student according to their specific situation. By analyzing students' mental health assessment data, study and life data, etc., AI can deeply understand students' mental health status, personality traits, interests and hobbies as well as specific problems faced, and then formulate personalized counseling plans for each student. For example, for students with anxiety, AI can recommend relevant psychological adjustment methods according to the causes and degrees of their anxiety, such as deep breathing training, meditation relaxation, time management skills, etc., and conduct one-on-one interactive communication with students through virtual counselors to guide students to gradually relieve anxiety. For students with interpersonal relationship problems, AI can provide training on interpersonal communication skills, simulate various interpersonal communication scenarios, and let students practice in a virtual environment to improve their interpersonal communication abilities.

2.3. Real-time monitoring to realize timely intervention of mental health problems

Traditional intervention in mental health education of higher vocational colleges is often carried out after students have obvious mental health problems and take the initiative to seek help. This passive intervention method often misses the best intervention time, leading to further deterioration of the problem. In addition, during the intervention process, teachers are also difficult to real-time understand the changes in students' mental state and cannot adjust the intervention strategy in a timely manner, affecting the intervention effect.

AI technology can realize real-time monitoring of students' mental health status, timely detect changes in students' psychology, and conduct timely intervention^[12]. Through intelligent terminal devices such as smartphones and smart bracelets, AI can real-time collect students' physiological data and behavioral data, such as heart rate, blood pressure, sleep quality, number of exercise steps, mobile phone usage time, etc. These data can reflect students' mental state to a certain extent. For example, an abnormal increase in students' heart rate may mean they are in a state of tension and anxiety; poor sleep quality may be related to depression. By analyzing and processing these real-time data, AI can timely find abnormal changes in students' psychology and automatically take corresponding intervention measures according to preset rules and models.

3. Practical paths of AI-empowered mental health education in higher vocational colleges

3.1. Constructing an AI-based intelligent evaluation system for mental health of higher vocational students

3.1.1. Design and implementation of data collection module

Data collection is the foundation for building an intelligent evaluation system. To ensure the accuracy and comprehensiveness of evaluation results, it is necessary to design a scientific and reasonable data collection module to collect multi-dimensional data related to students' mental health^[13]. The data collection module mainly includes the following contents:

- (1) Collection of basic information data, such as age, gender, major, grade, home address, family structure, parents' occupation, etc. This information can help AI understand students' basic situation and analyze the mental health characteristics and laws of students from different groups;
- (2) Collection of psychological assessment data by integrating a variety of standardized psychological assessment scales, such as Symptom Checklist 90 (SCL-90), Self-rating Anxiety Scale (SAS), Self-rating Depression Scale (SDS), etc., students are allowed to complete the assessment online within a specified time. AI can automatically score and analyze the assessment results, extracting students' psychological characteristic indicators, such as anxiety level, depression level, interpersonal sensitivity, etc.;
- (3) Collection of campus behavior data by connecting with the campus management system of higher vocational colleges, it collects students' learning behavior data (such as academic performance, attendance records, classroom interaction, homework completion, etc.), life behavior data (such as dormitory schedule, consumption records, sports data, etc.) and social behavior data (such as the number of friends on campus social platforms, interaction frequency, remarks content, etc.). These data can reflect students' actual performance in campus life and provide important basis for analyzing students' mental health status;
- (4) Collection of physiological data by encouraging students to use intelligent terminal devices such as smart bracelets and smart watches, it collects students' physiological data, such as heart rate, blood pressure, sleep quality, steps, etc. These physiological data can real-time reflect students' physical state and psychological and emotional changes, providing support for AI to real-time monitor students' mental health status.

3.2. Developing an AI-based virtual counselor service platform

3.2.1. Functional design of virtual counselors

Virtual counselors are virtual images with human interaction capabilities developed based on AI technology, which can provide comprehensive and personalized mental health services for higher vocational students^[14]. In terms of functional design, virtual counselors should have the following core functions:

- (1) Intelligent question-answering function: Through natural language processing technology, virtual counselors can understand students' questions and provide accurate and timely answers based on preset knowledge bases and learned knowledge. Students can consult virtual counselors on various mental health issues, such as "how to relieve test anxiety", "how to handle interpersonal conflicts", "what to do when encountering setbacks", etc. Virtual counselors can not only provide professional psychological knowledge answers, but also give personalized suggestions and guidance combined with students' specific situations.
- (2) Emotional counseling function: By analyzing students' language expression, tone and intonation as well as facial expressions (if video interaction is adopted), virtual counselors can identify students' emotional states and take corresponding emotional counseling measures according to changes in students' emotions. For example, when students show negative emotions such as anxiety and depression, virtual counselors can guide students to express their inner feelings, release negative emotions and help students restore a positive emotional state through listening, empathy, encouragement and other ways. Meanwhile, virtual counselors can also provide students with

some emotional regulation methods and skills, such as meditation relaxation training, emotional diary recording, etc., to help students improve their emotional management abilities.

- (3) Psychological counseling function: According to students' mental health assessment results and specific needs, virtual counselors can provide personalized psychological counseling services^[15]. The counseling content can include self-cognition counseling, learning psychological counseling, interpersonal communication counseling, career planning counseling and other aspects. In the counseling process, virtual counselors can conduct in-depth communication and interaction with students in a conversational and guided manner, helping students find their own problems, explore solutions to problems, and promote students' psychological growth and development. For example, in terms of learning psychological counseling, virtual counselors can help students analyze the causes of learning difficulties, formulate scientific learning plans, and cultivate good learning habits; in terms of career planning counseling, virtual counselors can provide students with career information consultation, career goal setting suggestions, etc., according to their professional characteristics, interests and hobbies and ability qualities.
- (4) Crisis intervention function: When virtual counselors detect that students have extreme psychological crisis tendencies such as suicide and self-harm, they can immediately start the crisis intervention mechanism. On the one hand, virtual counselors will soothe students' emotions through language, stabilize their psychological state, and prevent the further escalation of crisis events.

4. Conclusion

The integration of artificial intelligence into mental health education in higher vocational colleges offers transformative potential for improving the precision, personalization, and timeliness of psychological support. By leveraging technologies such as intelligent evaluation systems, virtual counseling platforms, and big data analysis, AI can effectively address current limitations in manpower, service scope, and intervention efficiency. Practical applications demonstrate that AI not only enhances the scientific and systematic nature of mental health education but also promotes proactive prevention and individualized care. However, challenges remain regarding ethical considerations, data security, and technology adaptation. Therefore, future work should focus on establishing sound regulatory frameworks, strengthening data protection mechanisms, and improving the digital literacy of educators and students. Overall, the application of AI provides a promising pathway toward the modernization and sustainable development of mental health education in higher vocational colleges.

Funding

2025 Tianjin University Ideological and Political Work Research Base (Tianjin Medical University) Project (Project No.: JJSZY202507002)

Disclosure statement

The author declares no conflict of interest.

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