

“Jade Nurturing” Empowerment: A Study on the Practice Model of Integrating Liangzhu Culture into Basic Education and Rural Heritage

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Abstract

The country is vigorously advancing the innovative development of outstanding traditional Chinese culture through relevant policies. Under such a policy context, Liangzhu culture serves as a key heritage that witnesses the 5,000-year unbroken development of Chinese civilization. However, its implantation into modern basic education is confronted with realistic difficulties. These hurdles cover shallow perceptions among teachers and students, monotonous approaches to interdisciplinary integration, and insufficiently rich and varied extracurricular practice activities. This study takes four primary and secondary schools in the Liangzhu area of Hangzhou as research subjects, constructs a 5Cs Framework for 21st Century Key Competences (5C education system) for Liangzhu culture based on Culture-Science, Technology, Engineering, Arts and Mathematics (C-STEAM) education theory, and reveals the cultural transmission mechanisms of each teaching link through meme propagation theory. The research also draws on practical experiences of intangible cultural heritage inheritance in surrounding rural areas, proposing a vision of collaborative inheritance between schools and villages, to offer a referenceable and operable practice plan for the long-term educational inheritance of cultural heritage.

Keywords

Liangzhu culture, Culture-Science, Technology, Engineering, Arts and Mathematics education theory, Cultural heritage, School curricula

Introduction

With the deepening of globalization, the trend of multicultural integration has strengthened further, and now it is a fundamental issue of national development to build cultural confidence and inherit traditional culture. In 2017, the General Office of the Communist Party of China Central Committee and the General Office of the State Council issued the Opinions on Implementing the Project for the Inheritance and Development of Excellent Traditional Chinese Culture.

It explicitly demands the full integration of outstanding traditional Chinese culture into moral education, cultural knowledge education, arts and physical education, and social practice education. Furthermore, it highlights a crucial task. We should take preschool, primary and secondary school textbooks as the starting point, and establish a dedicated curriculum and textbook system for Chinese culture [1].

Subsequently, the Ministry of Education further detailed the implementation path for “integration into textbooks, classrooms and campuses” in the Guidelines for Incorporating Excellent Traditional Chinese Culture into Preschool and Primary School Curricula.

Integrating traditional Chinese culture into primary and secondary school curricula and textbooks, it is a way to inspire the local education system to make full use of local cultural resources for the development of distinctive school-based curricula [2]. In accordance with this policy, identifying cultural carriers that are rich in history and education has become an indispensable step to achieve the goal of integrating them into textbooks.

As a primary result of the exploration of Chinese civilization, Liangzhu culture has been rich in archaeological discoveries and maintains an excellent state of preservation. Thus, it is an indispensable material

textbook and historical foundation for building the Chinese cultural curriculum and plays a key role in connecting top-level design with basic education [3]. About 5,300-4,000 years ago, the Liangzhu culture was mainly concentrated in the lower reaches of the Yangtze River, around Lake Tai and the Qiantang River Basin. Using advanced plow-based rice agriculture, special handicrafts, a stratified social system and a unified belief system, it had already formed a well-established early state in the beginning of Chinese history. In 2019, the Liangzhu Archaeological Site was inscribed on the List of World Heritage sites [4].

It is one of the world's remarkable prehistoric cultural wonders and an indispensable material witness and essential part of the 5,000-year continuous civilization history of China, officially inscribed on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List for its outstanding universal historical and cultural value. Its brilliant archaeological achievements include exquisite jade craftsmanship, sophisticated black pottery firing technology, systematic urban construction and large-scale major public works, etc. These fully embody the profound spirit of creation, innovation, excellence and pioneering enterprise that has been passed down in the Chinese nation to this day.

The above inherent attributes of the C-STEAM teaching model are highly consistent with the core competency cultivation objectives of current compulsory basic education in China. Meanwhile, they carry profound and tangible connotations and possess abundant and multi-layered cultural, ecological, artistic as well as practical educational values that can support the long-term inheritance of intangible cultural heritage and the comprehensive development of students' 5C literacy.

Liangzhu culture boasts profound historical connotations and multi-dimensional educational value. To comply with the fundamental requirements of fostering virtue through education and inheriting fine traditional Chinese culture in the new era, educators should fully explore and utilize its diverse educational resources. These resources are tangible, accessible and practical, which can be well applied to daily teaching practice. Therefore, Zhejiang Province has listed Liangzhu culture as one of the main cultural characteristics

for the development of the province.

The Education Bureau of Yuhang District, Hangzhou, has stated in the "Construction Plan for the Liangzhu cultural Corridor" that intellectual property-ization (IP-ization) of Liangzhu culture will be carried out to amplify the contemporary influence of this world-famous prehistoric archaeological heritage.

At present, the educational reform of Liangzhu culture is not good. Most of the teaching methods focus on the display of artifacts and superficial experience, without systematic decoding of cultural genes and inheritance mechanisms [5]. Most young learners usually have fragmented, scattered and superficial cognition of traditional excellent Chinese culture, failing to grasp the profound spiritual connotations and historical value behind Liangzhu jade wares, city sites and ritual systems.

Traditional teaching relies heavily on indoctrination, forming a rigid and single knowledge-transmission model. It is an urgent practical problem in current education to effectively break through this model and systematically construct a diversified, immersive and comprehensive cultural inheritance practice path. Meanwhile, this issue constitutes the core research difficulty that this paper aims to explore and resolve, so as to offer operable teaching strategies for the localized popularization of Liangzhu civilization in primary and secondary schools.

Current status and issues of integrating Liangzhu culture into school education

This research aims to accurately evaluate how well Liangzhu culture has been deeply integrated into the regular daily teaching system of compulsory basic education, as well as identify prominent obstacles in its actual implementation. For this purpose, the study conducts field investigations and empirical research. It selects four representative primary and secondary schools within Hangzhou's core protected zone of Liangzhu cultural relics as research objects. Adopting a rigorous mixed-methods approach that combines field investigation and large-scale questionnaires, this paper explores the current status of Liangzhu culture integrated into school education. The analysis is conducted from two key perspectives: campus culture construction and atmosphere building, and the systematic design of featured school-based courses. Detailed data are presented in Table 1.

Table 1. Basic information of surveyed sample schools.

School ID	School name	School type	School stage	Sample selection instructions
S1	Liangzhu First Primary School	Public Primary School	Grades 4-6 (Upper Elementary)	Located in the core area of Liangzhu Ancient City, the school regularly offers expanded courses on Liangzhu culture as part of its curriculum.
S2	Liangzhu No.2 Primary School	Public Primary School	Grades 4-6 (upper elementary grades)	Pilot schools in the Liangzhu area of Yuhang District participate in the district-level “Liangzhu culture into Campus” special initiative.
S3	Liangzhu Qixian Primary School	Public primary school	Grades 4-6 (Upper Primary)	In urban regular public primary schools, Liangzhu culture education is only carried out through scattered extracurricular activities.
S4	Liangzhu Gudun Road Primary School	Public Primary School	Grades 4-6 (upper elementary and middle grades)	Demonstration school of characteristic activities in the district, with a solid foundation in Liangzhu cultural and creative products and ancient city study tours.

Research found that over half (56%) of students expressed “limited understanding” of Liangzhu culture, only aware of scattered symbols like jade artifacts and ancient city ruins, but struggling to grasp its core value and spiritual significance as evidence of 5,000 years of Chinese civilization. The largest proportion of students (61%) rated their cultural affinity as “average”. A fifth-grade student admitted in an interview: “In class, we only look at pictures of jade cong and jade bi, the teacher doesn’t explain the stories behind the ancient city’s water management or ritual systems. I forgot these contents quickly, and they seem unrelated to my daily life.”

This fragmented, symbol-based teaching serves the complete Liangzhu cultural system, compounded by the influence of emerging cultural trends and utilitarian learning attitudes, resulting in weak student initiative for learning and a notable lack of sense of belonging and pride in local culture. Existing curricula also lack holistic and engaging integrated designs, further reducing Liangzhu culture education in the Zhejiang region to a fragmented, ad hoc level.

In terms of teaching resources, the integration of Liangzhu

culture content across subjects is highly concentrated in Chinese and mathematics, while subjects such as English, science, and moral and legal education are barely covered. The vast majority of students acquire knowledge through “classroom instruction”, with less than 15% learning through methods such as “visiting museums” or “group cooperative inquiry”.

A fourth-grade homeroom teacher mentioned in an interview: “There are no supporting systematic teaching materials, and I haven’t systematically studied the complete history of Liangzhu myself. In class, I can only briefly introduce the appearance of artifacts, with no time to design inquiry or hands-on activities”. Most teachers lack professional knowledge reserves in Liangzhu’s history, ritual systems, and artifact value, limiting their instruction to a superficial introduction of objects. This makes it difficult to outline the development of civilization and convey its value, and a single lecture-based approach cannot achieve interdisciplinary, experiential teaching of Liangzhu culture [6].

In terms of rich and diverse extracurricular practical

activities that match the concept of C-STEAM education, the overall standardized and sustainable implementation of Liangzhu culture-related themed activities is obviously insufficient at present.

According to the survey data, only 19% of students believe that their schools frequently organize systematic and in-depth such cultural experience activities, and even when relevant activities are occasionally carried out, they are mostly superficial and limited to one-off simple visits to museums and heritage parks without extended hands-on creations and inquiry projects. Diverse forms of practice, such as cultural and creative workshops, thematic research, cultural festivals, and community outreach, are rarely implemented [7].

Schools generally lack long-term, stable, and deeply integrated sustainable cooperation mechanisms with professional cultural resource units such as the Liangzhu Museum, heritage protection parks and local grassroots communities, resulting in intermittent and ad-hoc exchange activities that cannot form lasting educational synergy.

A large number of high-quality off-campus cultural resources have not been sorted out, screened and systematically transformed into standardized, regularly available and operable school-based teaching resources for daily classroom use. Moreover, there is no unified curriculum framework or supporting teaching manuals to guide teachers in applying these heritage resources, which greatly restricts the in-depth implementation of Liangzhu culture education in routine teaching arrangements.

Furthermore, the whole practice of Liangzhu culture popularization and education still lacks a comprehensive, scientific, quantifiable and actionable long-term evaluation system to measure its actual teaching effects. Current evaluations mostly focus on superficial indicators such as the frequency of activities and student participation, while failing to effectively assess core educational goals such as enhancing students' cultural awareness and emotional identification [8].

As a result, Liangzhu culture education has long been in a state of "emphasizing activities, neglecting evaluation, and struggling with optimization". Few targeted assessment indicators and complete evaluation systems have been set

up to measure students' cultural cognition and practical gains, making it hard to adjust teaching designs in a data-driven and targeted manner.

Construction of the 5C education system for Liangzhu culture

Theoretical foundations of c-steam education and the construction of the 5c education system

In 2020, Zhan Zehui and Zhong Baichang put forward a theoretical basis for this project, which is the Culture-Science-Technology-Engineering-Arts-Mathematics (C-STEAM) education model for Chinese scholars [9]. This model localizes and transforms traditional STEM education by adding a cultural dimension of Culture to Science, Technology, Engineering, Arts and Mathematics, thus evolving into the well-known C-STEAM educational framework with prominent humanistic characteristics.

Thus, it is interdisciplinary and centered on culture. It has the educational purpose of fostering students' core competencies, the carrier function of preserving outstanding traditional Chinese culture, and the social need to promote the development of distinct regional culture. Its core of cultural education is highly consistent with the practical demands for the inheritance and innovative dissemination of Liangzhu cultural heritage in basic education.

Based on the above research foundation, and in full consideration of the mature 5C educational stage framework widely adopted in C-STEAM education, this paper has creatively integrated profound and distinctive Liangzhu culture to put forward a systematic Liangzhu culture 5C Education System, which includes five progressive stages with clear learning objectives, layered tasks and evaluable learning outcomes.

Background and perception (C1), which focuses on experience and cultural background and perceiving the cultural context. Understanding and experience (C2) is to learn about cultural connotation and internal logic.

Creation and revision (C3), aims to produce works in line with Liangzhu culture and continuously improve the Design. Cooperation and sharing (C4) will promote the sharing of cultural achievements and show cultural appeal; and Summary and reflection (C5), is to review cultural

projects and reflect on the whole journey of culture [10]. The five stages are in line with the development of

perception and experience, practical creation, and finally summary. Detailed data are presented in Figure1.

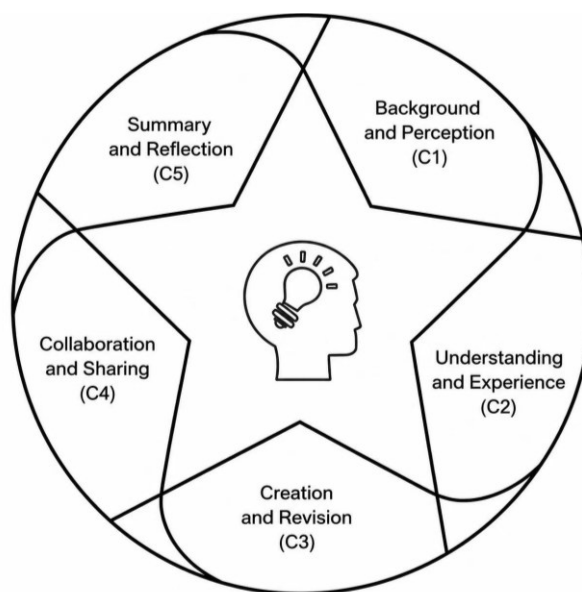


Figure 1. The 5C model of C-STEAM.

This system allows students to experience the complete process from cultural immersion to cultural export, achieving the internalization of Liangzhu culture. At the same time, the five stages correspond to five types of competencies for student development: Background and perception cultivate observation and sensitivity. Understanding and comprehension develop summarization skills. Creation and revision foster innovation and hands-on ability, cooperation and sharing enhance teamwork, and summarization and reflection build critical thinking.

Basic content and stage-based teaching methods of the Liangzhu culture 5C education system

(1) Experiencing Liangzhu culture

Field trips will be organized to take the students to the Liangzhu Museum and the Liangzhu Ancient City Ruins Park. Students are guided to learn about the development of the early states, jade culture, water conservancy and agriculture and experience them through observation and practice of Liangzhu culture.

At the place, a guide will lead the class and give some notes. Students are also asked to read related picture books and participate in group reading sessions at the themed library to share their thoughts. Through this form of immersive education, students will be able to experience the real charm of Liangzhu culture and thus spark their interest in

it. It can help the children learn to observe and acquire knowledge about the history of their hometown gradually.

(2) Understanding the Liangzhu culture

After the field trip, the students have gained some initial knowledge about the Liangzhu culture, but at this time, their understanding is still relatively shallow and lacks systematic organization and breadth.

Through guided explanations of the museum's collections and the "Liangliang Little Classroom", in conjunction with short videos and documentaries, we will systematically summarize the outstanding heritage of the Liangzhu culture in areas such as water conservancy works, jade artifacts, agricultural tools, settlement architecture, etc. It will help the students understand the core of the Liangzhu culture and be motivated to participate in group discussions. This multi-sensory teaching method can solve the problem that traditional education focuses too much on knowledge transmission and lacks student participation, it will also arouse students' interest in learning and promote their growth, critical thinking and comprehension skills by means of systematic knowledge.

(3) Creation of Liangzhu culture

Under the theme of "Liangzhu + Creativity", the five practical sessions are "Telling Liangzhu Stories", "Painting Liangzhu Art", "Reading Liangzhu Books",

“Making Liangzhu Artifacts” and “Writing Liangzhu Essays”, which allow children to experience the culture of Liangzhu through practice.

This series of practical activities combines cultural studies with other courses such as art and engineering to address the problem that there is only one way of integrating Liangzhu culture in subject teaching and to enhance students’ problem-solving abilities, hands-on skills and aesthetic sense [11].

(4) Sharing Liangzhu culture

Through major short-video channels and new media official accounts, a series of Liangzhu culture-themed graphics and short videos will be produced for wider information dissemination and expanded public influence. Students are to work in groups, and the best groups will be chosen and rewarded. They share the results of their work and learn from each other. At this time, we will build students’ sense of cooperation, language expression and communication abilities, as well as their awareness of social responsibility for cultural workers. It can enable them to feel that they are making a contribution to the spread of Liangzhu culture, to inherit and develop cultural heritage, and thus boost their sense of cultural identity.

(5) Reflections on Liangzhu culture

Organize seminars to summarize and review, reflecting on shortcomings in project implementation. Focus on four aspects: field experience, classroom instruction, group creation, and summary and promotion.

It deeply reflects on feasible paths for improving the overall quality of traditional cultural education and effectively overcoming its prominent practical deficiencies, thereby injecting lasting endogenous momentum into the long-term sustainable development of the Liangzhu culture 5C Education System rooted in local archaeological heritage resources.

This important consolidation phase hones students’ ability to think critically and view cultural heritage things dialectically, while also helping researchers continuously optimize Liangzhu culture teaching design and perfect supporting mechanisms to achieve the project’s stable and sustainable development, and lay a solid theoretical and practical foundation for the large-scale popularization and iterative upgrading of this localized heritage education

model across primary and secondary schools.

Theoretical deepening from the perspective of meme transmission

The 5C system encompasses a complete process from perception, understanding, creation, sharing, to reflection. However, going through this process does not necessarily mean that culture has been inherited. Students may simply complete various tasks, but whether the information about Liangzhu culture truly enters their cognition and remains there still requires a basis for judgment. Memetics precisely provides such a basis. First proposed by Dawkins in his 1976 book *The Selfish Gene*, this theory defines the smallest unit of cultural transmission as a “meme”, emphasizing the mechanism of cultural evolution through imitation, replication, and variation. Its core theoretical framework includes four stages of meme transmission: assimilation (the host actively accepts information), retention (the information is retained in cognition), expression (reproduction through language or behavior), and transmission (spread to new hosts).

Only when core cultural information finishes four iterative propagation stages, it can be stably recognized as inherited in education. With this theoretical standard to examine the Liangzhu cultural 5C education system and compare meme transmission stages with the hierarchical 5C framework, their clear logical correspondence is found:

“Background and perception” match meme assimilation. Teachers build vivid contexts via jade cong pictures and Liangzhu Ancient City documentaries to implant cultural memes into students’ cognition.

“Understanding and appreciation” aligns with meme retention. Lectures and group discussions help students grasp Liangzhu cultural connotations and solidify these memes in their memory.

“Creation and revision” correspond to meme expression. Students replicate cultural elements through writing, painting and handcrafts, replicating core genes while adding personalized creative variations. “Cooperation and sharing” corresponds to the transmission phase of memes - students spread the Liangzhu culture memes they have learned to others through group presentations, extracurricular practices, and digital platforms, allowing the cultural memes to reach a broader audience. One aspect

of “Summary and reflection” is evaluating the effectiveness of meme transmission - such as the degree of students’ cognitive internalization, depth of engagement,

level of creative expression, and personal willingness to spread the memes. Detailed efficacy data are presented in Table 2.

Table 2. Observation system of classroom communication effects of cultural memes.

Dimension	Observation indicators	Data collection methods	Data analysis methods
Cognitive internalization	Students’ accuracy in reproducing core cultural archetypes	In-class quizzes (fill-in-the-blank / drawing questions)	Use Excel to calculate accuracy rates of pre-class and post-class two tests
Participation depth	Contribution to group tasks, frequency of in-class speaking	Observation record forms (filled out by teachers/teaching assistants)	Frequency classification and summarization
Creative expression	Scoring on rationality and innovation of cultural symbols used in students’ works	Grading by teachers according to formulated evaluation criteria	Descriptive statistical analysis via SPSS
Willingness to disseminate	Proportion of students willing to actively share knowledge learned in this course after class	Post-class questionnaire feedback	Calculation of data proportions

The above correspondence shows that the Design of the 5C system is in line with the life cycle of cultural memes, such as acceptance and assimilation, and expression and spread. Before the start of the project, a group was formed to distribute a cultural confidence questionnaire for the students.

A second survey will be distributed near the end of the school year to collect the information. By comparing data collected from pre-tests and post-tests, this study finds that most students shifted from limited understanding of Liangzhu culture to systematic basic cognition, and their emotional attitudes toward local heritage changed from neutrality to positive recognition. To some extent, this shows that the Liangzhu culture 5C Education System has improved students’ sense of cultural identity and promoted the spread of cultural memes.

From school to village: An extended path of cultural heritage

As living cultural heritage, the Liangzhu culture needs to be nurtured in the communities of the public, not just in schools. In Yuhang District and the surrounding areas with the origins of Liangzhu culture, some villages and communities have gathered rich experience in the active inheritance of intangible cultural heritage. It can also be used to expand the 5C education system beyond school in

non-school settings. Banshan Village in Baizhang Town, Yuhang District is not a direct site of Liangzhu culture, but its practical model of cultural heritage inheritance can also serve as a reference. Banshan Village is a mountainous area close to the northern end of the Liangzhu cultural Corridor, and it has been surrounded by about 2,000 mu of bamboo forest.

It is a representative project of intangible cultural heritage in Zhejiang Province, and the Ao Fish Lantern is one of the many such municipal-level heritage sites [12]. Recently, Banshan Village has begun to explore the potential of “culture+” through the development of nature education industries and established Xiaoqiang Public Welfare Book House and Yuhang Zhixing Academy, forming a cultural education practice system for primary, secondary and tertiary students. The above measures are in line with the five stages of the 5C model.

Study of nature and field investigation fall under the “Background and perception” and “Understanding and experience” stages of the 5C model. The first two stages are to experience culture in daily life and learn about it through guided exploration and study. The practice in Banshan Village begins currently. Banshan Village has organized parent-child study classes and other activities, such as “The Life of Bamboo” and the experience program “Little Bamboo Farmers”, allowing students to enter the

large bamboo forest and learn about the whole process of cutting bamboo and digging bamboo shoots in a labor scenario.

At the same time, the historical and cultural relics of the village, such as the thousand-year-old Futuo Temple and the starting point of the Hangxuan Ancient Road (Hangzhou section), have also been added to the study routes. Students will be out of class doing some local culture exploration by themselves.

Experience and Hands-on creation of Intangible Cultural Heritage are in the “Creation and revision” stage of the 5C model. In the third stage, students are required to create their own cultural works based on what they have learned, thereby strengthening their sense of culture. Banshan Village has opened an intangible cultural heritage (ICH) workshop and now organizes many immersive ICH experience activities. Under the direction of ICH inheritors, students craft Ao’yu lanterns through frame assembly, paper pasting and pattern painting. During the revision phase, participants continuously adjust structures and polish color details to complete personalized lantern artworks.

The book *House Platform and Community Sharing* is in line with the “Cooperation and sharing” and “Summary and reflection” steps of the 5C model. The last two stages are to share our accomplishments, show off our charm and achieve cultural inheritance through reflection. The practice in Banshan Village is also like this. Xiaoqiang Public Book House is in Banshan Village; it covers about 600 square metres and has nearly 10,000 books. It regularly holds events and lectures to be a place of public culture in the village. Students can post their research ideas here, and all sorts of works created by students, such as bamboo weaving, colour painting, seal carving, etc., will also be shown to the public.

Based on the experience of Banshan Village, the Liangzhu Culture 5C Education System can be extended to rural areas to build a joint inheritance path for schools and villages. Leveraging the practice bases of intangible cultural heritage as off-campus study areas can have students experience Liangzhu culture and local life through field trips, and at the same time, public cultural areas can be constructed in rural communities to display student

works. Heirs of intangible cultural heritage can be invited to the school to act as off-campus teachers and lead students in adding elements of Liangzhu culture to traditional crafts.

Good student cultural and creative designs can be transformed into actual rural cultural products to provide students with more authentic creative circumstances for activities such as “Crafting Liangzhu Artifacts” and “Painting Liangzhu Art”. In a real rural environment, students will be able to engage in some hands-on activities that cannot be organized in the classroom, and the school’s 5C education goals can also be achieved.

It can also inspire young people to learn about and appreciate the culture of local heritage. In terms of memetics, it is to say that new transmission channels for cultural memes have been opened.

Conclusion

According to the C-STEAM theory, this paper has developed and carried out pilot applications of the Liangzhu 5C education system. Through practice, it has been found that the above model can help students gain an initial understanding of the culture efficiently.

However, two major problems in promoting it have arisen: First, in terms of teaching staff, A large number of teachers acknowledge that they possess insufficient cognition and conduct superficial research on Liangzhu civilization; consequently, their classroom teaching remains limited to basic introductory explanations. Interdisciplinary teacher training is the main bottleneck to the promotion of the 5C model. Second, in terms of school-local cooperation, although there has been some collaboration among schools and institutions such as the Liangzhu Museum and the Heritage Park, it is mainly in the form of one-off activities, and a deep cooperative mechanism based on the curriculum has not been established.

Research limitations

There are some problems in this study. The survey only recruited four public primary schools located within the core Liangzhu cultural reserve, leading to a limited sample size and narrow coverage; cross-regional comparative analyses have not yet been carried out in this research. The way that can be employed in the long term for observing and assessing cultural identity still needs improvement.

Prospects

In the future, more research can be conducted to expand the sample size, explore collaborative inheritance mechanisms involving schools and rural communities, and verify the applicability and generalizability of the 5C model in more schools and areas. “Yu Education” serves as more than merely the title of a course or research project. It also embodies an aspiration underlying this study: The cultural inheritance model constructed in the research can be passed down sustainably over time. By allowing young people to deeply immerse themselves in authentic cultural heritage resources, the program helps them establish a solid sense of recognition and confidence in their indigenous civilization. Ultimately, these youngsters can grow into active practitioners and inheritors of traditional culture.

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Conflicts of Interest

The authors declare no conflict of interest.

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