AI-ASSISTED LEARNING AND TEACHING MODEL FOR FOLK MUSIC IN YUNNAN*

Wang Haiyan[1], Pong Horadal[2], Kanakorn Sawangcharoen[3] and Prapai Sridama[4]

[1-4]BansomdejchaoprayaRajabhat University, Thailand

Corresponding author E-mail: 739566765@qq.com

Received 5 June 2026; Revised 12 July 2026; Accepted 14 July 2026

Abstract

This study aims to: 1) examine the current situation of AI-assisted learning and teaching for folk music in Yunnan Province; 2) develop an AI-assisted learning and teaching model; and 3) evaluate the proposed model. This study employed the Delphi method and focus group discussion to collect expert opinions, develop the model, and evaluate its feasibility and appropriateness.

The results revealed: An AI-assisted learning and teaching model for folk music in Yunnan Province was developed. The model includes AI teaching tools, AI learning platforms, intelligent feedback systems, teachers' technical skills, pedagogical integration skills, and AI literacy.

Keywords: AI-Assisted Learning and Teaching, Folk Music Education, Yunnan Province, Delphi Method, Focus Group, Teacher Competencies

* Wang Haiyan, Pong Horadal, Kanakorn Sawangcharoen and Prapai Sridama. (2026). AI-Assisted Learning And Teaching Model For Folk Music In Yunnan. Journal of Interdisciplinary Social Development, 4(5), 711-727.;

DOI: https://doi.org/10.

Website: https://so12.tci-thaijo.org/index.php/JISDIADP/

Introduction

The rapid development of artificial intelligence, big data, cloud computing, digital platforms, and intelligent learning environments has significantly changed the way education is organized, delivered, evaluated, and experienced. Education is no longer limited to traditional classroom instruction or one-way knowledge transmission. Instead, teaching and learning are increasingly supported by data-driven decision-making, adaptive learning resources, intelligent feedback, and flexible digital interaction. In this context, teachers are expected not only to use digital tools but also to redesign learning activities, provide individualized support, monitor students' learning progress, and improve learning experiences through intelligent technologies. UNESCO has emphasized that AI can support education through personalized learning, learning analytics, intelligent tutoring, and feedback systems, but its application must remain human-centered, inclusive, transparent, and ethically responsible (Miao et al., 2021; UNESCO, 2021).

The integration of AI into education has also created new possibilities for music teaching and learning. Music education is a field that requires demonstration, imitation, repeated practice, listening, correction, emotional expression, and performance evaluation. Compared with many other subjects, music learning depends heavily on continuous feedback and individual practice. Recent studies show that AI can be applied in intelligent music software, online teaching, autonomous learning, music creation, performance assessment, accompaniment, and real-time feedback (Yu et al., 2023). These functions can help students identify problems in pitch, rhythm, tempo, technique, and performance accuracy more efficiently. At the same time, AI can support teachers by providing teaching resources, recording learning data, and assisting in the diagnosis of students' learning difficulties. However, AI should not be understood as a replacement for teachers. Rather, it should function as a

supportive tool that enhances teachers' instructional design, classroom interaction, and personalized guidance.

Yunnan Province is one of the most culturally and ethnically diverse regions in China, with rich folk music traditions formed through long-term social, historical, and cultural development. Yunnan folk music is closely related to ethnic identity, local customs, festivals, rituals, labor, oral tradition, and community life. It has important educational value because it carries not only musical knowledge but also cultural memory, aesthetic experience, and ethnic heritage. Traditional folk music teaching usually depends on oral transmission, teacher demonstration, imitation, repeated practice, and cultural explanation. These methods are valuable because they preserve the emotional, contextual, and cultural characteristics of folk music. However, in the digital era, traditional teaching methods also face challenges such as limited access to high-quality resources, insufficient individualized learning support, weak documentation of learning processes, and difficulties in attracting younger generations.

Existing studies on Chinese music education suggest that music education in China needs to pay greater attention to cultural context, curriculum development, teaching innovation, and the relationship between traditional culture and modern educational practice (Yang & Welch, 2023). This is especially important for Yunnan folk music education, where musical forms are often embedded in specific ethnic, regional, and social contexts. If digital or AI technologies are introduced without cultural sensitivity, they may lead to over-standardization, loss of stylistic diversity, or weakening of cultural meaning. Therefore, AI-assisted folk music education should not only focus on technological efficiency but also consider cultural authenticity, pedagogical appropriateness, and sustainable transmission.

Although AI has been increasingly discussed in general education and music education, its application in Yunnan folk music teaching remains limited.

Current research has not yet provided a systematic model explaining how AI teaching tools, AI learning platforms, intelligent feedback systems, teachers' technical skills, pedagogical integration skills, and AI literacy can be effectively integrated into folk music education. In particular, there is a need to clarify how AI can support classroom teaching, personalized learning, performance feedback, teacher development, and cultural transmission in a coherent framework. Therefore, this study aims to develop and evaluate an AI-assisted learning and teaching model for folk music in Yunnan Province, China. The findings are expected to provide theoretical and practical guidance for integrating AI technologies into folk music education while maintaining the cultural authenticity and educational value of Yunnan ethnic music.

Objectives

1. Study on the current situation of AI-assisted learning and teaching practices for folk music in Yunnan Province.

2. AI-assisted learning and teaching developing model for folk music in Yunnan Province.

3. Evaluate the AI-assisted learning and teaching model for folk music in Yunnan Province.

Methodology

A sample group of the Delphi Method consisted of 21 purposively selected experts with the following qualifications: 1) having more than 10 years of teaching, research, or professional experience in music education, folk music education, educational technology, AI-assisted teaching, instructional design, or teacher development; 2) holding an intermediate or above professional title or a doctoral degree; 3) being a university teacher, researcher, educational technology specialist, music education expert, or folk music practitioner; and 4)

having rich knowledge and experience in one or more aspects of AI-assisted learning and teaching, Yunnan folk music education, digital learning platforms, intelligent feedback systems, teacher competencies, or cultural transmission.

A sample group of the Focus Group consisted of 11 purposively selected experts with the following qualifications: 1) having more than 10 years of teaching, research, or professional experience related to music education, folk music education, AI-assisted teaching, or educational technology; 2) holding an intermediate or above professional title or a doctoral degree; 3) being a university teacher, researcher, instructional design expert, educational technology expert, or folk music education specialist; and 4) having rich experience in evaluating teaching models, integrating digital or AI technologies into education, or preserving and transmitting Yunnan folk music.

Expert Questionnaire Content

There were three versions of the expert questionnaire, corresponding to the three rounds of Delphi expert consultation:

(1) The first version was an expert interview form with open-ended questions. It explored the current situation of AI-assisted learning and teaching practices for folk music in Yunnan Province, as well as possible components of the model, including AI teaching tools, AI learning platforms, intelligent feedback systems, teachers' technical skills, pedagogical integration skills, and AI literacy.

(2) The second version was a five-point Likert scale developed by integrating the literature review and the experts' opinions collected from the first-round open-ended interviews. The specific content included the components and indicators of the AI-assisted learning and teaching model for folk music in Yunnan Province.

(3) The third version was also a five-point Likert scale. It contained the revised items from the second round and included the corresponding statistical results from the previous round, such as median and interquartile range, to help

experts reconsider and confirm their judgments.

The construction process of the expert questionnaire was as follows:

Step 1: Construct the first-round expert interview form with open-ended questions.

Step 2: Construct the second-round expert questionnaire as a five-point Likert scale based on the literature review and the results of the first-round expert interviews.

Step 3: Invite five experts to examine the Item-Objective Congruence (IOC) of the expert questionnaire.

Step 4: Modify the second-round expert questionnaire based on the IOC results and distribute it to 21 Delphi experts.

Step 5: After collecting and analyzing the experts' responses, prepare the third-round expert questionnaire with a five-point Likert scale and statistical indicators from the previous round, such as median and interquartile range.

Discussion Outline

A discussion outline is a summary of the main topics to be covered in the focus group meeting. In this study, the focus group discussion outline was designed to guide experts in evaluating the AI-assisted learning and teaching model for folk music in Yunnan Province. The outline generally included two parts: meeting rules and questions about the proposed model. The meeting rules explained the purpose, procedure, confidentiality, and participation requirements of the discussion. The questions about the model focused on its feasibility, pedagogical appropriateness, technological applicability, cultural relevance, and possible suggestions for improvement.

Research Procedure and Processes

This study was mainly divided into two research stages. The details of each stage are presented as follows.

Stage 1: Employing the Delphi Method to Achieve Objectives 1 and 2

1.1 Develop a list of 21 experts who were qualified to participate in

three rounds of Delphi consultation.

1.2 Request the Graduate School of Bansomdejchaopraya Rajabhat University to issue an official letter for collecting expert opinions.

1.3 Conduct three rounds of expert opinion consultation and feedback. The first round used open-ended questions, while the second and third rounds used five-point Likert scale questionnaires.

1.4 Analyze expert opinions after each round. The experts' responses were summarized, revised, and returned for further evaluation until consensus was reached on the components and indicators of the AI-assisted learning and teaching model for folk music in Yunnan Province.

Stage 2: Employing Focus Group Discussion to Achieve Objective 3

2.1 Select and invite 11 focus group experts with relevant experience in folk music education, AI-assisted teaching, educational technology, instructional design, and model evaluation.

2.2 Prepare a structured discussion outline before the focus group meeting. The questions focused on the feasibility, pedagogical appropriateness, technological applicability, cultural relevance, and improvement suggestions for the proposed model.

2.3 During the discussion, the moderator invited each expert to express opinions on each issue. The moderator guided the discussion process, maintained a positive discussion atmosphere, and encouraged all experts to participate actively. However, the moderator did not express personal opinions or use persuasive language, in order to avoid influencing the accuracy and objectivity of the results.

Results

1. The Results of the First Round of the Delphi Method

Through analyzing the experts' responses to the open-ended questions, the current situation of AI-assisted learning and teaching for folk music in Yunnan Province was obtained. Regarding AI teaching tools, 23.8% of experts rated the current situation as high, 42.9% as medium, 19.0% as low, and 14.3% did not mention this item. Regarding AI learning platforms, 19.0% rated it as high, 38.1% as medium, 23.8% as low, and 19.0% did not mention it. Regarding intelligent feedback systems, 14.3% rated it as high, 33.3% as medium, 28.6% as low, and 23.8% did not mention it.

For teacher-related competencies, 19.0% of experts rated teachers' technical skills as high, 42.9% as medium, 28.6% as low, and 9.5% did not mention this item. Regarding pedagogical integration skills, 14.3% rated it as high, 38.1% as medium, 33.3% as low, and 14.3% did not mention it. Regarding AI literacy, only 9.5% rated it as high, 33.3% as medium, 38.1% as low, and 19.0% did not mention it. These results indicate that AI-assisted folk music teaching in Yunnan Province is still developing, with particular weaknesses in intelligent feedback systems, pedagogical integration skills, and AI literacy.

2. The Results of the Second Round of the Delphi Method

In the second round, 21 expert questionnaires were distributed and all were returned as valid responses, giving a response rate of 100%. A total of 108 items were evaluated. Among them, 6 items had mean scores below 4.00, 101 items had mean scores above 4.00, and 1 item had a mean score of exactly 4.00. From the perspective of mode, no item had a mode of 3, indicating that all items met the importance criterion at the most frequent response level.

From the perspective of interquartile range (IQR), 85 items had IQR values of 0 or 1, accounting for 78.7% of all items. This means that the expert panel had exceeded the predetermined 75% consensus criterion. However,

some items still had IQR values of 2, indicating relatively inconsistent expert opinions. Therefore, these items were revised according to expert suggestions and included in the third-round questionnaire for further confirmation.

3. The Results of the Third Round of the Delphi Method

In the third round, a total of 108 revised items were assessed. All 108 items obtained mean scores above 4.00. From the perspective of mode, no item had a mode of 3, showing that all items met the importance criterion. In terms of IQR, all 108 items had IQR values of 0 or 1, indicating that 100% of the items reached a high level of expert consensus. Therefore, the third round confirmed stable agreement among the experts, and no fourth round was needed.

4. The Results of the Focus Group Method

After the completion of the three rounds of the Delphi method, the focus group method was used to further evaluate and validate the proposed AI-Assisted Learning and Teaching Model for Yunnan Ethnic Music. The purpose of the focus group was to examine whether the model was feasible in actual teaching contexts, whether the structure of the model was reasonable, and whether the indicators were suitable for folk music education in Yunnan Province.

Based on the discussion and revision suggestions provided by the focus group experts, the final version of the model was formed. The final model included 6 primary elements and 108 secondary elements. The six primary elements were AI teaching tools, AI learning platforms, intelligent feedback systems, teachers' technical skills, teachers' pedagogical integration skills, and teachers' AI literacy.

The focus group experts generally agreed that the dimension of AI teaching tools was necessary because such tools can support multimodal presentation, classroom demonstration, annotation, accompaniment, and

interaction in folk music teaching. They also confirmed the importance of AI learning platforms, especially in supporting personalized learning paths, self-paced practice, learning records, resource sharing, and access to Yunnan ethnic music materials.

For intelligent feedback systems, the experts emphasized that feedback should not only focus on technical accuracy, such as pitch, rhythm, and tempo, but should also consider ethnic style, ornamentation, cultural context, and performance expression. Therefore, teacher review and professional judgment should remain part of the feedback process.

The experts also agreed that teacher-related competencies were essential for the successful implementation of the model. Teachers' technical skills are needed to operate AI tools, manage digital resources, and solve basic technical problems. Teachers' pedagogical integration skills are required to connect AI tools with lesson design, classroom activities, assessment, and differentiated instruction. Teachers' AI literacy is important for understanding AI functions, limitations, ethics, data privacy, algorithmic bias, and cultural authenticity.

Overall, the focus group results showed that the model was feasible, pedagogically appropriate, technologically applicable, and culturally relevant. The experts confirmed that the model could provide practical guidance for integrating AI into Yunnan folk music education while supporting teaching effectiveness, student engagement, personalized learning, and the sustainable transmission of ethnic music culture.

Discussion

The findings indicate that AI-assisted learning and teaching for folk music in Yunnan Province is still at a developing stage. Although AI teaching tools and AI learning platforms have begun to appear in teaching practice, their use

remains limited and insufficiently systematic. This is consistent with previous research showing that AI has potential in music education through intelligent software, online learning, autonomous learning, and performance support, but its educational value depends on appropriate pedagogical integration (Yu et al., 2023).

The relatively weak development of intelligent feedback systems is an important finding. Music learning requires repeated practice, immediate correction, and performance-based feedback. AI can support pitch, rhythm, tempo, and performance analysis, but folk music education also requires attention to style, cultural meaning, and expressive features. Therefore, AI feedback should not be treated only as a technical evaluation system; it should be interpreted together with teachers' professional judgment and cultural understanding.

The results also show that teachers' technical skills, pedagogical integration skills, and AI literacy are central to the success of the model. This supports the TPACK perspective, which argues that effective technology integration requires the combination of technological knowledge, pedagogical knowledge, and content knowledge (Mishra & Koehler, 2006). In this study, teachers need not only to operate AI tools, but also to integrate them into folk music teaching objectives, learning activities, assessment, and cultural transmission.

The Delphi results confirmed the structure of the proposed model. In the second round, most items reached a relatively high level of consensus, but some items required revision due to unclear wording, weak feasibility, or insufficient cultural relevance. After revision, the third round showed that all 108 items reached expert consensus. This indicates that the six dimensions of the model are appropriate for guiding AI-assisted folk music education in Yunnan Province.

The focus group results further confirmed the feasibility and cultural relevance of the model. This is important because Yunnan folk music is closely related to ethnic identity, local culture, and intangible cultural heritage. Previous research has emphasized that Yunnan folk music protection should consider cultural sustainability rather than only preservation of musical forms (Kuang, 2022). Therefore, the use of AI in this field should support cultural transmission instead of weakening authenticity.

This study suggests that AI-assisted folk music education requires a balance among technology, pedagogy, and culture. AI teaching tools, AI learning platforms, and intelligent feedback systems provide technical support, while teachers' competencies ensure meaningful and responsible integration. This aligns with UNESCO's view that AI in education should support learning innovation while maintaining human-centered and ethical principles (Miao et al., 2021; UNESCO, 2021).

Conclusion

In this study, "AI-Assisted Learning and Teaching Model for Folk Music in Yunnan Province, China," the researcher draws the following conclusions.

1. Research on the Current Situation of AI-Assisted Learning and Teaching for Folk Music in Yunnan Province

1.1 Current Situation of AI Teaching Tools

The results showed that 23.8% of experts rated the current situation of AI teaching tools as high, while 42.9% rated it as medium. This indicates that AI teaching tools have been introduced into folk music education to some extent, but their use is still not systematic. Many tools are mainly used for basic presentation or classroom support, rather than deeply supporting folk music demonstration, annotation, differentiated instruction, and cultural explanation.

1.2 Current Situation of AI Learning Platforms

Regarding AI learning platforms, 19.0% of experts rated the current situation as high, while 38.1% rated it as medium and 23.8% rated it as low. This suggests that platform-based learning has begun to appear in folk music education, but its ability to provide personalized learning paths, folk music resource databases, practice records, and cultural background learning remains limited.

1.3 Current Situation of Intelligent Feedback Systems

Only 14.3% of experts rated intelligent feedback systems as high, while 28.6% rated them as low and 23.8% did not mention this item. This shows that intelligent feedback systems are still relatively weak in Yunnan folk music education. Current systems may not sufficiently support feedback on pitch, rhythm, technique, stylistic variation, and ethnic music performance characteristics.

1.4 Current Situation of Teachers' Technical Skills

For teachers' technical skills, 19.0% of experts rated the current situation as high, while 42.9% rated it as medium and 28.6% as low. This indicates that teachers have some basic ability to use digital or AI tools, but they still need further improvement in operating platforms, managing digital resources, solving technical problems, and using learning data effectively.

1.5 Current Situation of Teachers' Pedagogical Integration Skills

Regarding pedagogical integration skills, only 14.3% of experts rated the current situation as high, while 33.3% rated it as low. This suggests that many teachers still face difficulties in integrating AI tools into lesson planning, classroom activities, assessment, differentiated instruction, and folk music cultural teaching. AI is often used as an auxiliary tool rather than being fully embedded into teaching design.

1.6 Current Situation of Teachers' AI Literacy

Teachers' AI literacy was the weakest area. Only 9.5% of experts rated it as high, while 38.1% rated it as low. This indicates that teachers still lack sufficient understanding of AI functions, limitations, ethics, data privacy, algorithmic bias, and cultural risks. In folk music education, weak AI literacy may also lead to over-reliance on AI results and insufficient attention to cultural authenticity.

2. The AI-Assisted Learning and Teaching Model for Folk Music in Yunnan Province

After three rounds of the Delphi method and evaluation by focus group experts, the final AI-assisted learning and teaching model for folk music in Yunnan Province was obtained. The final model includes 6 primary elements and 108 secondary elements. The six primary elements are AI teaching tools, AI learning platforms, intelligent feedback systems, teachers' technical skills, teachers' pedagogical integration skills, and teachers' AI literacy. Due to limited space, the detailed indicators are not repeated here and can be found in the results section.

Recommendations

1. Development of AI-Assisted Folk Music Teaching Resources

Educational institutions in Yunnan should systematically develop AI-assisted teaching resources for folk music education. These resources should include audio-visual materials, musical notation, textual explanations, performance demonstrations, and cultural background information. Such resource construction can enhance instructional clarity, support multimodal learning, and strengthen students' understanding of both musical techniques and cultural meanings.

2. Enhancement of AI Learning Platforms for Personalized Learning AI learning platforms should be further optimized to support personalized, adaptive, and self-paced learning. Functions such as ethnic music repertoire databases, segmented practice, learning records, differentiated learning tasks, and progress monitoring should be integrated into platform design. These functions can support individualized learning needs and provide teachers with evidence for instructional adjustment.

3. Construction of Culturally Responsive Intelligent Feedback Systems Intelligent feedback systems should be designed with sensitivity to the stylistic and cultural characteristics of Yunnan folk music. In addition to evaluating pitch, rhythm, tempo, and technical accuracy, feedback systems should consider ornamentation, ethnic style, performance context, and cultural expression. Teacher review and professional judgment should be retained to prevent mechanical or culturally inappropriate evaluation.

4. Strengthening of Teachers' AI-Related Competencies Professional development programs should be provided to strengthen teachers' technical skills, pedagogical integration skills, and AI literacy. Teachers should be trained to operate AI tools, design AI-supported learning activities, interpret AI-generated feedback, manage learning data, and address ethical issues such as privacy, bias, and responsible AI use. Enhancing teacher competence is essential for the effective implementation of the proposed model.

5. Preservation of Cultural Authenticity in AI-Assisted Folk Music Education The implementation of AI-assisted teaching should be guided by the principle of cultural authenticity. AI should function as a supportive pedagogical tool rather than a replacement for teachers, oral transmission, cultural explanation, and human interpretation. Collaboration with local musicians, cultural inheritors, and folk music experts is recommended to ensure that digital resources and AI feedback remain culturally accurate and contextually

appropriate.

6. Further Empirical Validation of the Proposed Model Future research should empirically examine the effectiveness of the AI-assisted learning and teaching model in real educational settings. Experimental, quasi-experimental, or mixed-method studies may be conducted to evaluate its impact on students' learning motivation, performance skills, cultural understanding, learning engagement, and teachers' instructional practices. Such evidence would further strengthen the practical applicability and theoretical contribution of the model.

References

China Daily. (2024). Yunnan holds folk songs performances and competitions. Retrieved on March 12, 2026 from https://www.chinadaily.com.cn/a/202401/27/WS65b4708ba3105f21a507ea78.html

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Engeström, Y. (1987). Learning by expanding: An activity-theoretical approach to developmental research. Orienta-Konsultit.

Howard, K. (Ed.). (2016). Music as intangible cultural heritage: Policy, ideology, and practice in the preservation of East Asian traditions. Routledge.

Kuang, J. (2022). From oblivion to reappearance: A multi-faceted evaluation of the sustainability of folk music in Yunnan Province of China. SAGE Open, 12(3). https://doi.org/10.1177/21582440221117806

Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). AI and education: Guidance for policy-makers. UNESCO Publishing.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Tsinghua University Institute for Rural Studies. (2023). Ethnic Culture Research Institute. Retrieved on March 12, 2026 from https://backoffice.onec.go.th/uploads/Book/2152-file.pdf

UNESCO. (2018). UNESCO ICT competency framework for teachers. (Version 3). United Nations Educational, Scientific and Cultural Organization.

UNESCO. (2021). Recommendation on the ethics of artificial intelligence. United Nations Educational, Scientific and Cultural Organization.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

Wang, C., & Si, Q. (2011). Research on Data Statistical Processing Methods and Their Applications in Delphi Method. Journal of Inner Mongolia University of Finance and Economics (Comprehensive Edition), 4, 92-96. Doi: 10.13895/j.cnki.jimufe.2011-04.019

Yang, Y., & Welch, G. (2023). A systematic literature review of Chinese music education studies during 2007 to 2019. International Journal of Music Education, 41(2), 175–198. https://doi.org/10.1177/02557614221096150

Yu, X., Ma, N., Zheng, L., Wang, L., & Wang, K. (2023). Developments and applications of artificial intelligence in music education. Technologies, 11(2), 42. https://doi.org/10.3390/technologies11020042