

Research on the Reconstruction of the "Three-Dimensional Education" System for Mental Health Education in Colleges and Universities Empowered by Artificial Intelligence: An Empirical Survey Based on the Needs of Teachers and Students

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Abstract: Currently, the problems in university mental health education are complex and intertwined: risk identification is often biased; full-time and part-time staff teams do not cooperate effectively; and the closed-loop mechanism for psychological assessment frequently fails. Based on the Three-in-Full Education Theory and ecological systems theory, this paper proposes a closed-loop psychological monitoring system in conjunction with a set of immersive psychological education scenarios. The three methods of this study are a literature review, questionnaire distribution and analysis, and differential comparative quantitative analysis for the most urgent problems in practice. Based on the above survey, the current education system is fragmented and slow to respond to crises. Therefore, this paper proposes utilizing artificial intelligence technology to drive psychological education more actively through an intelligent closed-loop operation mechanism.

Keywords: Artificial Intelligence; Mental Health Education; Three-Dimensional Education; Multimodal Data.

1. Introduction

With the implementation of the "Healthy China 2030" strategy and the deepening of all-round higher education reform, strengthening college mental health education has become an essential part of achieving the basic task of nurturing virtue through education and promoting the all-round development plan under the "Five Educations Combined" framework [1]. This paper explores the path for university mental health education to move from a model of "remedial intervention" to one of "developmental empowerment" [2]. In spite of this, the present model of

psychological education in higher education is still rather fragmented. No cooperative structures have been built by the various parties involved in education, so data is not shared and responsibilities are unclear. At the same time, the old way of static assessment cannot track the changes in students' psychology, and standardised curricula are far from meeting the individual needs of today's students [3]. The whole system will likely compromise the accuracy and effectiveness of mental health education in some way. It will be difficult to continuously observe changes in students' emotions under these circumstances, and thus the all-staff, all-process, and all-round education model cannot be effectively implemented or maintained [4].

Innovation and leapfrog development in artificial intelligence technology have offered a particular solution to this structural contradiction. Process multimodal data, perform sentiment analysis and employ intelligent algorithms to proactively identify psychological risks and issue dynamic early warnings; thereby promote a transition in educational decision-making from experience-based to data-driven [5]. However, most existing research focuses on localised optimisation of technical tools and has not integrated "technology empowerment" with the construction of the "Three-Dimensional Education" ecosystem. Therefore, the technical applications have not been well-aligned with actual teaching scenarios and remain fragmented; they have failed to form a cohesive system [6]. Areas with multiple ethnic groups, such as Guangxi, have many different cultures and thus various goals for regional development; therefore, a psychological education system that accommodates local conditions and introduces targeted policies urgently needs to be built.

Based on this, this study selects teachers and students in Guangxi colleges and universities as

the survey subjects to investigate the "fragmentation" status and reconstruct an integrated educational ecosystem. In line with the idea of "three-dimensional education" and in accordance with ecological systems theory, this study will investigate the true feelings of all parties, identify existing educational problems, and reveal practical requirements for intervention using AI technology. Based on the above, it intends to build an AI-powered educational ecosystem that promotes multi-party collaboration and a complete closed-loop system of scenario immersion. Use an AI platform to break down departmental collaboration barriers and build a multi-stakeholder educational framework; optimise the original static assessment model by adding a dynamic closed-loop management mechanism for all stages of students' academic development; and create virtual-reality integrated immersive scenarios to ensure the organic integration of psychological services into daily life [7]. The main purpose of this paper is to examine the current development situation of colleges and universities in Guangxi, explore a digital development path for local mental health education, and provide reference for strengthening the foundation of psychological education in the border ethnic areas of Guangxi.

2. Research Subjects and Methods

A total of 329 questionnaires were distributed in this survey to explore the needs for AI empowerment in the construction of the "Three-Dimensional Education" system for mental health education at colleges and universities in Guangxi, and 300 valid questionnaires were collected; thus, the actual collection rate was 91.19%. Among all the respondents, students made up the highest proportion at 83.62%, followed by full-time and part-time mental health education teachers at 6.33%, counselors/homeroom teachers at 8%, and professional course teachers/administrative staff at 1.67%. The 10 cities and prefectures in Guangxi included Nanning, Guilin, Liuzhou, Yulin, Wuzhou and Baise, and scientifically and evenly sampled colleges and universities from these areas. The total Cronbach's α coefficient of the scale in this survey was 0.810; since it exceeded the ideal standard of 0.8, it was determined that the questionnaire had a good structure, the content had good internal consistency, and the measurement results were

stable and reliable. A 5-point Likert scale was used for the questionnaire (1 = "completely unnecessary" to 5 = "very necessary"), and the sample size and distribution met the actual regional conditions of colleges and universities in Guangxi for representativeness [8].

3. Data Processing

SPSS26.0 was used for all statistical analyses in this study to explore existing problems in mental health education at colleges and universities, the need for AI empowerment in constructing the "Three-Dimensional Education" system, and the differences and expectations of various identity groups concerning AI empowerment.

4. Main Results

4.1 Prominent Pain Points in the Current Mental Health Education System for College Students

To further elaborate on the practical problems in current mental health education at colleges and universities, this paper will systematically organise and compare the research results.

4.1.1 Fragmentation Pain Point: Primarily manifested as lack of cooperation among stakeholders

According to the survey, when students are experiencing psychological distress or a crisis, such as anxiety and depression, 28% of the respondents always feel coordination problems between the school and their parents, and 38.33% frequently have such problems. Most of the respondents were aware of coordination problems to some extent, and thus this collaborative issue needs to be addressed urgently. Furthermore, there are barriers such as delayed information sharing and limited cooperation between schools and families, and a normalised collaborative co-management mechanism has not been established [9].

4.1.2 Process Disruption: Infrequent psychological tests and observations reduce the frequency of monitoring.

Given that psychological tests, such as the SCL-90, are only administered once per semester, the proportion of frequency items that "always" or "often" reached 75.43%. Therefore, most of the respondents believe that the current way of psychological screening and assessment cannot promptly detect changes in students' mental health. It can be seen that a long-term, real-time and traceable psychological monitoring system

is needed urgently. See Figure 1:

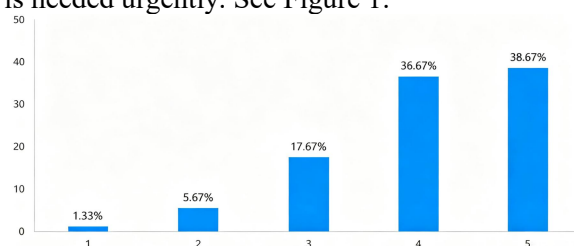


Figure 1. Distribution of Perceptions of the "process disruption" Problem in the Current Psychological Assessment System

4.1.3 Recognition Blind Spot: Potential psychological risks of quiet, introverted students are difficult to identify.

Topic: On the potential psychological crisis of classmates who "seem normal but are silent and reserved", survey data show that the combined proportion of "always + often" reached 73.38%. Therefore, it can be concluded that most respondents believe it is difficult to detect potential psychological problems in "quiet and introverted" students. The traditional way of assessing psychological risk based on outward behaviour is no longer suitable, and now we need to establish a hidden, non-obtrusive, and highly accurate path for anomaly detection.

4.1.4 Human Resource Constraints: The scale of the specialized mental health workforce is small, and service coverage is inadequate.

According to the survey, there are a small number of full-time psychological counselors in Guangxi universities. Only full-time psychological teachers are available to teach, and thus not all students can be reached. Therefore, the institution generally uses part-time teachers to cover all the classes. However, there is also a problem here: many part-time teachers do not have formal academic qualifications or special professional knowledge, and therefore may interpret the course content differently. Therefore, it can be seen that the main reason for all the problems is a shortage of personnel, and artificial intelligence should be used to address this problem.

4.2 Faculty and Students' Functional Needs for AI-Enabled Mental Health Education

Most of the respondents have a good attitude towards the benefits of AI application and hope that it will help organise office work, enable dynamic monitoring, and promptly address problems. According to the survey, to build an AI-assisted mental health education system, 45.67% of the respondents indicated that it is

"very necessary" and 33.33% believed that it was "fairly necessary"; together, these two accounted for 79.18%. Therefore, most of the respondents believe that AI can help to break down data silos and identify students who need support.

Second, in terms of using multiple forms of information, such as sound, facial expressions and behaviour, to aid in the identification of abnormalities and achieve dynamic monitoring, 38% of the respondents considered it "very necessary", and 40% thought it was "relatively necessary"; together, these two reached 77.82%. Therefore, it can be concluded that most of the respondents believe this technology is good.

Third, in cases of psychological crisis or emotional distress for students, AI technology can promptly offer relevant self-help resources or suggest seeking professional help. 74.75% of the respondents hoped that AI would intervene early in a crisis and provide self-help or referral suggestions. Most of the respondents can take timely preventive and corrective actions themselves.

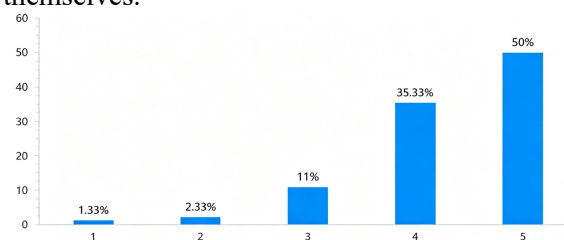


Figure 2. Analysis of Data Privacy and Security Requirements for AI-enabled Psychological Education

Fourth, concerning privacy and security, when asked about the design of the highest level of data protection, 50% of the respondents answered that it was "very necessary", and 35.33% answered that it was "fairly necessary", with a combined proportion of 85.33%. Therefore, most of the respondents listed privacy and security as their first bottom-line requirement. Personal psychological information is very private and sensitive, so it needs to meet the norm; moreover, the encryption management of the system should be strengthened to prevent data leakage. Otherwise, the AI-enabled technology will not be widely used (see Figure 2).

5. Summary

Based on the above survey results, many problems still exist in the actual implementation of the "three-all education" system for college

mental health education. First, coordination among all parties concerned in education is weak; Timeliness and continuity of services at different stages of students' learning are not guaranteed; Educational scenarios may not fully meet the actual needs of students; Potential psychological problems are difficult to identify in time; and there is a lack of full-time psychological staff. The above problems are interconnected and together restrict the effect of mental health education.

Given the above, there is now a strong demand for AI application in the current system and high expectations from all parties. AI will improve the efficiency of cooperation, achieve real-time dynamic observation, provide timely intervention, and thus will be very useful in development. It is expected to become an effective tool for addressing practical difficulties. Artificial Intelligence-powered applications are also limited and have some risks. Protecting privacy and information security are the basic conditions and prerequisites for all applications of artificial intelligence in mental health services; they must be guaranteed at the highest level. At the same time, due to differences in identity and role, public awareness and acceptance of AI vary widely. Increase the weight given to the actual experience of frontline full-time mental health educators and fully consider their professional opinions and practical proposals in the decision-making process.

Students are the most direct users of the intelligent mental health education service system. At present, the actual requirements for the form of intelligent mental health assistants, practical functional modules and personal privacy protection need to be fully considered during the system's development and design. Full-time and part-time teachers, counsellors/advisers and administrative staff have raised deeper practical problems concerning algorithmic ethics, a lack of concrete implementation in humanistic care, and its impact on the essential nature of education; these issues clearly show that this technology may produce various kinds of complex cascading effects during actual promotion and application. Strictly assess the system plan and construction at the very beginning, and implement all the response measures in an all-encompassing way. The good reliability and validity of this measurement scale have effectively verified that the survey data and analysis results are accurate

and reliable, and have practical reference value. The above results show that the two research dimensions in this study, namely "existing system pain points" and "expectations for intelligent empowerment", have good structural stability and meet the requirements for internal consistency within each dimension.

(6) $8 \leq \pi \leq 9$. Recommendations

For example, "1. Introduction", should be Times New Roman 11-point boldface, initially capitalized, flush left, with one blank line before.

6. Second-Order Headings

6.1 Adopt a Problem-Oriented Approach to Set Up Scientific Priorities for the Staged Development of AI.

Given the practical deficiencies in information recognition identified by the survey, namely blind spots in recognition, and considering actual application requirements, it is recommended to prioritize the development of an AI-based dynamic monitoring and early warning system. This system needs to integrate various forms of multimodal information as analytical inputs as analysis inputs to help identify abnormal emotional changes in students in time, and thus prevent or address any problems early on. Examples include relatively easy-to-obtain and organise basic data, such as students' academic behaviour trajectories, campus card-swiping and spending records, and peer social interactions. Thus, the problems of late submission and superficial or inaccurate answers in traditional tests will not occur.

6.2 Build an All-Encompassing Governance System and Strengthen Privacy Protection and Ethical Compliance

A special AI ethics review and governance committee will be established in a coordinated way. Its members should include university administrators, experts in mental health education from the region, information technology specialists, legal experts, and representatives of teachers and students. A special group will be designated to establish strict operating norms for the data collection, secure storage, legal use and final destruction. This will protect the students' legal right to informed consent and clarify the responsibility for data security step by step. Privacy-by-Design should be adopted in the Design stage. High-end security technical solutions should be employed

to strengthen the data-protection barrier, and a regular inspection and evaluation mechanism needs to be established to periodically test the operating logic of AI algorithms and prevent biased judgment or discriminatory deviation during operation.

6.3 Integrate Intelligent Technology with Humanistic Care and Maintain the Human-Centered Bottom Line.

The Functions of the AI system need to be specified. First, it should be made clear that AI is only to assist the full-time mental health educators in universities and will not replace their professional duties. Second, from the very beginning of system design, the idea of humanistic care should be included in all subsequent research and development. For example, in the interface design of virtual human services, emotional support and counselling functions should be added. In the event of sudden psychological intervention, the primary responsibility for full-time psychological teachers should remain with them. In daily teaching and learning, when guiding teachers and students to use AI tools for communication and dialogue, face-to-face offline communication should still be maintained to deepen the foundation of emotional connection.

6.4 Develop Personalised Intelligent Mental Health Service Products Based on Users' Actual Needs.

Development of intelligent mental health service products should be based on research-driven demand. Based on field investigation and analysis of questionnaire data, most students consider convenient service channels such as WeChat mini-programs and wearable devices to be highly desirable, followed by the exploration of virtual digital human carriers for an immersive mode of emotional interaction. However, in the development of such products, the functional architecture should fully integrate a core module for psychological risk monitoring and early warning, and self-help resources, such as emotion-regulation techniques, sleep-optimisation plans, and study-stress management strategies, should also be provided. Add support for anonymous interaction, build a reliable framework of personal privacy protection, and ensure the confidentiality of users.

6.5 Strengthen Differentiated Guidance and

Training for Different Groups, And Enhance AI Application Capabilities.

Training in AI application should be organised for all full-time and part-time mental health education teachers and counsellors/class advisers. The training content should cover how to use the technology, an introduction to its advantages, what AI can and cannot do, and its purpose limitations, etc., to reduce the psychological pressure caused by new technologies. Students should also be taught how to use AI mental health service systems properly, build a foundation of information literacy, and form an objective and rational view of this technology.

6.6 Pilot First, Then Iterate and Optimise

Pilot schools and classes will be selected for the practical application of AI-assisted mental health education. Based on the user feedback collected during the trial, the function Design and service-operation model will be continuously improved. This will help ensure that AI applications are in line with the university's educational positioning and consistent with the practical situation of campus mental health education, thus supporting the effective achievement of the collaborative education goal of "full participation, full-process integration and all-round permeation" [10]. Pay more attention to the operating feedback from different identity groups, such as subject teachers and administrative staff, and improve the system's compatibility and convenience of use.

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