

Digital Empowerment: Educational Transformation and Digital Environmental Practice Innovation of Rongchang Tao Intangible Cultural Heritage Resources Under the Background of Chinese-Style Aesthetic Education

Shen Shihan ^{1,*}, Siti Salmi Jamali ¹ and Adzira Husain ¹

¹ School of Creative Industry Management & Performing Arts, Universiti Utara Malaysia, Malaysia

* Correspondence author: shen_shihan@ahsgs.uum.edu.my

Abstract: Guided by cultural confidence, traditional inheritance and immersive digital practice, Chinese-style aesthetic education enables the innovative digital transformation of intangible cultural heritage (ICH). As a typical southwestern Chinese ceramic ICH, Rongchang Pottery bears distinctive regional culture, craft aesthetics and humanistic values, yet it suffers from disjointed school education, simplified inheritance modes and insufficient digital practical support. This study explores its digital educational transformation and multi-scenario digital practical strategies empowered by computer technology. Adopting mixed research methods, it establishes a tiered training system of cultural cognition, skill experience and innovative digital creation, as well as an integrated digital practice model covering campuses, communities and society supported by computer virtual simulation, 3D modeling and AI intelligent evaluation systems. The results show that localized digital aesthetic education based on Rongchang Pottery effectively improves students' cultural literacy, aesthetic taste, practical abilities and cultural identity. It also breaks classroom boundaries, realizes immersive digital ICH inheritance and builds a scalable regional digital aesthetic education model. Furthermore, this paper clarifies the correlation between Chinese-style aesthetic education, computer digital technology and ICH revitalization, fills research gaps in regional ceramic ICH digital integration, and offers theoretical and practical references for traditional craft inheritance, high-quality regional digital aesthetic education and cultural heritage education. This study explores its educational transformation and multi-scenario practical strategies, and integrates computer digital technology including virtual simulation, 3D scanning restoration, AI scoring and digital media operation to optimize teaching, display and evaluation links in full teaching chain.

Keywords: Chinese-style aesthetic education; Digital empowerment; Computer digital technology; Rongchang Tao; intangible cultural heritage; digital educational transformation; digital environmental practice; traditional craft inheritance

1. Aims and Background

1.1. Research Aims

This research aims to construct a systematic framework for the digital educational transformation of Rongchang Tao (a national intangible cultural heritage, ICH) resources under the background of Chinese-style aesthetic education, explore innovative digital paths for environmental practice empowered by



computer digital technology including virtual simulation, 3D digital reconstruction and artificial intelligence evaluation, and verify the practical effects of the digital transformation model. It further provides a replicable reference for the inheritance of traditional ceramic ICH and the high-quality development of regional digital aesthetic education, and promotes the integration of excellent traditional culture and computer digital technology into the whole process of aesthetic education.

1.2. Research Background

1.2.1. Policy Background of Chinese-Style Aesthetic Education

Aesthetic education is an important part of the all-round education system of "moral, intellectual, physical, aesthetic and labor" in China [1]. In recent years, the state has continuously strengthened the top-level design of aesthetic education. The Opinions on Comprehensively Strengthening and Improving School Aesthetic Education in the New Era and the Notice on Comprehensively Implementing the Immersion Action of School Aesthetic Education issued by the Ministry of Education clearly propose to build a modern school aesthetic education system with Chinese characteristics, integrate excellent traditional cultural resources into aesthetic education, and take "immersion" as the core path to realize the educational value of aesthetics [2]. Chinese-style aesthetic education adheres to the guidance of "fostering morality and cultivating people", roots in the life of the times, carries forward the spirit of Chinese aesthetic education, and emphasizes the integration of cultural inheritance, aesthetic practice and digital innovation [3].

1.2.2. Current Situation and Value of Rongchang Tao ICH

Rongchang Tao, one of the "Four Famous Pottery in China", has a firing history of more than 2,000 years dating back to the Han Dynasty (Figure 1). Its production technology was included in the national intangible cultural heritage list in 2011. With the artistic characteristics of "red as jujube, thin as paper, bright as mirror, and sound like chime", it has high historical, cultural and artistic value [4]. It has a complete production process of 24 steps, including mud selection, mud drying, mud grinding, shaping, carving and glazing, and its decorative techniques such as makeup soil carving, paper-cut decal and plant ash glaze are unique [5].

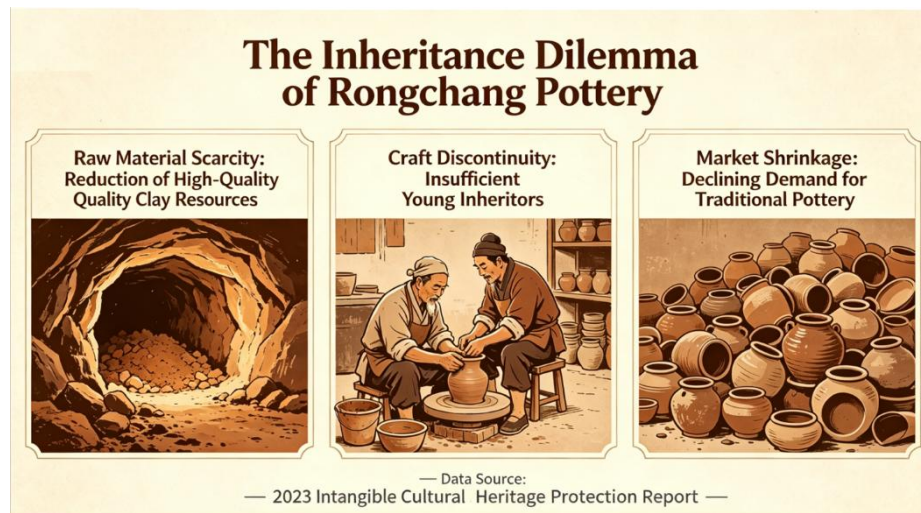


Figure 1. Historical evolution, artistic characteristics and inheritance dilemma of Rongchang Tao intangible cultural heritage

However, Rongchang Tao faces challenges such as the loss of traditional crafts, the aging of inheritors, and the disconnection between inheritance and modern education [6]. It is urgent to rely on aesthetic education to activate the educational value of ICH resources and realize the creative transformation and innovative development of Rongchang Tao culture [7].

1.2.3. Research Status at Home and Abroad

Foreign studies mostly focus on western aesthetic education concepts, and rarely combine computer virtual simulation, digital modeling, 3D reconstruction and other information technology to reconstruct

craft teaching scenes, lacking quantitative intelligent evaluation of practical teaching effects relying on computer algorithms [8]. Domestic studies have carried out preliminary exploration on ICH aesthetic education, but there are insufficient systematic researches on digital environmental practice paths, the application of computerized quantitative evaluation systems, the construction of digital ICH resource libraries, and the quantitative evaluation of practical effects supported by AI scoring tools [9]. There is an urgent need to carry out in-depth research combining the background of Chinese-style aesthetic education and computer digital empowerment [10].

1.3. Research Significance

1.3.1. Theoretical Significance

This research enriches the theoretical connotation of Chinese-style aesthetic education, expands the research perspective of the educational transformation of ICH resources, and constructs a theoretical framework for the integration of Rongchang Tao ICH and aesthetic education, providing theoretical reference for the research of similar traditional ceramic ICH [11].

1.3.2. Practical Significance

It promotes the integration of Rongchang Tao ICH resources into campus aesthetic education, realizes the inheritance of crafts and the cultivation of aesthetic ability, creates a characteristic aesthetic education environment with regional cultural characteristics, enhances students' cultural confidence and national identity, and provides practical cases for the inheritance and innovation of ICH and the high-quality development of regional aesthetic education [12-13].

1.4. Research Content and Innovation Points

1.4.1. Research Content

First, this paper analyzes the connotative characteristics of Chinese-style aesthetic education and the educational value contained in Rongchang Tao intangible cultural heritage resources [13]. On this basis, it constructs a systematic educational transformation model of Rongchang Tao ICH resources, which includes a hierarchical curriculum system, diversified teaching methods, and a three-dimensional teacher training mechanism [14]. Meanwhile, it explores multi-dimensional innovative pathways for environmental practice from the three aspects of campus, community and social space [15]. Finally, through empirical research such as questionnaire surveys and controlled teaching experiments, this study verifies the practical effects of the above transformation model, and puts forward targeted optimization strategies according to the existing problems in the implementation process.

1.4.2. Innovation Points

(1) Perspective innovation: Integrate Rongchang Tao ICH resources into the research background of Chinese-style aesthetic education, introduce computer digital technology as core empowerment carrier, and build a "culture - aesthetic - digital practice - computer intelligent evaluation" integrated research framework.

(2) Model innovation: Construct a hierarchical and progressive educational transformation model suitable for different age groups, and form a characteristic curriculum system and teaching methods.

(3) Practice innovation: Propose a multi-dimensional digital environmental practice innovation path integrating campus, community and society, and realize the immersive, online-offline integrated inheritance of Rongchang Tao culture based on computer technology including virtual simulation teaching, 3D pottery scanning restoration, AI creation evaluation and new media digital communication of Rongchang Tao culture.

2. Experimental Section

2.1. Research Objects

This research selects 3 schools in Rongchang District, Chongqing, including 1 primary school (Anfu Central Primary School), 1 junior high school (Anfu Middle School) and 1 senior high school (Rongchang Tao Culture Characteristic High School), as the experimental research objects. A total of 600 students and 30 art teachers are selected, and the basic information of the research objects is shown in Table 1.

Table 1. Basic Information of Research Objects

School Type	Number of Students	Age Range	Number of Art Teachers
Primary School	200	8-12 years old	10
Junior High School	200	13-15 years old	10
Senior High School	200	16-18 years old	10

2.2. Research Methods

2.2.1. Literature Research Method

This study systematically adopts the literature research method as the fundamental theoretical approach to fully grasp the research context, theoretical basis and practical progress related to the theme. Through multi-channel and multi-dimensional collection, collation, classification and in-depth interpretation, a comprehensive and rigorous theoretical basis and literature support system for this research is constructed. Specifically, the research comprehensively collects and combs domestic and foreign authoritative literature, national and local policy documents, official archives, academic papers, monographs, research reports, industry standards and historical materials closely related to the core topics of this paper. The literature scope covers four key dimensions: first, the core connotation, value orientation, implementation principles and practical paths of Chinese-style aesthetic education in the new era, as well as the policy requirements and theoretical research results of integrating excellent traditional culture into school aesthetic education; second, the historical evolution, craft characteristics, cultural value, protection status and inheritance dilemmas of Rongchang Tao intangible cultural heritage; third, the theoretical models, practical cases and experience summaries of the educational transformation and innovative development of intangible cultural heritage resources; fourth, the construction strategies, implementation modes and evaluation systems of environmental practice and immersive inheritance in the field of traditional craft education. On this basis, the research further sorts out the logical relationship between Chinese-style aesthetic education and the inheritance of intangible cultural heritage, summarizes the existing achievements, controversies and deficiencies in domestic and foreign related research, clarifies the current research focus and development trends, and identifies the entry point and innovation space of this study. Through systematic literature analysis and theoretical induction, this paper clarifies the theoretical framework, research ideas and logical main line of the educational transformation and environmental practice innovation of Rongchang Tao intangible cultural heritage resources under the background of Chinese-style aesthetic education, so as to lay a solid, sufficient and reliable theoretical foundation for the construction of the educational transformation model, the design of environmental practice paths and the development of empirical research.

2.2.2. Investigation Method

(1) Questionnaire survey: Design questionnaires for students and teachers respectively, to investigate the current situation of students' understanding of Rongchang Tao culture, aesthetic ability and learning willingness, as well as teachers' teaching status, professional ability and training needs. A total of 630 questionnaires are distributed, and 612 valid questionnaires are recovered, with an effective recovery rate of 97.1%.

(2) Interview method: Conduct in-depth interviews with 10 Rongchang Tao ICH inheritors, 20 school administrators and art teachers, and 30 students, to understand the difficulties and needs in the process of educational transformation and environmental practice of Rongchang Tao resources.

2.2.3. Experimental Research Method

Carry out a one-year experimental teaching in the experimental schools, implement the educational transformation model and environmental practice path of Rongchang Tao resources constructed in this research, set up a control group (using traditional aesthetic education teaching mode) and an experimental group (using the Rongchang Tao characteristic aesthetic education teaching mode), and compare and analyze the changes of students' aesthetic ability, cultural cognition and practical ability before and after the experiment.

2.2.4. Case Analysis Method

Select typical cases of digital environmental practice of Rongchang Tao resources in experimental schools, such as the construction of campus digital pottery culture environment, online cloud pottery experience community, digital exhibition hall, community offline pottery experience activities, and social

digital exhibition and exchange activities, to conduct in-depth analysis and summarize the innovative experience and existing problems of computer-aided ICH inheritance.

2.3. Construction of Educational Transformation Model of Rongchang Tao ICH Resources

2.3.1. Construction Idea

Adhere to the core concept of Chinese-style aesthetic education of "fostering morality and cultivating people", take the educational value of Rongchang Tao ICH resources as the core, follow the cognitive rules and aesthetic development characteristics of students of different ages, and construct a hierarchical, progressive and systematic educational transformation model integrating curriculum, teaching and evaluation.

2.3.2. Hierarchical Curriculum System

According to the age characteristics and cognitive level of students in primary, junior high and senior high schools, a three-level curriculum system of "perception - experience - innovation" is constructed, as shown in Table 2.

Table 2. Hierarchical Curriculum System of Rongchang Tao Aesthetic Education

Stage	Curriculum Orientation	Core Content	Weekly Class Hours
Primary School (Grades 3-6)	Cultural Perception & Aesthetic Experience	Basic historical culture of Rongchang Tao, artwork appreciation, simple hand-building and clay experience	1 period
Junior High School (Grades 7-9)	Skill Mastery & Aesthetic Appreciation	Traditional pottery techniques, carving and glazing, craft aesthetic analysis	2 periods
Senior High School (Grades 10-12)	Innovative Creation & Cultural Inheritance	Intangible heritage craftsmanship learning, modern integrated design, cultural research and creative practice	2 periods + extracurricular practice

2.3.3. Diversified Teaching Methods

Integrate the characteristics of Rongchang Tao crafts and the laws of aesthetic education, and adopt diversified teaching methods:

(1) Immersive experience method: Invite ICH inheritors to enter the classroom, and students personally experience the whole process of Rongchang Tao production from mud processing to firing (Figure 2).



Figure 2. On-site practical experience of Rongchang Tao craftsmanship guided by intangible cultural heritage inheritors

(2) Situational Teaching Method. Immersive cultural scenarios centered on Rongchang Tao are constructed in teaching. Off-site learning activities, including field visits to Rongchang Pottery Museum

and Antao Town, are organized to strengthen students' intuitive perception, aesthetic cognition and cultural empathy towards local intangible cultural heritage.

(3) Project-based learning method: Take "Rongchang Tao innovative design" as the project, and students complete the design and production of works through team cooperation.

(4) Digital computer-aided teaching method: Rely on computer virtual simulation technology to digitally restore the whole 24-step production process of Rongchang Tao, simulate high-risk, high-cost complex processes of firing and glazing which cannot be repeatedly operated in classrooms, build a computer 3D model library of Rongchang Tao classic pottery types and decorative patterns for students to conduct digital disassembly, transformation and creative splicing online; develop AI auxiliary design plug-ins to help students combine traditional craft elements with modern digital modeling for creative design; build cloud teaching platform to store teaching videos, craft digital models and student electronic works, realize remote synchronous teaching and online after-class tutoring.

2.3.4. Teacher Training System

To guarantee the high-quality implementation of Rongchang Tao intangible cultural heritage aesthetic education courses and continuously enhance the professional competence of art teachers in terms of cultural literacy, practical craftsmanship, aesthetic guidance and innovative digital teaching, this study constructs a multi-dimensional, collaborative and sustainable three-dimensional teacher training system under the joint participation of schools, ICH inheritors and universities, so as to realize the complementary advantages of practical inheritance, theoretical research and digital school-based teaching. First of all, schools regularly invite national-level and municipal-level representative inheritors of Rongchang Tao to carry out targeted craft training for art teachers, covering the core links of traditional techniques such as mud selection, billet making, carving, glazing and firing, so that teachers can accurately grasp the authentic skills and aesthetic connotation of Rongchang Tao, and lay a solid practical foundation for classroom teaching. Secondly, schools strengthen in-depth cooperation with institutions of higher education, organize art teachers to participate in advanced studies, academic seminars, special workshops and other activities in related majors of universities, guide teachers to systematically learn the theories of Chinese-style aesthetic education, educational psychology, intangible cultural heritage inheritance and protection, so as to improve their theoretical accomplishment, research capacity and curriculum development ability, and promote the transformation from pure skill teaching to integrated teaching of culture, aesthetics and digital practice.

In addition, each experimental school establishes a dedicated school-based teaching research group led by art teachers, which takes digital aesthetic education centered on Rongchang Tao as its core research theme. The team organizes regular teaching research routines including collective lesson planning, instructional design seminars, open demonstration lessons and post-class teaching reflection. More importantly, the school adds systematic training sessions focused on computer-aided digital teaching capabilities, covering four core technical modules: the operation of professional 3D modeling software for pottery reconstruction, the deployment and interactive operation of virtual simulation teaching platforms, the application and data analysis of AI intelligent evaluation systems for student works, and the whole-process production of short videos, digital brochures and interactive new media materials for cultural popularization. Through serial digital skill training, teachers can master the full set of computer tools required for online-offline integrated pottery teaching, effectively resolve prominent bottlenecks in the delivery of digital Rongchang Tao courses, such as insufficient digital teaching resources, teachers' weak technical operation ability and the disconnection between traditional craft teaching and modern digital presentation.

Through the three-dimensional collaborative training mechanism of "school + inheritor + university + digital technical support", the teaching team can effectively balance the inheritance of traditional crafts and the innovation of digital aesthetic education, and provide a stable and high-level teacher guarantee for the long-term promotion of Rongchang Tao ICH digital educational transformation and multi-scenario digital environmental practice.

2.4. *Design of Environmental Practice Innovation Path of Rongchang Tao ICH Resources*

2.4.1. Campus Environmental Practice: Build an Immersive Cultural Aesthetic Space

(1) Material environment construction: Build characteristic functional spaces such as pottery art studios, digital exhibition halls, VR virtual experience rooms, physical display halls and cultural walls in schools, deploy computer interactive touch screens to display Rongchang Tao classic works, digital 3D models, students' creative works and craft process murals (Figure 3).



Figure 3. Construction of immersive campus material space with Rongchang Tao cultural elements

(2) Cultural activity construction: Hold annual "Rongchang Tao Culture Festival", pottery art competitions and exhibition activities, and carry out theme activities such as "saying Tao, painting Tao, making Tao".

(3) Classroom environment construction: Arrange Rongchang Tao cultural elements in art classrooms, set up craft display areas and student work display areas, and create a strong cultural atmosphere.

2.4.2. Community Environmental Practice: Build a Co-Inheritance Platform for School and Community

(1) Build a community pottery experience center: Rely on community activity centers to set up pottery experience classrooms, open to students and residents, and carry out regular experience activities.

(2) Carry out community volunteer service activities: Organize students to enter the community to carry out Rongchang Tao culture promotion and experience teaching activities, and enhance residents' cultural identity.

(3) Jointly create community cultural works: Organize students, inheritors and residents to jointly create large-scale Rongchang Tao cultural works, which are displayed in public spaces such as community squares.

2.4.3. Social Environmental Practice: Build a Multi-Dimensional Inheritance and Communication Network

(1) Cooperate with cultural venues: Establish long-term cooperative relations with Rongchang Tao Museum, Intangible Cultural Heritage Exhibition Hall and other venues, and organize students to carry out research and learning activities.

(2) Carry out exhibition and exchange activities: Organize students' Rongchang Tao works to participate in domestic and foreign art exhibitions and cultural exchange activities, and expand the influence of Rongchang Tao culture.

(3) Integrate computer digital media communication: Use new media platforms such as WeChat mini-program, short video platform; rely on computer three-dimensional scanning to restore ancient pottery cultural relics, build digital cultural relic archives and develop digital collections; develop AI popular science mini-program with computer algorithm to realize automatic identification of Rongchang Tao craft patterns and one-click craft knowledge popularization; build cloud exhibition platform to display students' digital and physical pottery works online, expand the communication scope of Rongchang Tao culture through computer digital media matrix.

2.5. Evaluation Index System Construction

Construct a multi-dimensional evaluation index system covering students' cultural cognition, aesthetic ability, practical ability and cultural identity, as shown in Table 3.

Table 3. Evaluation Index System of Educational Transformation and Environmental Practice of Rongchang Tao Resources

Primary Index	Secondary Index	Evaluation Standard	Weight
Cultural Cognition	Understanding of Rongchang Tao History	Master the origin, development and historical status of Rongchang Tao	20%
	Cognition of Craft Characteristics	Understand the 24 processes and artistic characteristics of Rongchang Tao	15%
Aesthetic Ability	Aesthetic Appreciation Ability	Correctly appreciate the beauty of shape, glaze and carving of Rongchang Tao works	15%
	Aesthetic Creation Ability	Combine cultural elements to carry out aesthetic creation	15%
Practical Ability	Craft Operation Ability	Master the basic production techniques of Rongchang Tao	15%
	Innovative Design Ability	Combine modern concepts and computer digital design tools to innovate traditional crafts	10%
Cultural Identity	Cultural Confidence & Pride	Recognize the value of Rongchang Tao culture and have a sense of pride	5%

2.6. Data Collection and Processing

To systematically quantify the intervention effects of digitalized Rongchang Tao aesthetic education, this study collected mixed quantitative and qualitative data from the experimental group and the control group at two critical time nodes: the pre-test prior to the one-year experimental teaching intervention, and the post-test upon the full completion of all offline courses and computer-aided digital environmental practice activities. Multi-dimensional multi-source data were captured via three standardized computer-assisted data acquisition pipelines. First, structured questionnaires were distributed and recycled through a cloud-based computer survey platform, which automatically collected respondents' information regarding students' mastery of Rongchang Tao culture, aesthetic judgment capacity, willingness to engage in computer-based digital creation, and cultural self-identity. Second, standardized hands-on skill assessments were implemented to evaluate students' proficiency in both traditional Rongchang Tao handcraft procedures and computer digital modeling operations, including virtual pottery shaping, pattern digital carving and 3D model rendering. Third, double-blind evaluation of student creations was conducted with the support of an AI intelligent scoring system: the algorithm automatically extracted dimensional indicators such as craft completion, cultural connotation expression, aesthetic layout and digital innovation degree, then generated objective scoring benchmarks to reduce subjective bias from manual evaluation.

All recovered valid data underwent unified cleaning, encoding and normalization, and were centrally archived in a secure computer cloud database for unified retrieval and subsequent statistical analysis. In terms of statistical analysis methods, descriptive statistics were adopted to visualize the overall distribution and basic demographic characteristics of all samples. Paired-sample t-tests were utilized to compare the intra-group differences of each cohort before and after the digital teaching intervention, while independent-sample t-tests were employed to identify inter-group disparities between the experimental group and the control group at the post-test stage. The statistical significance threshold was set as $P < 0.05$. Relying on computer statistical analysis tools, this research quantitatively verified whether the digital educational transformation model empowered by computer technology could produce statistically significant improvements in students' comprehensive aesthetic literacy and practical innovation ability.

3. Results and Discussion

3.1. Results of Questionnaire Survey

3.1.1. Students' Cognition of Rongchang Tao Culture

Before the experiment, only 28.3% of the students in the experimental group had a basic understanding of Rongchang Tao culture, 45.6% had heard of it but knew little, and 26.1% had never heard of it. After one year of experimental teaching, 82.5% of the students in the experimental group had

a good understanding of Rongchang Tao culture, a significant increase compared with before the experiment, and significantly higher than 35.2% of the control group.

3.1.2. Students' Aesthetic Ability and Learning Willingness

Before the experiment, there was no significant difference in the scores of aesthetic ability and learning willingness between the experimental group and the control group ($P > 0.05$). After the experiment, the scores of aesthetic ability and learning willingness of the experimental group were significantly higher than those of the control group ($P < 0.01$), as shown in Table 4.

Table 4. Comparative analysis of students' aesthetic competence and learning willingness scores before and after intervention ($\bar{x} \pm s$)

Group	Time point	Aesthetic competence	Learning willingness
Experimental group	Pre-experiment	62.35±8.26	60.12±7.58
	Post-experiment	85.62±6.15	88.35±5.92
Control group	Pre-experiment	61.89±8.12	59.86±7.45
	Post-experiment	68.54±7.33	65.21±6.89

$P < 0.01$, vs. pre-experiment in the same group; $P < 0.01$, vs. control group at post-experiment.

3.2. Results of Experimental Teaching Effect

3.2.1. Comparison of Students' Comprehensive Ability Scores

After the one-year experimental teaching intervention and multi-dimensional environmental practice activities, the post-test data showed that the comprehensive ability scores of students in the experimental group were statistically significantly higher than those in the control group ($P < 0.01$). The comprehensive ability evaluation covered four core dimensions: cultural cognition of Rongchang Tao, aesthetic appreciation and creation ability, hands-on craft practical ability, and sense of cultural identity and pride. The results demonstrated that the hierarchical curriculum system, immersive teaching methods, and multi-scenario environmental practice path constructed in this study produced a significant positive effect on students' overall development. In terms of grade distribution, the excellent rate of comprehensive ability in the experimental group reached 68.3%, showing a large-scale improvement in students' literacy. In contrast, the excellent rate in the control group, which adopted conventional aesthetic education teaching, was only 22.5%. The extremely significant gap between the two groups fully verified that integrating Rongchang Tao intangible cultural heritage into Chinese-style aesthetic education can effectively enhance students' comprehensive quality, rather than limited improvement in single skills or knowledge.

3.2.2. Analysis of Students' Practical Works

Within the one-year experimental teaching cycle, a total of 600 qualified creative works were collected from students in the experimental group. The works were divided into two major categories: 182 digitally-generated virtual pottery models produced via computer-aided design software, and 418 physical handmade Rongchang Tao artifacts, covering practical daily tableware, ornamental art pieces, cultural and creative derivatives, and large-scale thematic installation art.

From the perspective of creative orientation, the collected works can be categorized into three distinct types. The first category contains 210 works rooted in traditional cultural inheritance, which faithfully inherit the time-honored decorative patterns, hand-carving techniques and unique glaze artistic characteristics of Rongchang Tao, fully demonstrating students' solid mastery of the core traditional craft aesthetics. The second category consists of 255 works that realize the organic integration of traditional craft genes and modern creative expression. These creations absorb contemporary life scenarios and trendy aesthetic elements, and adopt computer digital creation technologies including three-dimensional parametric modeling, VR virtual craft presentation and digital texture mapping, endowing Rongchang Tao with distinctive modern visual language and contemporary expressive power. The third category includes 135 pioneering experimental works that make innovative breakthroughs in vessel molding logic, structural design, manual craftsmanship and digital material simulation. Students leveraged computer simulation tools to test the visual effects of composite digital materials, breaking the expression limitations of traditional clay raw materials and fully highlighting their independent innovative thinking and exploratory practical awareness.

On the whole, the student creations presented a prominent integration feature of traditional craft heritage and digital innovative expression. Students were capable of transforming theoretical knowledge of Rongchang Tao craftsmanship into tangible physical artifacts and digital virtual models, and flexibly combined aesthetic perception with computer-aided innovative design. A batch of outstanding physical pottery works and digital model achievements were selected for display at the Chongqing Intangible Cultural Heritage Art Exhibition, gaining consistent positive evaluations from professional craft inheritors, art educators and industry experts. Such feedback further corroborates that the digital educational transformation framework constructed in this study can effectively cultivate students' hands-on practical capability and digital innovative design literacy.

3.3. Results of Environmental Practice Effect

3.3.1. Campus Environment Effect

The construction of the immersive campus cultural environment has created a strong atmosphere for the inheritance of Rongchang Tao culture. The number of students participating in pottery interest activities has increased from 120 before the experiment to 480 after the experiment, and the participation rate has reached 80%. The campus pottery culture festival has become a characteristic brand activity, enriching the forms of aesthetic education activities.

3.3.2. Community and Social Environment Effect

The community pottery experience center has carried out 45 offline experience activities + 28 online computer virtual pottery cloud experience activities, serving more than 2,000 residents online and offline, and enhancing the community's cultural identity. Students' physical and digital pottery works have participated in 8 domestic and foreign offline exhibitions and 5 online cloud digital exhibitions; the short videos, 3D digital craft demonstration animations of Rongchang Tao culture shot by students have been played more than 5 million times on new media platforms, expanding the social influence of Rongchang Tao culture through computer digital communication matrix.

3.4. Discussion

3.4.1. Effectiveness Analysis of Educational Transformation Model

The experimental results show that the hierarchical educational transformation model of Rongchang Tao ICH resources constructed in this research is effective. The "perception-experience-innovation" curriculum system conforms to the cognitive rules of students of different ages, and diversified teaching methods such as immersive experience and project-based learning significantly improve students' learning interest and participation. The "school-inheritor-university" teacher training system solves the problem of insufficient professional ability of aesthetic education teachers and provides a guarantee for the implementation of characteristic courses.

3.4.2. Innovation Value of Environmental Practice Path

The multi-dimensional environmental practice path integrating campus, community and society realizes the immersive inheritance of Rongchang Tao culture. The campus environment construction creates a cultural atmosphere for daily aesthetic education, the community environment practice builds a bridge between school education and social life, and the social environment practice expands the space for cultural inheritance and communication. This "trinity" environmental practice model breaks the limitation of traditional classroom teaching and realizes the integration of aesthetic education and life practice.

3.4.3. Existing Problems and Causes

(1) Unbalanced resource allocation: There are differences in the construction of pottery art venues, digital VR experience rooms, computer design equipment and the allocation of teachers in different schools, and the digital equipment and resource allocation in rural schools is relatively insufficient.

(2) Difficulty in integrating traditional crafts and modern digital innovation: Some students have a single understanding of traditional crafts, lack proficiency in operating computer 3D modeling, virtual simulation design software, and it is difficult to integrate modern digital design concepts and elements in the creation process.

(3) Insufficient long-term mechanism construction: The current practice activities are mostly carried out relying on projects, and the long-term and sustainable development mechanism needs to be further improved.

3.4.4. Optimization Strategies

(1) Strengthen digital resource integration and sharing: Establish a regional Rongchang Tao digital aesthetic education resource sharing cloud platform based on computer server, realize the sharing of digital pottery models, virtual simulation teaching resources, online training courses, teachers, venues and course resources, narrow the digital equipment gap between urban and rural schools.

(2) Deepen the integration of tradition and digital modernity: Invite digital designers, computer modeling technicians and inheritors to jointly develop digital innovative courses, teach students to use computer auxiliary design software to extract traditional cultural elements and integrate them into modern digital modeling creation, and enhance the digital innovation of works.

(3) Improve the long-term development mechanism: Incorporate Rongchang Tao aesthetic education into the school's regular teaching management, establish a multi-party cooperation mechanism of "government-school-inheritor-enterprise", and provide guarantee for the sustainable development of characteristic aesthetic education.

4. Conclusions

4.1. Main Research Conclusions

(1) Under the background of Chinese-style aesthetic education, the educational transformation of Rongchang Tao ICH resources has important theoretical and practical significance. It can effectively activate the educational value of ICH resources, enrich the connotation of aesthetic education, and promote the inheritance of excellent traditional culture and the all-round development of students.

(2) The hierarchical digital educational transformation model of Rongchang Tao ICH resources constructed in this research, with the "perception-experience-digital innovation" curriculum system as the core, diversified computer-aided digital teaching methods as the support, and the three-dimensional digital teacher training system as the guarantee, is scientific and effective. It significantly improves students' cultural cognition, aesthetic ability, hands-on practical ability, computer digital creation ability and cultural identity.

(3) Supported by computer virtual simulation, three-dimensional scanning and artificial intelligence evaluation technologies, the multi-dimensional digital environmental practice innovation framework covering campus, community and society achieves immersive digital inheritance of Rongchang Tao culture.

(4) The educational transformation and environmental practice of Rongchang Tao ICH resources face problems such as unbalanced resource allocation, difficulty in integrating tradition and modernity, and insufficient long-term mechanism. It is necessary to optimize and improve from the aspects of resource sharing, curriculum innovation and mechanism construction to promote the sustainable development of characteristic aesthetic education.

4.2. Research Limitations

(1) The research objects are limited to 3 schools in Rongchang District, and the sample coverage is narrow, which may affect the generalization of the research conclusions.

(2) The research cycle is one year, which is relatively short, and the long-term effect of the educational transformation model and environmental practice path needs to be further verified.

(3) The research focuses on the practical level, and the in-depth theoretical research on the internal mechanism of the integration of Rongchang Tao ICH and Chinese-style aesthetic education is insufficient.

(3) The research focuses on the practical level, the application depth of computer digital technology such as big data analysis, intelligent generation design in Rongchang Tao aesthetic education is insufficient, and the in-depth theoretical research on the internal mechanism of the integration of Rongchang Tao ICH, computer digital technology and Chinese-style aesthetic education is insufficient.

4.3. Research Prospects

(1) Expand the research sample scope, carry out multi-regional and multi-school empirical research, and further verify and optimize the educational transformation model and environmental practice path.

(2) Extend the research cycle, conduct long-term tracking research on students' development, and analyze the long-term impact of Rongchang Tao aesthetic education on students' cultural literacy and innovative ability.

(3) Strengthen theoretical research, deeply explore the internal mechanism and logical relationship between Rongchang Tao ICH resources, computer digital technology and Chinese-style aesthetic education, enrich the theoretical system of traditional cultural inheritance and digital aesthetic education integration.

(4) Promote the industrial integration of Rongchang Tao culture, computer digital technology and aesthetic education, develop digital cultural and creative products, VR immersive aesthetic education courses, computer online pottery training service platforms and characteristic cultural and creative products, realize the mutual promotion of cultural inheritance and digital cultural industry development, help rural revitalization and cultural power construction.

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About The Author

Shen Shihan was born in 1992 and is from Sichuan. Graduated from Sichuan Fine Arts Institute with a Master's and Bachelor's degree. Studied art research at the University of Dundee in the UK in 2018. Currently studying at Universiti Utara Malaysia, my research focuses on traditional Chinese handcraft culture, intangible cultural heritage and Rongchang Pottery in Chongqing.