

# Research on the Innovative Path of AI Technology Empowering College Students' Mental Health Work

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**Abstract:** With the full implementation and explosion of artificial intelligence big models such as DeepSeek, Doubao and Dream, the business of many traditional industries has been more or less affected. However, with its super data processing ability and intelligent analysis ability, it has been warmly welcomed and widely used in the industry, and has also given rise to some innovative changes in the development of various industries. In this wave of artificial intelligence, AI technology is also constantly infiltrating into the field of education and mental health work, and the mental health work of college students is also ushering in new development and opportunities. This study investigates the application of AI technology in college students' psychological work, and analyzes that the application of AI technology can promote the breadth coverage and accuracy of college students' psychological work, and effectively improve the quality and efficiency of college students' mental health work. However, due to the limitations of AI technology's own data calculation and objective existing data security problems, the application of AI technology can effectively improve the quality and efficiency of college students' mental health work. There may be certain deviations in the actual work process. Based on the above analysis, this paper can be used as a discussion on the application of AI technology in college students' mental health work.

**Keywords:** Artificial intelligence; Mental health; Intelligent intervention; Digital divide; AI empowerment

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## 1. Introduction

The mental health of college students is an important part of Lide Shuren, which is highly valued by the whole society, school and family. However, due to the increasing pressure of family, academic pressure and employment pressure, some students are seriously obsessed with electronic products, lack of resistance, and cannot deal with it correctly in thought, which leads to the complex characteristics of college students' mental health problems. According to the report of the National Adolescent Mental Health Survey in 2024, the detection rate of anxiety risk was 45.28%, and more than 70% of students were troubled by psychological problems. The

detection rate of depression in college students was as high as 21.48%, which was much <sup>[1]</sup> higher than that of ordinary people. There are some problems in the traditional mental health work model of college students, such as uneven distribution of resources, unreasonable use of technology, inflexible service model, low social cognitive acceptance, and high privacy concerns of students. With the development of artificial intelligence, the reform and innovation of college students' mental health model can be promoted, and the mental health work of college students can be promoted to the intelligent stage of the whole process of "prevention-intervention-rehabilitation".

## **2. The practical dilemma of college students' mental health work**

### **2.1. Unbalanced distribution of resources**

Limited by the level of economic development and ideological understanding, there may be significant differences in mental health resources between urban and rural areas and between regions. First-tier developed cities have abundant resources and professional medical resources. In grassroots and rural areas, resources are seriously depleted, and the number of psychological counselors and mental health teachers in schools is seriously insufficient. Even if the mental health staff are equipped, most of them are part-time staff with limited professional ability. The ratio of psychological teachers to students is 1:4000 in China, and even 1:8000 <sup>[2]</sup> in poor areas. Schools in mountainous areas generally lack psychological assessment tools. 74% of the teachers surveyed said that it was difficult to identify potential psychological crises <sup>[3]</sup>. The imbalance of resources led to the public not being able to correctly view psychological problems and intervene and treat them in the first place.

### **2.2. Limitations of intervention on psychological problems**

The traditional mental health work is too dependent on face to face, affected by the single tool, the status of doctors, the number of daily consultations is limited, and there is space and time barrier. 78% of poor students give up seeking <sup>[4]</sup> help because of transportation costs. The service is too standardized, the lack of personalized program counseling, the coordination mechanism of school, family and society is not sound, the problem detection and intervention are not timely, the counseling is intermittent, the lack of continuity, the intervention effect is poor, and it is difficult to continuously track and evaluate.

### **2.3. Backward application of concept and technology**

Traditional questionnaire is one of the important measurement methods, which has always played a pivotal role in the historical process. However, with the changes of The Times, the traditional scale has the problems of single dimension, high error rate of expression, subjective expression of subjects and so on. It only focuses on the dominant symptoms such as depression and anxiety, and ignores other internal negative emotions, which cannot fully represent the psychological status, such as self-rating Anxiety Scale (SAS), self-rating Depression scale (SDS) and Symptom Checklist 90 (SCL-90). Because the scale requires candidates to fill in a lot of content, it takes a long time, and the workload of data entry is large. The results obtained by the scale are affected by the subjectivity and initiative of the subjects themselves, and there will be certain missed diagnosis and misdiagnosis.

### **2.4. Social cognition and privacy concerns**

Due to the low prevalence of mental health knowledge in the public and the lack of scientific understanding

of mental problems, people mistakenly believe that mental problems are mental diseases. In addition, movies and television works often depict mental patients as violent and dangerous images. Once problems occur, they will be labeled as “mental illness”, enterprises refuse to provide employment opportunities and people refuse to interact with them. It will directly affect the individual’s future, aggravate the public fear, stigmatize students generally have a “sense of shame for psychological help”, the exposure risk of face-to-face consultation leads to 36% of the potential help-seekers choose silence <sup>[5]</sup>, miss the best intervention period, delay treatment and lead to the deterioration of the condition.

### **3. The empowering path of AI technology**

#### **3.1. AI screening systems**

Psychological screening refers to a method to evaluate individual mental health status and detect and intervene potential psychological problems in time. However, the evaluation results of traditional psychological screening methods are not objective and accurate. AI screening system can use multi-modal (facial analysis, voice analysis, body movement, etc.) analysis methods to complete the assessment and early warning of mental state, and can eliminate human interference. The psychological early warning model based on multi-modal data fusion included multi-dimensional features such as academic performance (30%), social network (25%), physiological indicators (20%), and text emotion (25%) <sup>[6]</sup>. The pilot project of a provincial department of education showed that the accuracy of AI screening was 89.3%, which was 27 percentage points higher than that of the traditional scale <sup>[7]</sup>.

#### **3.2. Virtual counselors**

Psychological counselors are the guardians of college students, and the efficiency and accuracy of counseling are directly affected by the professional level and experience of counselors, counseling methods and techniques, consulting relations and visitor factors. With the help of AI technology, Natural Language Processing (NLP) technology was used to support 7×24 hours of online question answering. And the empathetic response is achieved through affective computing algorithm. The effect of Woebot anxiety intervention developed by Stanford University was reduced by about 28% <sup>[8]</sup> compared with the baseline. The response accuracy of the Qingxin system developed by Tsinghua University was 82.4% <sup>[9]</sup>. Students can consult at any time, and the information provided to them is professional and accurate, which can ensure the timeliness and quality of counseling and intervention work. However, the virtual counselor is only an “emotional first aid” for the students, not a “therapist”. Consult a professional as soon as you get your results, and follow up on your actions.

#### **3.3. Standardized and individualized intervention**

Because of the differences in economic development level, regional culture, distribution of professional talents and the construction of service institutions, to some extent, there is a gap in psychological counseling resources. First-tier cities have developed mature psychological counseling industry earlier, while second - and third-tier cities and even some areas and rural areas have very few psychological counseling resources, and the levels of counseling and intervention are uneven. Most of the one-time counseling and routine intervention can not be fully guaranteed, let alone take care of everyone. AI reinforcement learning algorithm was used to build a dynamic intervention model, and the relevant intervention methods were adjusted through real-time intervention feedback. A middle school in Shanghai found that the compliance rate of using AI recommended scheme was 41% <sup>[10]</sup> higher than that of using standardized scheme. Make up for the problem of medical level, so that

different regional psychological resources can not only achieve identity but also meet personalized needs, provide the correct basis for each evaluation and intervention, and formulate specific plans according to the cultural characteristics of different regions to ensure the accuracy of counseling intervention.

### **3.4. Emotional companionship throughout the whole period**

Many college students' psychological problems arise from the "lack of emotional expression channels". Counselors are faced with heavy business work for a long time, and there is less time for greedy talk with students. Students are unable to consult effectively. AI enforces college students' mental health work, creates a collaborative system of "AI+ counselor + student cadre + home and school", breaks through the limitations of time and space, dispels students' concerns, provides 7×24 hours of instant response, and realizes the vision of students "psychological counseling whenever they want and who they want to talk to".

## **4. Practical case analysis**

### **4.1. "Soul Partners" Program of Ministry of Education**

The "Spirit Partnership Program" is a project supported by the Central Committee of the Communist Youth League with the central Special Lottery public welfare fund. It is a key group for youth social organizations to serve community teenagers and adolescents in distress, especially left-behind children. It organizes training on "emotion management", "life education", "resilience training" and other subjects. To mobilize students' enthusiasm and promote them to express their emotions actively; It also has a digital platform specifically for 23 provinces in central and western China, which integrates the three functions of intelligent screening, resource recommendation and crisis warning. It has found 5,723 high-risk individuals and completed 89<sup>[11]</sup> interventions for two consecutive years. Therefore, it is necessary to see the combination of AI empowerment and community interaction to help teenagers cultivate psychological resilience and build a good "heart" defense line.

### **4.2. Tencent's "AI Supporting Education" project**

In August 2021, Tencent Education teamed up with "Childhood Lesson", supported by Tencent AI technology combined with "Childhood Lesson" online support teaching experience, to carry out online mental health volunteer service project, provide emotional counseling methods for rural schools in mental health cloud classroom, and promote mental health-related knowledge to rural children. The project test data showed that the score of psychological resilience of students who participated in the online mental health teaching increased from 45.6 points to 65.3 points ( $P < 0.01$ )<sup>[12]</sup>.

## **5. Ethical challenges of technology application**

### **5.1. Data privacy risks**

With the development of the Internet and big data technology, data brings convenience to people's work and life. Under the support of artificial intelligence technology, it becomes easier to obtain data, and there is a risk of personal data being leaked or even abused. Because mental health related data is sensitive, including emotional diaries, suicide tendencies and other content. When the AI psychological counseling system is used, it will leave a lot of traces. If there are bad motives to steal the data by destroying the database and achieve their own goals through network attacks, a lot of private data about users will be used, resulting in serious consequences. It is suggested to establish a federated learning mechanism and use edge computing architecture to keep data from



leaving school<sup>[13]</sup>. Various means such as technical protection, management optimization, and user education are adopted to effectively reduce the probability of occurrence and the impact of risks.

## **5.2. Algorithm bias problem**

The inference process of the model depends on training, and AI technology cannot understand the social culture and pragmatic context of humans. Once a test result is considered correct, even if it is wrong, it will eventually become part of the new training data, and then appear in the next round of inference recommendation. The language characteristics of students are different, and the model will also be offset, so the corresponding proprietary corpus should be established. The Peking University research team used transfer learning to improve the recognition accuracy from 68 to 83%<sup>[14]</sup>, but in the real application scenario, it is necessary to let itself have control of the mental health data and continuously optimize its own data to avoid bias.

## **5.3. Human-machine relationship boundary**

With the development of artificial intelligence technology, the problem has become increasingly prominent and attracted more and more people's attention. Anthropomorphic representation makes many users unable to distinguish the relationship between human and machine, and may regard AI as a "perfect listener". As a result, personal social ability is reduced, and communication and communication between people are reduced. In the long run, students' psychological problems are becoming more and more serious. Human-computer relationship should not be the erosion of technology on humanities. It is suggested to establish a three-level response mechanism<sup>[15]</sup> of "AI screening-teacher retry-expert intervention". To achieve the symbiosis and co-prosperity of the two, technology should become the assistant of human beings.

# **6. Suggestions**

## **6.1. Build a collaborative ecology of "AI initial screening + teacher compound + expert treatment"**

A regional digital platform was built to promote the use of multimodal AI primary screening tools in first-line schools or economically underdeveloped areas. Intelligent screening, resource push and crisis warning are carried out to achieve standard and basic treatment of psychological work, suspicious clues are found by student consultation, abnormal data are found by AI intelligent analysis, teachers are involved in time, and the accuracy of composite primary screening is required to be referred to professional institutions by the school within 24 hours for high-risk cases, and experts are required to intervene and treat them.

## **6.2. Strengthen personnel training, strengthen data privacy protection**

Strengthen the training of mental health staff, develop relevant teaching materials and courses, improve students' and staff's awareness of the importance of data protection, give users the right to delete data and the right to interpret algorithms, further improve technology development, and increase the means of information protection, such as using edge computing architecture to ensure that data does not leave the campus and ensure data security.

## **6.3. Build a human-computer collaboration model to balance the relationship between technology and humanistic care**

Build the architecture of "AI empowerment + human gatekeeping", while applying AI technology to

improve psychological work efficiency, do not overuse AI to replace the need for deep intervention and crisis intervention, do not use anthropomorphic language to describe AI, and require AI to clearly define its “non-human” attributes, do not cause students to have emotional dependence on AI, and truly play the dominant role of human. Let students and teachers establish a sincere emotional connection, and let AI become a real “helper”.

## 7. Conclusion

The rapid development of AI technology has improved the efficiency and quality of college students' mental health work, and made it possible to provide 24-hour online psychological services, monitor college students throughout the process, accurately identify high-risk psychological problems, and intervene and refer them in the first place. However, it should also be clearly realized that AI technology is only a means rather than an end, and cannot replace people. On the one hand, it should maintain the unity of technical tools and humanities, and maintain the emotional connection between staff and students. On the other hand, we should be clear about the fact that there are still various problems and risks in the process of technology development. In future related research work, we should pay attention to strengthening the injection of humanistic emotions, pay attention to the protection of students' information data, and further promote the application of AI technology to the actual mental health work of college students, so as to help the high-quality development of college students' mental health work.

## Disclosure statement

The author declares no conflict of interest.

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