Development of Mental Health Education in an Artificial Intelligence Model in Private Higher Education at Guizhou Qiannan Economic College

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Abstract

This research consists purposes were 1. to analyze the current status and key challenges of mental health education at Guizhou Qiannan Economic College in the context of AI 2. to develop a conceptual model for measuring the effectiveness of AI-supported mental health education in private higher education and 3. to confirm the validity and practical effectiveness of the proposed model through empirical testing and expert evaluation. The research employed a mixed-methods design including Delphi consultation, pilot testing, a large-scale questionnaire (n = 540), CFA and structural equation modeling (SEM), supplemented by semi-structured interviews (n = 12) and expert focus-group evaluation (n = 5). Results indicate strong institutional policy support (Input), robust process quality (curriculum relevance, feedback, interaction) and positive outcomes (satisfaction, mental health literacy, behavioral change, psychological well-being, and value internalization). SEM confirmed that Input ⟶ Process (B = 0.78) and Process ⟶ Outcome (B = 0.81) are strong pathways; Input also exerted a direct effect on Outcome (B = 0.36). The expert review endorsed the final circular model with AI positioned as a central mediating force. The paper presents the validated model, discusses implications for practice and policy in private colleges and outlines recommendations for ethical AI governance, capacity building and sustainability.

Keywords: Development of Mental Health Education, Artificial Intelligence, Higher Education

Introduction

Mental health among university students is a pressing global concern (World Health Organization, 2022) In China the integration of mental health education into ideological and political education (IPE) has become common practice, reflecting policy priorities around whole-person development (Ministry of Education, 2016;

Li and Wang, 2019). Concurrently, the "New Generation Artificial Intelligence Development Plan" has stimulated experimentation with AI in teaching, learning, and student support (Li, X., and Zhang, Q., 2021). This study responds to the urgent need for validated, context-sensitive models to measure and enhance the effectiveness of AI-supported mental health education in private higher education institutions. Private colleges often resource-constrained compared to state institutions face distinct challenges and opportunities when adopting AI-based interventions. Using Guizhou Qiannan Economic College as a representative site, this research develops and empirically validates an AI–Mental Health Education Model grounded in the Input–Process–Outcome logic (Chen, Y., and Huang, L., 2022) and informed by ecological and technology acceptance theories (Bronfenbrenner, 1979)

The Purposes

1. To analyze the current status and key challenges of mental health education at Guizhou Qiannan Economic College in the context of AI.

2. To develop a conceptual model for measuring the effectiveness of AI-supported mental health education in private higher education.

3. To confirm the validity and practical effectiveness of the proposed model through empirical testing and expert evaluation.

Literature Review

This section synthesizes three literatures: 1) mental health education and outcomes in higher education; 2) ideological and political education (IPE) in China and its relationship with psychological education and 3) AI, ethics, and technology acceptance in educational contexts.

1. Mental health education in higher education. Global evidence shows high prevalence of mental disorders among college students and the efficacy of prevention and literacy interventions (Auerbach, R. P., Mortier, P., and Bruffaerts, R., 2018). Mental health literacy and help-seeking are key proximal targets of university programs (Bai, X., & Wang, H., 2023). Universal and targeted interventions improve knowledge, attitudes, and, with sustained follow-up, behavioral outcomes (Durlak et al., 2011; Ng, Li, and Loke, 2022).

2. IPE and mental health in China. Chinese higher education emphasizes ideological and political education (IPE) that incorporates moral education and civic values (Tan, 2017). Research highlights both strengths (broad coverage, values internalization) and challenges (risk of instrumentalizing psychological care) when mental health is embedded within IPE (Liu, J., and Chen, H. (2023). Recent work argues for greater "precision"

personalization via big data and AI to reconcile collective objectives with individual psychological needs (Huang, T., and Li, W., 2022).

3. AI in education: opportunities and ethical concerns. AI can deliver scalability, personalization, and early-warning systems in student support (Luckin, R., Holmes, W., Griffiths, M., and Forcier, L. B., 2016). AI-driven chatbots and conversational agents have shown promise in delivering low-intensity mental-health support (Winzer, R., Lindberg, L., Guldbrandsson, K., and Sidorchuk, A., 2018). However, concerns about algorithmic bias, data privacy, and loss of human empathy remain critical (UNESCO, 2021). Technology acceptance models and trust research underline the importance of perceived usefulness, ease of use, and privacy for adoption (Bagozzi, R. P., 2007).

4. Theoretical framework. This study synthesizes the Input–Process–Outcome (IPO) model (Deng, J., and Liu, S., 2020). with Bronfenbrenner's ecological perspective and TAM-related constructs to theorize how institutional inputs (policy, resources, AI integration, IPE context) shape process quality (curriculum relevance, access, interaction, feedback, data privacy/trust) and thus outcomes (satisfaction, literacy, behavior, well-being, value internalization).
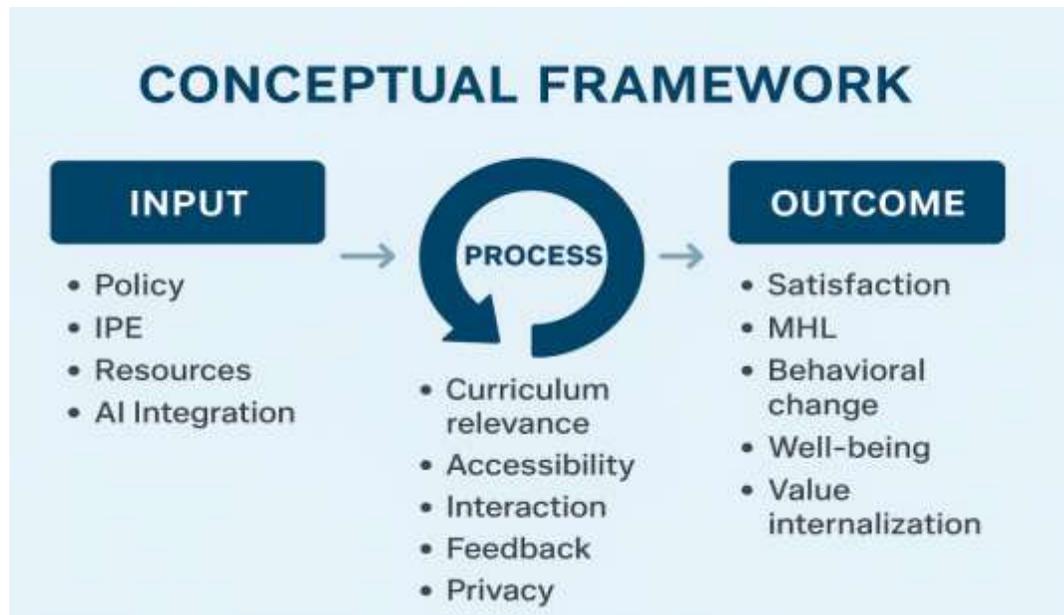

Figure 1 Conceptual Framework (Chao Deng, 2026)

Methodology

1. Population and sampling

The target sample was 540 full-time undergraduate students, stratified by major, year, and gender. G*Power and SEM parameter rules informed the sample target (15 participants per estimated parameter). Purposive sampling identified educators and expert panelists for the qualitative phases.

2. Research Instruments

A mixed-methods design was employed. Key stages included a literature review, expert workshops, Delphi rounds to refine measurement dimensions, pilot testing, a large-scale survey (n = 540), confirmatory factor analysis and SEM (AMOS 24.0), semi-structured interviews (n = 12), in expert focus-group evaluation (n = 5) for model validation. Ethical approval and participant informed consent procedures were observed.

3. Data collection

Through online and offline questionnaires, online questionnaires can be distributed via email, social media and other channels, while offline questionnaires can be distributed and collected at relevant activities and venues. This questionnaire aims to presents the validated model, discusses implications for practice and policy in private colleges, and outlines recommendations for ethical AI governance, capacity building and sustainability.

4. Data analysis

Data analysis. Quantitative analysis included descriptive statistics, reliability (Cronbach's α), KMO and Bartlett tests, CFA, and SEM. Qualitative interviews were thematically analyzed to triangulate quantitative findings.

5. Statistical Procedures

Instrument development. Based on Delphi outcomes and expert consultation, a 77-item questionnaire was developed (7 demographic, 20 input, 25 process, 25 outcome items; Likert 1–5). Items were piloted (N = 30–50) and refined by item-total correlation, discrimination index, Cronbach's alpha, and EFA. Final instrument was bilingual (English and Mandarin) and administered via WenJuanXing

Results

The article's results sections comprise the detailed analyses and tables produced from the survey, CFA, SEM, and interviews. The full empirical results follow and are organized under Demographics, Input–Process–Outcome analyses, CFA/SEM outputs, and qualitative themes.

1. Demographic profile (N = 540) Table 1 summarizes respondent characteristics (gender, year, major, AI experience, mental health participation, digital literacy, AI understanding).

Table 1 Demographic distribution

Variable	Category	Frequency	Percentage (%)
Gender	Male	113	20.93
	Female	427	79.07
Grade	Year 1	191	35.37
	Year 2	56	10.37
	Year 3	41	7.59
	Year 4	252	46.67
Major	Humanities & Social Sciences	329	60.93
	Science & Engineering	94	17.41
	Business & Management	117	21.67
AI Experience	Yes	485	89.81
	No	55	10.19
Mental Health Program Participation	Yes	452	83.70
	No	88	16.30
Digital Literacy	High	232	42.96
	Medium	270	50.00
	Low	38	7.04
AI Understanding	High	189	35.00
	Medium	292	54.07
	Low	59	10.93

(Detailed descriptive narrative is included in the full Results section of the document.)

2. Input, Process and Outcome: Descriptive Summaries The descriptive analysis of the Input, Process and Outcome dimensions revealed overall mean scores ranging from 3.91 to 4.12, situating the responses in the "High" category. This indicates that participants generally expressed positive perceptions toward the institutional context, the implementation process, and the resultant educational outcomes of the AI-supported mental health education initiative.

2.1 Input Dimension. Within the Input dimension, the overall mean score was 4.05, suggesting substantial readiness and support at the policy and resource levels. Among the four subfactors, Policy Context had the highest mean (4.12), reflecting strong institutional endorsement of integrating mental health education.

However, AI Integration received a slightly lower mean (3.91), indicating that while policies favor innovation, the actual deployment of AI tools remains uneven and at an early stage of developmental.

2.2 Process Dimension. The Process dimension recorded the highest composite mean of 4.08, underscoring the participants' favorable evaluation of the program's curriculum relevance, accessibility, and interaction mechanisms. Curriculum Relevance (4.10) and Interaction and Feedback (4.09) emerged as the strongest aspects, demonstrating AI-based learning environment's pedagogical responsiveness Nevertheless, Privacy and Data Protection yielded a slightly lower mean (3.95), highlighting an area for policy refinement concerning data ethics and learner trust.

2.3 Outcome Dimension. The Outcome dimension showed an overall mean of 4.01, indicating substantial perceived benefits among learners. The most highly rated outcome was Learning Satisfaction (4.12), followed by Mental Health Literacy (MHL) (4.05). These suggest that AI-enhanced approaches positively influence emotional awareness and self-regulation. However, Value Internalization (3.92) lagged slightly, implying that the translation of mental health understanding into sustained behavioral and moral frameworks requires deeper experiential learning components.

Table 2 Descriptive Summary of Input, Process, and Outcome Factors

Dimension	Subfactors	Mean	S.D.	Interpretation
Input	Policy Context	4.12	0.47	High
	Interprofessional Education (IPE)	4.06	0.51	High
	Resource Availability	4.11	0.50	High
	AI Integration	3.91	0.58	Moderate
	Overall Input Mean	4.05	—	High
Process	Curriculum Relevance	4.10	0.48	High
	Accessibility	4.06	0.52	High
	Interaction & Feedback	4.09	0.50	High
	Privacy & Data Protection	3.95	0.55	Moderate
	Overall Process Mean	4.08	—	High
Outcome	Learning Satisfaction	4.12	0.45	High
	Mental Health Literacy (MHL)	4.05	0.51	High
	Behavioral Change	3.98	0.53	High
	Well-being	4.00	0.50	High
	Value Internalization	3.92	0.57	Moderate

	Overall Outcome Mean	4.01	—	High

Interpretation:

Overall, these findings signify that the integration of AI-based mental health education within the Guizhou Qiannan Economic College context is well received, particularly in terms of institutional policy and process design. Yet, the relative underperformance of AI Integration and Value Internalization underscores the need for more comprehensive digital pedagogies that connect technological use with humanistic and ethical learning outcomes.

3. Measurement validation (CFA) and reliability CFA across Input (4-factor), Process (5-factor) and Outcome (5- factor) models showed acceptable to good fit indices (CFI range .94–.95; RMSEA .066–.08). Composite Reliability (CR) and AVE met thresholds (CR > .87; AVE > .58 across constructs). Cronbach's alpha values ranged .872–.930, indicating strong internal consistency. Discriminant validity (Fornell–Larcker) was satisfied for all constructs.

4. Structural model (SEM) The structural model achieved good fit (χ^2/df = 2.83; CFI = .945; RMSEA = .070). Standardized path coefficients supported hypotheses: - Input $\longrightarrow$ Process: β = 0.78, p < .001 - Process $\longrightarrow$ Outcome: β = 0.81, p < .001 - Input $\longrightarrow$ Outcome: β = 0.36, p < .001 (direct effect) The dominant Process $\longrightarrow$ Outcome path underscores that pedagogical processes and perceived service quality mediate institutional inputs to produce student-centered outcomes—consistent with process–outcome theory (Creemers & Kyriakides, 2012) and Kirkpatrick's levels (Kirkpatrick & Kirkpatrick, 2006) when applied to educational interventions.

5. Qualitative themes Interviews (n = 12) corroborated quantitative findings. Key themes included: (1) institutional policy support but uneven implementation (2) AI as enabling personalization but requiring teacher training (3) privacy and transparency as essential for student trust; (4) AI as supplementary to, not replacement for, human counseling.

6. Expert evaluation and model refinement: Five domain experts scored the proposed model highly across Utility, Feasibility, Propriety, Accuracy, and Sustainability (means 4.60–4.76). Experts recommended repositioning AI as a central mediator and adopting a circular feedback representation. These suggestions informed the final model.

7. Integrated model: final description: The Final AI-Supported Mental Health Education Model is circular, with AI integration centrally mediating Input $\longrightarrow$ Process $\longrightarrow$ Outcome and bidirectional feedback loops for continuous improvement. Core subcomponents are detailed in Figure 2.
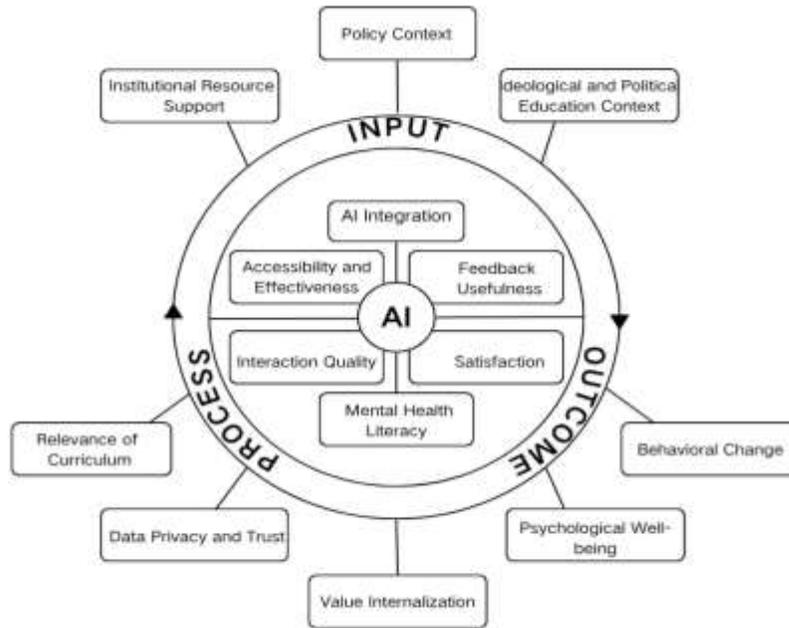
Figure 2 Final Model of Mental Health Education in Artificial Intelligence Model (Chao Deng, 2026)

Conclusion

This study developed and validated an AI-supported mental health education model tailored for private higher education in China. Empirical evidence supports a central role for AI as a mediator linking institutional input to pedagogical processes and learner outcomes. To capitalize on AI's potential, private institutions should adopt comprehensive strategies: 1) strengthen teacher training and technical support 2) implement transparent data governance and consent procedures 3) design blended human–AI service pathways and 4) establish continuous monitoring and feedback mechanisms for model improvement.

Discussion

This mixed-methods study advances theory and practice in AI-enabled mental health education in private higher education by delivering a validated, context-sensitive framework. The findings demonstrate that strong policy and resource inputs are necessary but not sufficient; high-quality processes curricular relevance, trustworthy feedback and interaction are the proximal drivers of student outcomes. AI functions as an active mediator: it increases precision and personalization but must be governed ethically (UNESCO, 2021).

1. Theoretical contributions

1.1 Integrates IPO educational effectiveness with TAM and ecological perspectives to explain how institutional structures and AI shape process quality and outcomes.

1.2 Empirically validates a multi-dimensional measurement instrument suitable for private higher education settings in China.

1.3 Demonstrates the mediating role of process variables and situates AI as a central, active mediator rather than a passive input.

2. Practical implications

2.1 Institutional policy must be matched with sustained investments in AI infrastructure and staff training.

2.2 Transparent data governance, consent, and communication are central to student trust and uptake (Beldad et al., 2010; Buchanan et al., 2007).

2.3 AI-enabled services should be designed to augment human counseling by providing timely screening and follow-up, without replacing human empathy.

3. Limitations

The study is limited to a single private college in Guizhou province, which constrains generalizability. Self-report measures may introduce response biases. While the SEM demonstrates associations and partial mediation, causal inference would benefit from longitudinal or experimental designs.

New finding or knowledge

The integration of AI-based mental health education within the Guizhou Qiannan Economic College context is well received, particularly in terms of institutional policy and process design. Yet, the relative underperformance of AI Integration and Value Internalization underscores the need for more comprehensive digital pedagogies that connect technological use with humanistic and ethical learning outcomes.

Research Suggestion

1. Suggestions for use

1.1 Establish clear institutional policies on AI use in psychological services, including consent, retention, and access controls.

1.2 Invest in regular professional development for faculty and counselors focused on AI literacy and ethical use.

1.3 Prioritize student-facing communication about data use to increase transparency and uptake.

1.4 Pilot iterative improvements using A/B testing and mixed-methods evaluation to refine AI interventions.

1.5 Replicate the model across diverse private institutions and conduct longitudinal research to test long-term behavioral and well-being outcomes.

2. Suggestions for next research

Research on innovation strategies of educational institutions using AI in curriculum content and teaching methods should be closely integrated with the characteristics and development trends of the digital age and new teaching formats and methods should be continuously explored and practiced.

References

Auerbach, R. P., Mortier, P., and Bruffaerts, R. (2018). WHO world mental health surveys international college student project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology, 127*(7), 623–638.

Bagozzi, R. P. (2007). The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems, 8*(4), 244–254.

Bai, X., and Wang, H. (2023). Artificial intelligence and mental health: A systematic review of applications and ethical challenges. *Frontiers in Psychology, 14*, 1132057.

Beldad, A., de Jong, M., and Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior, 26*(5), 857–869.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Harvard University Press.

Chen, Y., and Huang, L. (2022). AI-driven adaptive learning for higher education: Frameworks and implications. *International Journal of Educational Technology in Higher Education, 19*(32), 1–20.

Deng, J., and Liu, S. (2020). Artificial intelligence-assisted teaching model in higher education: Development and empirical testing. *Education and Information Technologies, 25*(5), 1–19.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., and Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*(1), 405–432.

Huang, T., and Li, W. (2022). Exploring AI-based psychological support systems in universities. *International Journal of Mental Health Promotion, 24*(6), 850–862.

Ministry of Education. (2025). *"Opinions on Accelerating the Digitalization of Education."* Ministry of Education of the People's Republic of China.

Li, X., and Zhang, Q. (2021). The role of institutional policy and resource support in AI-enabled education reform. *Journal of Educational Administration, 59*(4), 505–523.

Liu, J., and Chen, H. (2023). The influence of AI on mental health literacy among college students: A Chinese perspective. *Asian Journal of Education and Social Studies, 41*(2), 55–68.

Luckin, R., Holmes, W., Griffiths, M., and Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education.* Pearson.

Tan, J. (2017). *Mental Health. In Ed. The Encyclopedia of Cross-Cultural Psychology.* Wiley.

UNESCO. (2021). *Recommendation on the Ethics of Artificial Intelligence.* UNESCO Digital Library.

Winzer, R., Lindberg, L., Guldbrandsson, K., and Sidorchuk, A. (2018). Effects of mental health interventions for students in higher education are sustainable over time: A systematic review and meta-analysis of randomized controlled trials. *PeerJ, 6*, e4598.

World Health Organization. (2022). *World mental health report: Transforming mental health for all.* World Health Organization.