



Research on the Integration of Lingnan Architectural Culture into the Curriculum System of Higher Vocational Colleges from the Perspective of Digital Transformation

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Abstract. This study, from the perspective of digital transformation, explores the integration paths and practical models of Lingnan architectural culture in the curriculum system of higher vocational colleges. With the acceleration of the educational digitalization process, the inheritance of traditional culture faces new opportunities and challenges. Through literature analysis, case studies, and practical exploration, this paper constructs a theoretical framework for the integration of Lingnan architectural culture and higher vocational courses, proposes multi-dimensional integration strategies based on digital technology, and verifies their feasibility and effectiveness through teaching practice. The research shows that digital transformation injects new vitality into Lingnan architectural culture, not only promoting students' recognition and inheritance of traditional culture but also cultivating their digital literacy and innovation ability. This study provides theoretical references and practical guidance for the inheritance and innovation of traditional culture in vocational education, and is of great significance for promoting the deep integration of local culture and vocational education.

Keywords: Digital transformation, Lingnan architectural culture, Curriculum system

1 Introduction

With the advent of the digital age, the education sector is undergoing unprecedented transformation. The deep integration of digital technology and education and teaching is reshaping the form and essence of higher vocational education. At the same time, the inheritance of traditional culture is facing the challenge of innovative development. How to maintain the vitality of traditional culture in the digital wave has become an important topic in current educational research. As an important part of traditional Chinese architectural culture, Lingnan architectural culture has unique regional characteristics and artistic value and is an important carrier of Lingnan culture. Integrating Lingnan architectural culture into the curriculum system of higher vocational colleges

not only inherits and promotes traditional culture but also enriches and enhances the connotation of higher vocational education.

In the background of the digital transformation, the higher vocational colleges are vigorously pushing forward the teaching reform and constructing curriculum system that suits the requirement of the digital era.

The application of digital technology in the educational practice of higher vocational colleges in the Guangdong-Hong Kong-Macao Greater Bay Area is very extensive, covering multiple aspects such as smart classrooms, online intelligent learning platforms, virtual laboratories, metaverse platforms, cultural digital resource libraries, and mobile learning applications [1]. As in such environment, incorporating Lingnan architectural culture as part of the higher vocational college teaching system requires overcoming the dilemma of only how to integrate traditional cultural resources with modern education's teaching content; and more, the possibilities of the new way of presentation and dissemination empowered by digital technology also need to be explored.

This project explores how Lingnan building historical heritage can be embedded into vocational teaching and learning curriculums by digital means, aiming at formulating the systematic theoretical framework and concrete applications strategies. It tries to propose new concepts for the historical preservation and utilization of the traditional culture in the process of digital learning. Based on an in-depth analysis of the basics and essence of Lingnan building as well as a pragmatic reflection on the vocational education system at present, the research will discuss the dialectical relationship between the digitization technology on two dimensions of safeguarding inheritance and new way of teaching and learning and proposes some suitable practical application concepts and operation norms based on case studies.

2 Overview of Lingnan Architectural Culture and Its Educational Value

2.1 Overview of Lingnan Architectural Culture

2.1.1 Flexible and Diverse Architectural Forms.

Due to Lingnan geographical complexity and regionally tolerant culture, different types of structures and spatial forms have emerged, including the courtyard house, Lingnan vernacular house "sanwui liangbian" style houses, and colonnade with the mixture of Chinese and Western style. Over the years, the building methods were divided into various steps of evolution, since stone-brick constructions began from plain wooden timber frames (mortise and tenon) up to combinations of brick and stone masonry (in part covered by masonry infills). The other interesting point is how spatial designs tactically address the needs, the market-friendliness of arcaded houses and the hydraulic friendliness of high houses, which all manifest the realistic principle of adaptable to context of Lingnan's legacy of architecture.

2.1.2 Exquisite Decorative Arts.

The Lingnan architectural decoration has unique characteristics of “delicate and symbolism”. According to different technical means, the Lingnan architectural decoration forms a comprehensive artistic pattern, with the themes based on classical models, local stories, as well as local cultural content. Formally, they all have well balanced composition which do not lack legibility, dynamic color systems that attain harmonious visual effect, and a fine degree of craft technology that comprehensively considers their functionalities. The ornaments not just focus on the aesthetics of the building, but also present or illustrate with great richness of meaning, many cultural contents and sense of shared memories, which can become useful cases for understanding Lingnans society and philosophy.

2.2 Educational Value of Lingnan Architectural Culture

2.2.1 Cultural Identity and Inheritance Value.

Being an indispensable part of China’s cultural diversity, the adoption of Lingnan historical architecture and culture in vocational education provides a significant medium and channel for the effective realization of cultural heritage protection and cultural identity construction. The systematic cultural activities allow students to generate stronger feelings and values of identification with local cultures and thus enhances the cultural self-confidence and culture sense[2]. Thus, it can make excellent progress in the full integration of the traditional cultural factors as well as promoting students to be active developers of cultural inheritance. Creatively interpret and adapt to the Lingnan architectural culture under the modern cultural background, which makes the continuous replication of Lingnan cultural code in the modern cultural society.

2.2.2 Professional Skills and Innovation Ability Cultivation.

The Lingnan architecture culture provides rich inspiration and material for the vocational education and a complete sets of architectural technology of the unique Lingnan building vocabulary, craftsmanship and material application. This incorporation of cultural factors in teaching and learning models in built environment studies, spatial design and creative industry educations, would also contribute to augmenting the specialized knowledge banks of learners with aspects of intercultural cognition and cultural re-making ability. It is worth mentioning that the vernacular strategies of contextual-adaptive designing and decorative craftsmanship in Lingnan traditional building produce direct objects of professional training to students and stimulations for conceptual creation.

2.2.3 Education on Sustainable Development Concepts.

Thus, the sustainable ecology spirit in Lingnan architectural culture is the specific practices of traditional ecology concepts in China. These integration, adaptation to seasons and environment, eco-cultural, human and social sustainable ecology spiritual concept is very instructive today [3]. By exploring the responsive to the climate passive design skills and the environmental using of green material, and also “humanity-nature

harmony” environmental thought of Lingnan heritage works, the students can achieve integrity green civilization cognition. Such vocational training induces occupational ethic of technics-nature balance and can open promising lines of the way for training environmental-friendly professionals with green competencies.

3 The Current Situation and Challenges of the Curriculum System in Higher Vocational Colleges

3.1 Current Situation of Curriculum System in Higher Vocational Colleges

3.1.1 Modular Curriculum Design.

The concept of a modular curriculum architecture surpasses the more traditional discipline-based curriculum structures. It can be achieved by modifying the pedagogical material and reorganize into competency units, thus expanding the learning modes for delivering the curricular content. The widely accepted curricular modular categories include professional base, technical subject, career option specializations and further applications which can be structured as compulsory and elective offerings to formulate flexible learning routes. Such independent but complementary modules allow students to tailor their studies for their career ambitions but in a way that serves the architecture as a whole. This modularity also allows curriculum revision to be addressed and aligned with evolution in the domain space (industry in the sense mentioned here) in order to optimise responsiveness and lookforward attributes of vocational education.

3.1.2 Practical Linkages in Industry-Education Integration.

In higher vocational education institutions, practical teaching presents an interdisciplinary model based on four levels and degrees, which are elementary sense-making exercise, situational practice drill, practice in workplaces and integrating and application project, the numbers of hours usually take more than half the course hours. Methodological tools involve mixed theory and practice-oriented courses, course design by projects and workroom learning modes. The curriculum is a three tier system that includes learning centers on campus, study abroad companies or work site and the work practices centre. The criteria and evaluation scales of both work centers are defined collaboratively to ensure educational stability.

3.1.3 Initial Exploration of Digital Transformation.

Higher vocational education towards the digital direction is showing from complex experimental aspects in all aspects and are still in the early stage of research and development. In terms of teaching resource, as the new teaching medium such as digital teaching resources library, simulated operation learning and so on are developing rapidly. The innovative pedagogy of hybrid education combining the physical and virtual world, the inverting classroom practices is also increasingly adopted. Some universities adopted innovative technology like VR/AR device and the algorithms in AI into their teaching, helping students build up vivid knowledge-learning conditions. However,

over time, unresolved issues appear as asymmetries in the uptake of technology, shallow digitisation of technologies, and the fragmentation of adopting new pedagogical models.

3.2 Challenges Faced by the Current Curriculum System

3.2.1 Difficulty in Integrating Cultural Content with Professional Courses.

Lingnan Architecture Heritage Integrated into Vocational Courses Facing Obstacles: First, there is no system theory framework and ideological methodology for courses at the educational level, which further becomes difficult to define the subject content and subjects' connection with the subject that belong to the characteristics of vocational education. The pedagogical implementations often follow surface mixing effect, just the multicultural elements are automatically added into the pedagogical experience, without achieving deep mixing with the disciplinary material. In addition, the diversities of disciplinary expectations on mixing culture, and the level of absorption, imply that the specific strategies for mixing and implementation have not been fully considered for various disciplines.

3.2.2 Low Degree of Digitalization of Traditional Cultural Resources.

The digital Lingnan architectural cultural resources have systemic lack and shallow use of technology. The digital resources can only focus on famous buildings, typical elements, and lack resources for typical houses and countryside buildings; resource forms are only simple media forms, with insufficient presentation forms such as 3D reconstruction and VR experience. From the perspective of resource management, the standard for resource description and systematic hierarchy is not formulated, leading to low correlation of resource. Even more importantly, the resources mostly exist for display without interactivity and teachability, so it cannot satisfy the teaching needs.

3.2.3 Dual Challenges of Teachers' Cultural Literacy and Digital Competence.

Two major obstacles for course redesign concerning educators' cultural knowledge and information technology skill are outlined. Professors have sufficient expertise in teaching and training, but they lack overall recognition of the cultural heritage knowledge of the Lingnan style building (such as overall development history, new technologies, cultural symbolic meaning, etc.) about the building. At the same time, a significant digital teaching literacy deficit spans across teachers' constituencies: early-career instructors are technically proficient yet not pedagogically experienced and senior instructors are experienced classroom practitioners yet they are not technically experienced. This fragmentation contributes to the inconsistently integrated aspects of cultural, intellectual and technological elements into the teaching practices.

3.2.4 Incomplete Evaluation System.

This current evaluation system of cultural inclusion education has some deficiencies in measurement of its curriculum results: the current evaluation indicators do not attach enough importance on cultural identity, creative thinking, art sensibility, and other cultural capabilities, but lay more emphasis on employability and employment results. From the viewpoint of the evaluation methods, test-based and performance evaluation of individual items are the main forms and an incomplete approach to multidimensional evaluation tools is present to test cultural literacy. As far as the test subjects are concerned, single teacher evaluation is the main, and an incomplete aspect of the multiple stakeholders' participation evaluation tool is being developed. It is especially clear that we lack process-based summative measurements based on learning analytics, which hinders fine-grained student cultural competency progress assessment and makes it difficult to systematically improve the teaching quality.

4 Theoretical Framework of Cultural Integration from the Perspective of Digital Transformation

4.1 The Connotation and Pathways of Digital Transformation

4.1.1 Digitalization of Educational Resources.

Digital contents conversion is the foundation for education digital transformation, transforming traditional learning resources into adaptively consumed digital form in digital environment to build the technical foundation for flipped classroom. Part of this evolution is also not only putting existing explicit knowledge carriers such as textbooks and case studies online but also starting to explicitly encode implicit pedagogical content such as how to instruct and expert practices. Nowadays, modern teaching resource digitalization evolves from coarsest-level electronic substitution to most advanced semantics composition utilizing knowledge graphs to achieve the atomic management of teaching resources with ontological design and contextual relationship and adaptable teaching resources unit design. Decentralized storage, cloud computing and microservice architectures serve as the underlying technology for the delivery of non-uniformed educational resources in terms of service availability, reliability and scalability. Standards related metadata standards, standards about interoperability, criteria for quality evaluation belong to the specifications for cross-system resource exchange. Artificial intelligence is transforming educational materials not just from static collections to dynamic personal generators – adaptive recommendation and dynamic adaptive generation engines with support for personal learner maps (mood and needs) are re-defining the creation and use of educational materials changing their usage and navigation patterns from browsing to selective pushing.

4.1.2 Digitalization of Teaching Models.

Online teaching models are a disruptive change of the teaching and learning models and are essentially the concentrated display of deep integration of digital technology

and education. Online teaching models break through the one-way knowledge transmission teaching model of traditional teaching and establish multi-dimensional interactive space around the students. The hybrid teaching oriented to digital media realizes a natural combination of online and offline education, reasonably divides knowledge learning and internal application, thus leading to a flexible and efficient teaching [4]. On the spatial dimension, ubiquitous learning environments transcend physical classroom spaces and include social territories, working spaces into the space of learning; on the time dimension, synchronous and asynchronous learning are integrated to satisfy learners' flexible scheduling demands; on the social dimension, co-learning tools and social media applications build up highly engaging communities of learning and foster emergent group intelligence. The data-driven is an important feature of digital teaching model; to conduct extensive recording of learning behavior and real-time data mining, shift the traditional teaching mode from the teaching experience to the data driven mode, so that teachers can make precise teaching intervention according to the results of learning analysis. Following the ideas from cognitive science, online teaching models are more and more putting the focus on process design and experiential optimization of learning in their efforts to boost learning motivation and engagement in learning process design, motivate learning through gamification design and immersive experience optimization, and optimize learning efficiency through cognitive load optimization and micro-learning unit design, building up a virtuous cycle system of technology empowerment and teaching innovation.

4.1.3 Digitalization of Learning Assessment.

Online assessment system integration represents an integral part of educational reform that can eliminate the limitations of traditional assessment and set up comprehensive systems to analyze and improve teaching achievement. Such next generation systems go beyond standard summative assessment schemes and adopt learning process assessment schemes, with fine grained learning analytics, in fact, the assessment is now a developmental one, rather than an achievement one. In today's environments, information on learning processes is recorded using learning management systems, mobile applications, and sensor systems, and automatically analyzing them enables recording various indicators of process such as content interaction behavior, social activity level, or task progress. Modern assessment scenarios may also involve multiple skills such as learning, motivation and learning strategies so the assessment setups become complex structures. AI solutions are useful to create complex automatic evaluation processes, especially text analysis based on NLP and practical skills certification through vision techniques via Machine Vision, radically improving the evaluation process and relieving teachers. Digital platforms strongly focus upon proactive feedback and growth to their process as well as using interactive visualizations and personal report tools to help create feedback loops for continuous improvement. They also allow peer and instructor, self, and stakeholder views for collaborative evaluation spaces to also add to the validity of evaluations through additional views of evaluation.

4.2 Theoretical Foundations of Cultural Integration

4.2.1 Cultural Ecology Theory.

The cultural ecology paradigm is derived from comprehensive surveys on the reciprocal cultural-environmental dynamics, which suggests a reciprocal relationship between culture and its respective environment where both sides must regulate their ongoing adaptations through continual mutual interaction, which also necessitates efforts for cultural conservation to adjust to corresponding and emerging socio-cultural changes. The traditional cultural ecosystem in the digital world has undergone a new technological change with the development of new dissemination paths, new expression modes, and new ways of experience brought by the new technology[5]. the traditional cultural elements (such as Lingnan building culture) can be liberated from the physical boundary via the virtual rebuilding and multidimensional display through digital space digitalization. Meanwhile, digital technology in terms of knowledge transmission has changed the transfer mode of culture from unidirectional to shared interactive production, and from the preservation of staticity to the development of dynamism. All those changes in the ecosystem demand a responsive strategy that balances between indigenous character and technology by making flourishing inheritance with reciprocal nature of indigenous knowledge and technological system.

4.2.2 Constructivist Learning Theory.

The constructivist learning paradigm argues that knowledge is achieved in a learner-centered manner rather than teachers' passive presentation and the students' active process of creating meaning with their active social interaction with the environment based within a specific cultural contexts, and only from rich situated tasks that put learning in an authentic learning activity based on the tripartite nature of contextuality, socialization, and collaborative learning[6]. Integrating Lingnan architectural heritage into the teaching plan provides students with a good cultural background and realistic problem scenarios, which can stimulate students' academic enthusiasm and promote their acquisition and effective understanding of knowledge. In the online education environment, based on 3D modeling of ancient buildings by VR technology, spreading the cultural connotation of ancient buildings through the narrative method and collaborative modeling design by exploring the principle of space, multi-dimensional methods to construct a knowledge system by practical experience to achieve a deep understanding of the building culture of Lingnan. Based on the above theoretical framework, teachers can create multi-dimensional learning spaces, systematically integrate knowledge exploration paths and social cultural practice fields, and promote students to gradually construct individual knowledge networks in contextualized interactions, and deepen cross-field cultural identification. Figure 1 is a theoretical framework diagram of cultural integration from the perspective of digital transformation, which includes research framework and digitalization of educational resources, etc.

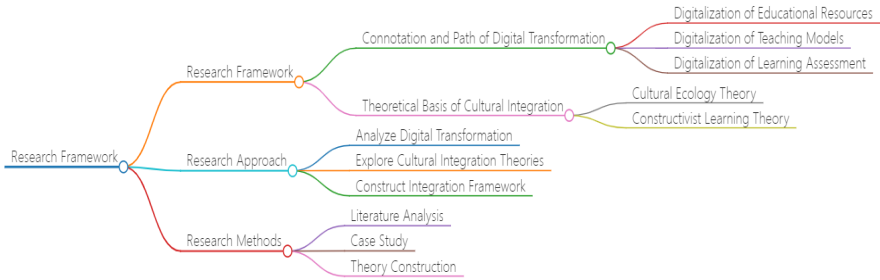


Fig. 1. Theoretical Framework Diagram of Cultural Integration from the Perspective of Digital Transformation

5 Strategies for Integrating Lingnan Architectural Culture into Curriculum Systems from the Perspective of Digital Transformation

5.1 Overall Design of the Curriculum System

Based on the background of the digital transformation, the overall system design of Lingnan architecture cultural integration into the teaching system design of higher vocational education should take the framework mode as a systematic way. Firstly, build a multi-level and three-dimensional curriculum system, with Lingnan architectural culture elements merged into the general education course, specialized education course in a hierarchy and gradient mode, establishing a knowledge system from simple to complicate. Secondly, design a module and flexible course combination. Based on the features of major disciplines, the Lingnan architecture culture is segmented into thematic modules of architectural form, decorative art, ecological wisdom, etc., the professional choices and combinations are carried out to increase the flexibility of courses, and strengthen the cross-disciplinary integration and innovation and entrepreneurship education at last. Innovation entrepreneurship courses should be set up under the cross-disciplinary teaching team model, through which interdisciplinary integration of education should be promoted and innovation ability should be cultivated. It is a whole-plan model of upholding the rational nature of the cultural connotation of Lingnan building style and thoroughly regarding higher vocational education, as well as the creativity of digitalization and smartening; it is the scientific system for the integration of inheriting and vocational education. Figure 2 presents the framework diagram of the Lingnan architectural culture curriculum system, which includes general education courses, modularized course combinations, and other contents.

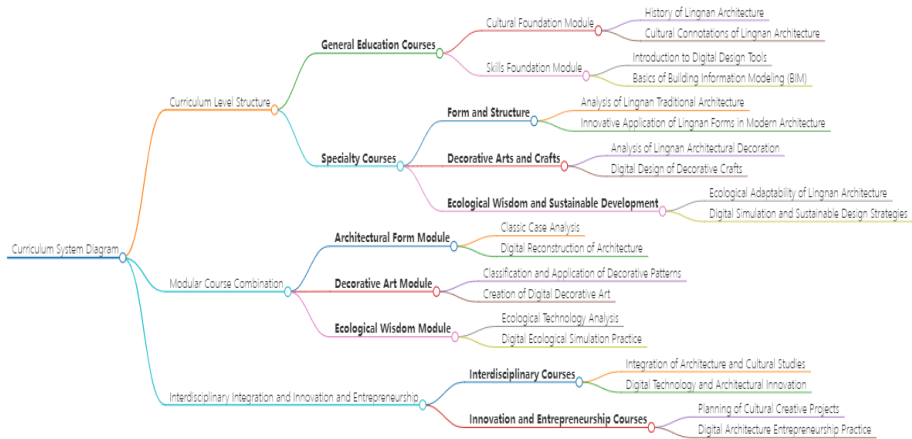


Fig. 2. Framework Diagram of Lingnan Architecture Culture Curriculum System

5.2 Construction of Digital Teaching Resources

Digitization of teaching resources becomes technical support to introduce Lingnan architectural heritage into curriculums. The design process of the series should go through three innovative approaches in sequence: First, make full use of technologies such as aerial photo of flying robot, 3D scanning, Ultra-high definition photographic technology to digitalize sample Lingnan architectures as possible, build a basic multimedia library including photo collection, video material, 3D model as well as interactive VR space etc which can be constituted as the main study library. Second, we reuse those processed data to create interactive digital textbook or online learning website featuring multiple media forms, to achieve efficient absorption of knowledge by systemic organization and on-demand information delivery. In conclusion, adopting VR, AR technology to construct virtual simulation teaching platform in architecture major to realize the digital reconstruction and operational simulation of ancient buildings and digital immersion experience. Such a three-dimensional instructional mode will further ensure not only the non-materiality characteristics of Lingnan architectural culture, but also a better teaching of Lingnan culture with vivid visual and interactive teaching. The content of digital teaching resource construction is shown in Figure 3.

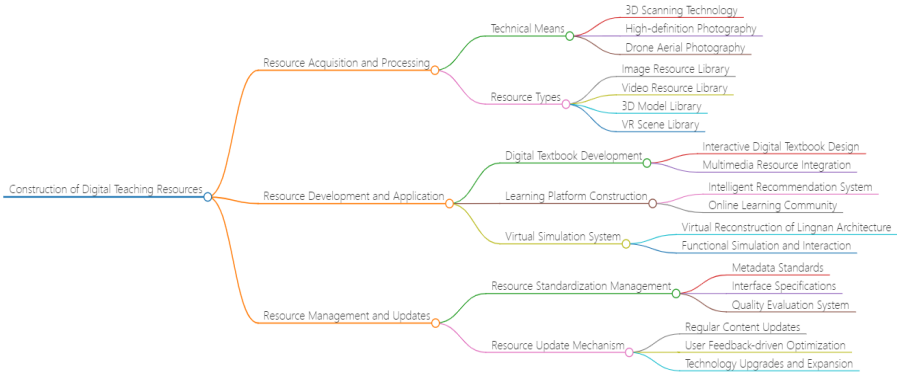


Fig. 3. Digital Teaching Resource Construction

5.3 Innovation in Digital Teaching Methods

Development of virtual learning process is the practice track for Lingnan architectural heritage entered curricula structure, specifically in three aspects: At first, problem-oriented blended learning combines online and offline learning resources and builds up problems based on Lingnan architectural heritage. In particular, this approach enables the trainees' ability to analyse topics under the premise of exploration and social learning through a collaborative learning process. In the second stage, aided by a variety of educational technologies, applied projects are developed in relevant areas for Lingnan traditional architecture, i.e. virtual reconstruction of ancient building and new interpretation of culture symbol. It not only cultivates the ability to apply technology by learning on the basis of the online technology tool, and realizes the integration of understanding in theory and applying of practice, but also the fourth, the adaptive education based on learning analytics, such as educational data mining and modeling to automatically, comprehensively, and frequently collect and analyze learning information for students so as to accurately discover needs of students and providing appropriate learning resources and personalized learning path. Combinedly, these four interrelated teaching approaches create a hierarchical progressive teaching model gradually enhancing students' holistic understanding and creative application of Lingnan architecture, thereby achieving the dual aims of cultural inheritance and professional competence improvement.

5.4 Construction of Digital Evaluation System

The construction of a digital evaluation system is the quality assurance mechanism for integrating Lingnan architectural culture into the curriculum system, including three complementary dimensions: Firstly, a diversified evaluation index system integrating cultural cognition, professional ability, digital literacy, and innovation ability should be constructed, achieving a comprehensive assessment of learning outcomes through scientific weight design. Secondly, based on process data such as learning duration,

interaction frequency, and resource access collected from the learning platform, data mining and visualization technologies should be used for learning behavior analysis, achieving dynamic monitoring and precise feedback of the learning process. Finally, an online platform for showcasing works should be established to make students' creative works on Lingnan architecture culture accessible to the public. This would involve the participation of multiple evaluation subjects such as industry experts and the general public in the evaluation process. This three-dimensional evaluation system breaks through the traditional single and static evaluation model, achieving diversification, process-oriented and socialization of the evaluation. It provides a scientific and objective quality evaluation mechanism for the effectiveness of cultural integration education.

6 Practical Cases and Effect Evaluation

6.1 Course Practical Cases

6.1.1 Practical Case of "Digital Design of Lingnan Architecture" Course.

Our innovative teaching practice for art and architecture undergraduate majors creatively integrates the protection of tradition with the innovation of digital technology. The teaching course content is skillfully designed as a three-phase instruction teaching of "basic theory+case analysis+practice project", to form an overall grasp of Lingnan traditional houses culture by the combination of theorized-practiced teaching model. In the phase of conceptual education, the system implements the trace back of Lingnan history, geographical distribution, structural features, and symbolic significance of buildings through a massive online digital archive; and then with the operation of digital analyzing module, detailed spatial restoration and constructive analyses are implemented to typical Lingnan buildings for its building wisdom and its building spirit decoding. The active part grants students the capability to conduct current digital applications such as Building Information Modeling (BIM) and parametric modeling for reutilizing traditional Lingnan design in current settings, sharing all kinds of resources on cloud-computing services and collaborating with different courses in synchronous projects from anywhere. In this way, ultimate design products are subject to immersive VR environments for multidimensional projection and exploratory evaluation, based on empirical findings such integrated digital pedagogy will simultaneously improve the students' expertise and cultural sensibility to cultivate students' talent to innovative reinterpretation of cultural heritage.

6.1.2 Practical Case of "Lingnan Architectural Decoration Art" Course.

The course is specifically aimed for the indoor decorative design programs, focusing on the unique decorative styles of Lingnan building by using the advanced teaching mode of virtual learning platform plus hands-on studio class, and successfully bridges old crafts and virtual technology. Online part: The Internet platform creates a "one-stop" digital repository with super-high-definition photos, 3D reconstruction, and detailed process video, so that the changes of Lingnan ornamentation over time, its

form and style, the connotation, and technology could be systematically researched. Hands-on lessons require the students to classify, compare and re-interpret the decoration patterns by doing hand work or combining art design elements on paper in comparison (and contrast) with traditional objects, thus further improve the artistic appreciation and cultural awareness of students. Hands-on lessons of the workshop consists of two parts “Traditional handcraft immersion” and “Digital transformation lab”. Students first learn classical handcrafts such as wood carving, ceramic making and decorative painting with a hands-on experience for material texture and craftsmanship flow, and then use photogrammetry, parametric design and additive manufacturing technology to restore them using a variety of decoration patterns, and produce new cultural products combined ancient aesthetics with modern style. Evaluation approaches comprise recursive learning status monitoring and final assessment of final performances based on rational profiling of engagement score, the studio work, and fellow review. By adopting this instructional approach, we are successfully fostering two set of capabilities: one is in the maintenance of traditional cultural and the other is in modern creation of design innovation. This is achieved by the concurrent focus on theory (theory), practice (practice), context (historical review), and technology (technology).

6.2 Effect Evaluation

6.2.1 Evaluation of Students' Learning Effects.

The researchers utilize surveying, assessment of learning results, in-depth interview techniques to establish the evaluation index system of Lingnan architectural culture curriculum concerning cultural literacy, job competence, information technology and innovation capacity and to conduct empirical research into it. The research results indicate that Lingnan architecture cultural curriculum improves students' cultural literacy and vocational competence considerably. In particular for interdisciplinary integration competence including identifying cultural motifs and digital restoration, modeling traditional ornamentations in parameters, developing cultural products, etc., people showed more adequate knowledge. Such skills are evident in both students' homework and course project work but also reflected in the students taking part in a variety of design challenge competitions thus reaffirming that the digital pedagogy has proven to cultivate positive complementarity between cultural awareness and technical practice growth.

6.2.2 Evaluation of Teachers' Teaching Effects 6.2.3 Social Response Evaluation.

A combination evaluation mechanism was established by surveying business enterprises, interviewing cultural enterprises and analysing the social media interaction data. The results indicate that the majority of the design enterprises believe that students in the degree program have good cultural innovation ability and corresponding digital skills. Cultural Heritage conservation organizations appreciate the way of cultural inheritance and approve it has achieved “living-inheritance” of cultural customs. The designs created by students have won a variety of industrial design competitions

and some of their products are adopted by enterprises in real applications or cultural product development projects. Some designs are protected by patent right. The external reviews show that our project achieves the program learning outcomes, as well as having objective values and providing positive impacts on Lingnan architecture preservation, continuation, and creative development.

7 Conclusion

The study has been conducted to explore new means on how to embed Lingnan architectural heritage into vocational education teaching curriculum via digitalization. The research findings indicate that digitalization has brought new energy to architectural relic conservation and more energy and interests to vocational education curricula, breaking the time-space limitations of past preservation as well as the curriculum constraints of traditional teaching mode. By constructing major frameworks of theory and hierarchical deployments, cultural elements were jointly integrated with related technologies, incorporating manual skills and introducing contemporary technologies to facilitate technical applications. It is especially the case that virtual or augmented realities have altered means of cultural representation and enhanced greater learner immersions and pedagogical learning effectiveness. Our qualitative data shows that such an interdisciplinary teaching practice augments students' cultural familiarity and technological literacy, while promoting digital literacy and design literacy at the same time, thus achieving complementary goals in the realm of heritage preservation and vocational training improvement.

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References

1. Deng Kaida & Dong Jie. (2024). Digital Technology Facilitating the Integration and Innovation of Traditional Rural Culture Education in Higher Vocational Colleges: A Case Study of the Architectural Interior Design Major. *Central Plains Culture and Tourism*, (08), 76-78.
2. Qin Guoqing. (2025). A Brief Discussion on the Integration of Excellent Traditional Culture into the Teaching Reform of Higher Vocational Courses in the New Era. *Modern Vocational Education*, (07), 117-120.
3. Zhong Feifeng. (2024). Sustainable Passive Energy-saving Design Strategies for Lingnan Vernacular Architecture. *Guangdong Civil Engineering and Architecture*, 31(5), 1-4+16.

4. Quan Lili. (2020). Design and Analysis of Blended Learning Mode Based on Online Teaching Platform: A Case Study of the "Information Technology Foundation" Course in Higher Vocational Education. *Computer Knowledge and Technology*, 16 (21), 128-130.
5. Yu Ni. (2024). The Rise of New Quality Productivity: Digital Technology Empowering the Inheritance and Innovation of Chinese Excellent Traditional Culture - Taking "Re-start · Shan Hai Jing" as an Example. *Art Garden*, (03), 6-11.
6. Zou Shuang. (2019). Research on the "Flipped Classroom" Teaching Model of College English from the Perspective of Constructivism. *Journal of Ezhou University*, 26 (04), 54-57.

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