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Research on Practical Pathways for Integrating Qiongya Culture into Early Childhood Music Education through AI Empowerment

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Abstract: Amidst the deep integration of digital education and culture, organically incorporating Qiongya culture into early childhood music curricula serves as a crucial approach to cultural enlightenment education, artistic education, and holistic development. Against this backdrop, AI technology provides accelerated pathways and channels for integrating Qiongya culture into early childhood music education. After analyzing the aspects of Qiongya culture suitable for early childhood music curricula and the advantages of AI in early childhood music education, this study identifies practical challenges through field research. These include insufficient innovation in integrating Qiongya culture, inadequate teacher training, monotonous teaching methods, and insufficient teacher competence. Subsequently, this study proposes specific implementation pathways for the AI-empowered integration of Qiongya culture into early childhood music curricula across four dimensions: enhancing curriculum resource development, refining teaching models, and strengthening evaluation systems. It also offers practical recommendations for achieving an organic combination of Qiongya culture and music education for young children.

Keywords: AI-empowered; Qiongya culture; Early childhood music

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1. Background

Early childhood is the optimal period for cultivating aesthetic appreciation and artistic literacy in the cultural arts. Music education serves as a foundational component of early childhood education, enhancing children's aesthetic abilities and functioning as a vital conduit for transmitting outstanding traditional culture, thereby fulfilling significant educational purposes. As a significant branch of Lingnan culture, Qiongya culture possesses a rich musical heritage, including Li ethnic folk songs, Zhuang ethnic fishing songs, and Qiong opera melodies. The inherent ethnic character and engaging nature of music align perfectly with the developmental needs and age-specific characteristics of young children. However, integrating Qiongya cultural knowledge into early childhood music curricula has proven challenging under traditional teaching models. In recent years, AI technology, with its inherent interactivity, personalization, and intelligence, has seen widespread adoption in education. AI can convey complex and difficult-to-grasp concepts to young children in the most direct manner, enabling them to intuitively understand Qiongya culture. The integration of AI into early childhood music classrooms not only enriches

the content and format of Qiongya cultural elements, but also enhances the value of these cultural traditions [1].

2. Core essence of Qiongya culture

Rooted in Hainan Island's unique geographical and historical context, Qiongya culture's core essence encompasses four dimensions: First is the indomitable spirit of resistance. From ancient settlers cultivating the wild island to the modern Qiongya Column's 23-year revolutionary struggle, where the red flag never fell, the people have consistently defended their homeland with unyielding will against isolation, external conflicts and repeated wars. Its people have steadfastly defended their homeland with indomitable will, forging a spirit characterized by pioneering courage and fearlessness in the face of adversity. As a vital node along the Maritime Silk Road, the cultures of indigenous ethnic groups like the Li and Miao have continuously collided and blended with those of immigrants from the Central Plains, Min Nan, and Southeast Asia. Examples include the fusion of Li rattan weaving techniques with Han textile skills, and the integration of Southeast Asian shophouse architecture with Hainanese vernacular dwellings, shaping a cultural ethos of "harmony without uniformity, embracing diversity". The third is ecological wisdom rooted in reverence for nature. The island's fragile ecology fostered a sustainable philosophy among Qiongya residents: "relying on the mountains for sustenance, relying on the sea for sustenance". This is evident in the Li people's slash-and-burn farming with fallow periods, fishermen's tradition of harvesting without harming the sea, and totemic worship of volcanoes, rainforests, and oceans, all embodying a worldview of "harmony between humanity and the land". Fourth, there is a pragmatic and open-minded philosophy of life. Influenced by the tropical climate and maritime culture, Qiongya culture rejects the constraints of elaborate rituals and ethics, forming a people-oriented approach characterized by "accepting one's fate with joy and pursuing practical progress". This is seen in the social gatherings at old-school tea shops and the relaxed folk customs during festivals, reflecting both a love for life and an open-minded attitude toward adversity [2].

3. Analysis of the compatibility between Qiongya culture and AI technology in early childhood music education

3.1. Core elements of Qiongya culture suitable for early childhood music education

3.1.1. Folk song elements

Folk songs such as the Li ethnic group's "Woodcutting Song" and "Resisting Marriage Song", and the Tanka ethnic group's "Saltwater Song" feature straightforward lyrics and lively rhythms. Their themes often revolve around natural landscapes and daily life, such as "Carrying a load of mountain wood, I return home with a smile" and "Waves splash, the boat rocks, baby sleeps soundly". These songs resonate with young children's experiences, making them easy to understand and remember. Additionally, simple, repetitive melodies align with young children's musical cognitive abilities, helping them quickly develop a sense of rhythm.

3.1.2. Instrumental elements

Qiongya culture features distinctive instruments such as the Li ethnic group's nose flute, mouth bow, and Hainan coconut fiddle. Their novel designs and unique timbres captivate children's attention. The nose flute is played with the nose, the mouth bow with the mouth, and the coconut fiddle is plucked directly with the fingers. These instruments expose children to diverse sounds, sparking their interest in instrument-making and performance, while enhancing their manual dexterity and creative imagination.

3.1.3. Folk music activity elements

Folk music traditions in the Qiongya region include the Li people's "March Third" singing contests and the Zhuang

people's "Sea Worship" ritual. During "March Third", singers improvise lyrics while following the established melody, and people sing and dance, expressing music through play. During the Sea Worship ceremony, the music alternates between solemn and upright, with melodies played in a rapid leaping rhythm that conveys vitality. Simple body movements accompany prayers, while chanting melodies advance swiftly, creating an atmosphere of fervent enthusiasm. These activity formats align with young children's playful and active nature, helping them develop teamwork skills and a sense of collective consciousness.

3.2. Advantages of AI technology in early childhood music education

First, it enhances the intuitiveness and engagement of the learning process. Targeting young children's concrete and visual thinking, VR and AR technologies bring Qiongya cultural music scenes into classrooms. Immersive experiences break temporal and spatial constraints, transforming abstract musical concepts into tangible imagery that sparks learning interest. Second, it enables personalized and precise instruction. AI-powered teaching systems leverage big data analytics to track children's learning behaviors in real time. Based on individual differences in musical perception and learning pace, these systems generate tailored learning plans, implementing "teaching according to individual aptitude". Third, it enhances interactivity and engagement of the students. Smart interactive devices, such as musical tablets and interactive projectors, create dynamic teaching environments. This shifts traditional teacher-dominated classrooms with low child participation to active, child-centred learning, transforming passive reception into active involvement and improving educational outcomes for children [3].

4. Practical pathways for integrating Qiongya culture into early childhood music education through AI

4.1. Establishing an AI-driven Qiongya culture music teaching resource system for early childhood education

4.1.1. Developing a digital Qiongya music resource library

AI technology was employed to excavate and digitally transcode musical materials from the Qiongya culture. Select folk songs like "Long Time No See, Long Time No See" and "Wuzhishan Songs", characterized by lively rhythms and simple melodies, based on children's cognitive development and receptivity. AI audio processing software was used to transpose songs to lower keys and simplify rhythms for easier children's singing. AI image recognition and 3D modelling are employed to transform elements of Qiongya culture, such as Li brocade, Miao silver ornaments, and revolutionary scenes, into animated formats. These animated visuals were combined with the adapted sheet music created in the previous step and AI-generated images to produce illustrations and animations. Pair these with rhythmically adapted sheet music and the final document/PPT courseware to create comprehensive audio-visual resource.

4.1.2. Development of AI interactive music teaching materials

Leveraging children's affinity for games and interactions, AI-powered interactive music teaching materials were developed. Centered on Qiongya culture, interactive modules such as "Learn Rhythm with Li Brocade" and "Find the Notes of Red Songs" were designed. In the "Learn Rhythm with Li Brocade" module, the courseware uses AI image recognition to capture children's hand movements tracing Li brocade patterns, converting these actions into corresponding rhythmic notes. This allows children to intuitively grasp the connection between musical rhythm and Qiongya cultural elements through hands-on interaction. When children sing snippets of red songs, the courseware intelligently identifies and highlights the corresponding notes, guiding them to learn and sing the entire song in the future. The courseware also features intelligent feedback, providing real-time encouraging evaluations and targeted guidance based on children's actions and singing performance to enhance their learning motivation.

4.1.3. Developing AI virtual teacher resources

AI virtual teachers embodying Qiongya cultural characteristics have been developed, such as "Teacher Aya" (dressed in traditional Li ethnic attire) and "Little Warrior Teacher" (wearing a Red Army cap). These characters were pre-programmed with teaching knowledge points related to Qiongya music and interactive skills. During lesson delivery, the virtual teacher plays instructional content under the teacher's guidance, and virtual teacher can use 3D animations to help children fully grasp the dance's basic movements and rhythmic essentials. Additionally, AI motion capture technology can be employed to correct the posture of children. Multimedia materials, such as animations and audio, can be incorporated to teach knowledge points about the creative background of Qiongya folk songs. The virtual teacher can then vividly guide children through the stories behind the songs. Finally, the virtual teacher can allocate sufficient review time for children after class and use voice interaction to help them answer questions related to Qiongya music [4].

4.2. Innovative implementation pathways for AI-supported Qiongya culture music education in early childhood

4.2.1. Implementing AI-personalized music learning guidance

Leveraging AI assessment systems, personalised learning profiles are created for each child based on evaluations of their musical foundations and preferences. This generates tailored Qiongya music learning plans for each individual (e.g., children with strong rhythmic sense focus on complex rhythms like the Li bamboo dance; those who enjoy singing prioritize Qiongya folk songs). Throughout the teaching process, AI learning terminals continuously collect real-time data on each child's Qiongya music learning progress (e.g. song-singing accuracy rates and dance movement precision). This data undergoes analysis via big data processing technologies, enabling dynamic adjustments to each child's learning plan. Once the system identifies a learning difficulty for a child in mastering a particular folk song, it proactively pushes relevant practice resources and instructional videos to help the child overcome the challenge.

4.2.2. Organizing AI interactive music games

Diverse AI-interactive music games should be designed to integrate learning through play. For instance, the "Qiongya Instrument Guessing Game" uses AI voice synthesis to simulate the sounds of traditional instruments (Li ethnic group's nose flute, Miao ethnic group's bamboo panpipe, etc.). Children identify instruments based on audio cues and view 3D models with AR demonstrations of playing techniques. Launch a "Red Song Relay Challenge" powered by AI voice recognition and scoring. Participants were divided into teams for song relay competitions, with the system evaluating the accuracy of the lyrics. Final scores are recorded to heighten competitive spirit and enjoyment". Li Ethnic Dance Creation" enables preschoolers to choreograph dances using body movements within an AI-sensing area. The AI system converts their dance actions into animated dance segments, combining them with other children's movements to form complete, beautiful Li ethnic dances. This activity develops physical coordination while stimulating creativity and teamwork skills.

4.2.3. Advancing AI-assisted home-school collaborative music education

Establish an AI-powered home-school collaborative music education platform to strengthen communication between teachers and parents, encouraging parents to join in fostering children's interest in learning Qiongya cultural music. Teachers use the platform to share children's in-school music progress, key points of Qiongya cultural music, and recommendations for parent-child music activities. Parents can upload videos or audio recordings of their children learning Qiongya cultural music at home. The AI provides simple evaluations and feedback on the submissions. The AI home-school platform also regularly hosts online AI parent-child music activities such as "Family Qiongya Folk Song Singing Contests" and "Parent-Child Li Ethnic Dance Show". These online AI-facilitated music activities involve video conferencing participation by both parents and children. Following completion, the AI provided live and recorded broadcasts, along with individualised scores and feedback for each family. This approach achieves home-school collaboration, enabling children to continue reinforcing their Qiongya cultural music learning through ongoing home

immersion [5].

4.3. Refining AI-empowered assessment and optimization mechanisms for Qiongya cultural music curriculum in early childhood education

4.3.1. Establishing a dynamic AI-based curriculum evaluation system

A multidimensional AI-driven dynamic course evaluation system was developed to monitor children's learning progress throughout the Qiongya cultural music curriculum. Assessment metrics were established across three dimensions: cognitive, skill, and affective. The cognitive dimension evaluates children's familiarity with foundational knowledge (e.g. origins of folk songs, names of musical instruments) and related musical knowledge, while the skill dimension assesses children's mastery of abilities such as singing, dancing, and rhythm perception. The affective dimension evaluates whether children enjoy Qiongya cultural music and develop a sense of cultural identification with it.AI technology transforms learning assessment into automated, continuous dynamic evaluation. Through AISK internet learning terminals and interactive courseware, the system collects real-time assessment data during lessons, including correct answers, participation in post-class activities, and completion of children's songs or musical pieces. The system performs instant data analysis to generate individualised progress reports, enabling teachers to understand each child's achievements and areas for improvement at each stage.

4.3.2. Implementing AI-driven continuous curriculum optimization

Targeted optimization addresses identified issues or shortcomings based on data from the AI dynamic assessment system. For instance, if AI detects low engagement with a specific type of Qiongya music content, it can leverage children's interest preferences to provide more diverse, tailored teaching resources and activity formats—such as incorporating animated content or adding interactive games. Employ AI technology to review teaching processes by recording classroom sessions. AI video analysis was used to dissect teaching methodologies and children's engagement states, identifying strengths and weaknesses through highlights and issues. Conduct teacher workshops addressing specific challenges, leveraging diverse analyses to refine teaching resources, methods, and activity designs through detailed pedagogical research. Establish a curriculum optimization feedback mechanism. Optimized curricula should be implemented in teaching practices while collecting data through AI assessment systems to validate improvements. This iterative cycle of "assessment-optimization-reassessment-reoptimization" enhances the quality of music curricula integrating Qiongya culture for young learners [6].

5. Conclusion

Within the context of integrating digital education with cultural heritage, AI technology offers an innovative pathway for incorporating the Qiongya culture into early childhood music curricula. Elements such as folk songs, distinctive instruments, and folk music activities from Qiongya culture align well with children's developmental needs. Meanwhile, AI's strengths of AI in intuitiveness, personalization, and interactivity can overcome the limitations of traditional teaching methods, demonstrating high compatibility between the two. Practically, integration can be advanced by establishing an AI-driven instructional resource system, innovating AI-supported teaching implementation pathways, and refining AI-empowered assessment and optimization mechanisms. This approach not only enriches the content and format of early childhood music curricula, enhances teaching effectiveness, and fosters children's artistic literacy and cultural awareness, but also propels the innovative transmission of Qiongya culture among young learners. Future efforts should focus on continuously optimizing AI applications and integrating them with early childhood education principles and the distinctive features of Qiongya culture. This approach better aligns technology with cultural preservation and early childhood education, achieving synergistic development and providing robust support for high-quality music education and local cultural heritage transmission.

Disclosure statement

The author declares no conflict of interest.

References

[1] Han H, 2025, Letting More People See the Beauty of Hainan Culture. Hainan Daily, 2025-09-20 (A02).

[2] Li G, 2025, Personalised Teaching Approaches for Kindergarten Music Curriculum Based on Early Childhood Development Characteristics. Young Musicians, 2025(11): 89–91.

[3] Wei Q, 2024, An Investigation into the Teaching Status of Hainan Music Culture in Higher Music Institutions. Contemporary Music, 2024(11): 31–33.

[4] Tang Q, 2024, Research on the Historical Transmission and Cultural Implications of Hainan's Revolutionary Music. Ingenuity, 2024(06): 86–88.

[5] Wan W, Yang X, 2023, Practice and Innovation of Hainan's Indigenous Music Culture in Local University Music Education. Grand View (Forum), 2023(01): 144–146.

[6] Zhang R, Yu W, 2019, Research on the Inheritance of Hainan Music Culture: A Case Study of Local Higher Music Institutions. Literary and Artistic Debate, 2019(12): 197–200.