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Research on the Interactivity between Aesthetic Education Courses and Professional Courses in Colleges and Universities: Taking the Environmental Art Design Major as an Example

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Abstract: Based on the policy requirements for the integrated development of aesthetic education and professional education in the new era, this study addresses the common disconnection between aesthetic education courses and professional teaching in the environmental art design major of higher vocational colleges. It innovatively proposes a three-dimensional interactivity model comprising goal coordination, content penetration, and evaluation feedback, exploring an educational reform scheme with higher vocational characteristics. Through a combination of theoretical construction and practical verification, the study develops teaching modules with regional characteristics and a school-enterprise collaboration project system, constructs a laddered curriculum structure of "theoretical cognition—technical transformation—practical application," and simultaneously establishes a dynamic evaluation feedback system. Practice has proven that this model significantly enhances students' ability to translate cultural symbols and apply material aesthetics. The study provides an actionable solution for higher vocational colleges to solve the problem of aesthetic education and professional education operating in isolation, and explores an effective path for cultivating composite design talents with technical capabilities, aesthetic literacy, and cultural understanding. In the future, it can be expanded toward the development of intelligent evaluation systems and innovation in industry-education integration mechanisms.

Keywords: Aesthetic education courses; Curriculum interaction mechanism; Environmental art design; School-enterprise collaboration

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1. Introduction

Against the strategic backdrop of high-quality development in higher education, aesthetic education, as a vital component of the "five education aspects" (moral, intellectual, physical, aesthetic, and labor education) system, its deep integration with professional education has become a key pathway to implementing the fundamental task of fostering virtue through education [1]. The Ministry of Education's Opinions on Comprehensively

Strengthening and Improving Aesthetic Education in Schools in the New Era explicitly states the need to "integrate aesthetic education throughout the entire process of school education and promote the organic combination of professional education and aesthetic education" [2]. However, a common disconnection currently exists between aesthetic education courses and professional courses in colleges and universities: aesthetic education courses often remain at the general art literacy level and fail to effectively penetrate the core teaching links of applied majors such as environmental art design. This fragmentation leads to students' design practices frequently falling into the dilemma of being dominated by technical rationality while lacking aesthetic connotation, which not only restricts the systematic improvement of their innovative capabilities but also makes it difficult to meet the industry's demand for "technology-aesthetics-culture" composite design talents [3]. How to build an interactive mechanism between aesthetic education and professional courses has become a core proposition requiring urgent resolution in deepening education and teaching reforms.

The theoretical significance of this study lies in breaking through the binary opposition between traditional aesthetic education and professional education. By exploring the symbiotic logic between aesthetic literacy and design capabilities in the environmental art design major, it constructs an integrated framework of "goal coordination-content penetration-evaluation linkage," providing a new perspective for interdisciplinary education theory. At the practical level, by optimizing curriculum structures, innovating teaching methods, and improving evaluation systems, it promotes the deep integration of aesthetic education elements into professional courses such as Home Interior Space Design and Public Space Design, aiming to solve the practical problem of "the separation between aesthetic education and professional teaching." The research results not only provide an operable paradigm for the teaching reform of environmental art design but also help transform art and design education from "skill-based instruction" to "literacy cultivation," supporting the cultivation of high-quality design talents meeting the national needs of "Beautiful China" construction, with significant promotion value and policy responsiveness [4].

Taking the environmental art design major as the entry point, this study adopts a four-stage research path of "theoretical modeling-current situation diagnosis-scheme design-practical verification," comprehensively using research methods such as questionnaires and curriculum case analysis to systematically construct a three-dimensional interactive model of "goal coordination-content penetration-evaluation linkage." The aim is to provide colleges and universities with a solution that combines theoretical innovation and practical feasibility to address the fragmentation dilemma between aesthetic education and professional courses.

2. Current review of research on the interactivity between aesthetic education and professional courses

Overseas research on the integration of aesthetic education and professional courses began earlier, with core concepts tracing back to the ancient Greek "Muse Education," which pursued "beauty and goodness in both body and mind" [5]. In modern practice, Harvard University's interdisciplinary curriculum system of "Art and Science" has significantly enhanced students' innovative thinking and cross-disciplinary integration capabilities by incorporating artistic practices into professional teaching, such as engineering and medicine, leading to an increase in patent applications [6]. The "dual-system aesthetic education" model of German Universities of Applied Sciences (FH) introduces corporate needs into classrooms, forming a closed loop of "project-driven-aesthetic penetration-technical realization," though its adaptability to art and design majors still requires verification [7–9]. The University of the Arts London in the UK uses virtual reality (VR) to build a "digital

art gallery," resulting in improved scores for spatial perception abilities among students in the experimental group. However, overseas research has two major limitations: first, when implementing Western theoretical models (such as the "Design Aesthetics" course at the Rhode Island School of Design) in Chinese universities, teaching objectives deviate due to differences in cultural symbol interpretation, highlighting insufficient cultural adaptability; second, empirical studies mostly focus on short-term effects and lack tracking of the medium-to-long-term impact of aesthetic education on students' career development [10–12].

In China, research on the interactivity between aesthetic education courses and professional courses has shown a parallel development of theory and practice in recent years. Theoretically, scholars have proposed a "function-aesthetics-culture" ternary integration model, emphasizing that environmental art design needs to balance technical rationality and artistic expression, but a systematic teaching framework has not yet been formed; in practice, some universities have attempted to promote the integration of aesthetic education into professional teaching through innovative teaching models and curriculum module development, but they still face issues such as fragmented curriculum integration, evaluation systems overly reliant on internal school assessments, and insufficient industry participation, leading to the persistent disconnection between aesthetic education and professional teaching [13,14].

Overall, the current academic discussion on the interactivity between aesthetic education courses and professional courses in China is still insufficient, especially in the field of environmental art design, where empirical research on the preliminary application of aesthetic education courses is particularly scarce [15]. This situation indicates that, under the background of deepening education reform and promoting the comprehensive development of quality-oriented education, there remains significant exploration space and academic value for in-depth research on the integration mechanism, teaching models, and effectiveness of aesthetic education and professional courses in environmental art design. This study was carried out at the School of Design (Public Art Education Center) of Hainan Vocational University of Science and Technology, exploring the interactivity between the professional core courses of the environmental art design major and the public aesthetic education courses offered by the Public Art Education Center.

3. Construction of the interactive mechanism of aesthetic education courses in environmental art design

3.1. Construction of the three-dimensional interactive model

This study proposes a three-dimensional interactive model of "goal coordination-content penetration-evaluation feedback" (Table 1), focusing on the characteristics of the environmental art design major and using the Aesthetics and Aesthetic Education course as the core carrier to systematically construct an interactive mechanism between aesthetic education and professional courses. The model forms a closed-loop teaching reform path by clarifying goal orientation, deepening content correlation, and strengthening evaluation feedback.

Table 1. Three-dimensional interactive model of aesthetic education and professional courses

Dimension	Core elements	Implementation path
Goal coordination	Enhance spatial aesthetic judgment Strengthen cultural symbol translation ability Cultivate material aesthetics application thinking	Develop the *Comparison Table of Aesthetic Literacy and Professional Competencies* to clarify the competency mapping between *Aesthetics and Aesthetic Education* and core professional courses such as *Home Interior Design*.
Content penetration	Analysis of regional architectural space aesthetics Emotional expression of interior materials Construction of light and shadow narrative logic	Develop localized teaching modules and establish a case resource library.
Evaluation feedback	Process-oriented growth files (40%) Cultural connotation of works (40%) Industry adaptability (20%)	Form a school-enterprise joint review team and conduct program discussion meetings.

3.2. Development of professional embedded courses

Taking the Aesthetics and Aesthetic Education course as an example, this study reconstructs teaching content and methods to form a progressive curriculum system of "theoretical cognition—technical transformation—practical output" (**Table 2**).

Table 2. Curriculum reconstruction framework of aesthetics and aesthetic education

Curriculum Module	Teaching Content	Corresponding Professional Courses	Class Hour Allocation	Teaching Methods
Analysis of Spatial Aesthetics	The relationship between the virtual and the real in arcade buildings / The proportional rhythm of Li ethnic group's boat houses / The decorative logic of Nanyang style	Home Interior Design	8	Scene restoration through modeling + Group discussion
Material Emotion Experiment	The rough texture of volcanic rocks / The expression of coconut wood texture / The deconstruction of color symbols in Li brocade	Building Construction and Materials	6	Laboratory operation + Case comparison
Light and Shadow Narrative Design	The interaction between natural light and artificial light / The emotional division of space by light and shadow / The aesthetics of lamp shapes	Interior Lighting Space Design	6	Field survey + Simulation software training
Cultural Translation Practice	Parametric modeling of Li ethnic patterns / The spatial translation of Danjia fishing rafts / The modern application of coconut carving elements	Furnishing and Soft Decoration Design	10	Project-based workshop

3.3. Implementation of school-enterprise collaborative projects

Focusing on the field of interior design, three types of practical projects have been developed (**Table 3**), forming an interactive chain of "aesthetic education guidance - professional deepening - industry verification," with a focus on the two-way integration of the aesthetic value of residential spaces and technological implementation.

Table 3. Matrix of school-enterprise collaborative projects in interior design

Project Type	Input from Aesthetic Education Courses	Output of Professional Courses	Implementation Process
Cultural Theme Home Furnishing	Analysis of Li Ethnic Pattern Symbols, Analysis of Spatial Proportions of Traditional Dwellings	Design Scheme for Hainan Culture-themed Residential Buildings	Survey and Mapping (2 weeks) → Conceptual Design (3 weeks) → Construction Drawing (4 weeks) → Enterprise Review (1 week)
Modern Minimalist Space	Principles of Material Texture and Color Matching, Basic Design Logic of Light and Shadow	Whole-house Design Scheme for Small-sized Apartments	Requirement Analysis (1 week) → SketchUp Model Building (3 weeks) → CAD Construction Drawing Deepening (4 weeks) → Budget Preparation (2 weeks)
Functional Home Furnishing	Analysis of Ergonomic Dimensions, Aesthetic Optimization Strategies for Storage Spaces	Design Scheme for Multifunctional Children's Rooms	Functional Planning (2 weeks) → Scheme Deliberation (3 weeks) → Detail Drawing (3 weeks) → User Testing (2 weeks)

3.4. Example of project process standardization: cultural-themed home furnishing design

First, the aesthetic education guidance stage (Weeks 1–3); Survey and mapping: conduct research on the spatial layout and decorative details of boat houses in the Li ethnic villages of Baoting, Hainan, and complete the Report on the Residential Aesthetics of the Li Ethnic Group. Symbol extraction: in the Aesthetics and Aesthetic Education course, use SketchUp (SU) software to abstract the sloping roofs and diamond patterns of boat houses into modern design languages, and generate a basic model library. Conceptual design: in line with the requirements of the Home Interior Design course, use SU to build a 3D model of the cultural - themed living room, with a focus on demonstrating the matching logic between patterned walls and wooden furniture.

Second, the professional deepening stage (Weeks 4–7); For the detailed design of the plan, use SU to improve the whole - house model, mark the main spatial dimensions and material types; generate renderings through V - Ray rendering, and adjust the natural light and shadow atmosphere. For technical drawings, use CAD to draw floor plans, elevation drawings, and detailed node drawings, mark the construction technology, and prepare the Material List to clarify the specifications and quantities of local materials such as coconut wood and rattan weaving.

Third, the industry verification stage (Weeks 8–10); Enterprise review: a review team composed of designers and project managers from the decoration companies in school - enterprise cooperation conducts the acceptance according to the Home Design Scoring Standards (**Table 4**). Feedback and optimization: For problems such as "disproportionate pattern scale" and "insufficient storage function," adjust the layout in the SU model and update the CAD construction drawings.

Table 4. Home design scoring criteria (Out of 100)

Dimension	Scoring Indicators	Weight	Tool Support
Aesthetic Expression	Cultural symbol recognition, color coordination, rationality of material matching	50%	SU model + renderings
Technical Specifications	Accuracy of dimension marking, completeness of construction drawings, feasibility of material list	50%	CAD drawings + material list

3.4. Construction of a dynamic evaluation system

Establish an evaluation framework with a linkage of "process-outcome-feedback" (**Table 5**), breaking through the traditional single-scoring model and achieving full-process interactive feedback between aesthetic education

and professional courses. Strategies for continuous improvement should also be implemented. First, coordinate teaching staff: Hold monthly joint teaching and research meetings on "aesthetic education - professionalism" to address specific issues such as "how to apply the theories of Artistic Composition to Architectural Drawing." Second, iterate resources: Update 20% of teaching cases each semester and incorporate the latest industry projects (for example, the case of "Design of Cultural Exhibition Halls in Hainan Free Trade Port" was added in 2024).

Table 5. Dynamic evaluation system for aesthetic education courses

Evaluation Dimension	Evaluation Content	Data Source	Weight
Process Performance	Research depth, collaboration ability, innovative awareness	Learning logs, classroom observation records	30%
Work Quality	Aesthetic logic, technical feasibility, cultural expression	Double-blind review (teachers + corporate mentors)	50%
Industry Feedback	Feasibility of project implementation, market recognition	Corporate scores, adoption rate statistics	20%

4. Case analysis of mechanism construction

In the traditional teaching model, the Aesthetics and Aesthetic Education course focuses on general art appreciation, lacking deep integration with core professional courses such as Home Interior Design and Public Space Design. This has led to a common tendency in students' design works of being "technology-dominated but aesthetically deficient." Industry research shows that local Hainan decoration enterprises have only a 75% satisfaction rate with graduates' "cultural interpretation ability," which significantly contradicts the demand for "regional culture + modern design" composite talents under the background of the Free Trade Port construction. Therefore, taking the three-dimensional interactive model as the core, this study systematically constructs a collaborative mechanism between aesthetic education courses and professional courses, aiming to explore a characteristic reform path for higher vocational colleges.

At the goal coordination level, the Mapping Table of Aesthetic Literacy and Professional Competencies was developed to clarify six core competency indicators such as cultural translation and material emotional expression, which were embedded in the curriculum outline of Home Interior Design. For example, in the "Spatial Aesthetics of Li Ethnic Boat Houses" module, students are required to transform the sloped roof proportions and diamond patterns of traditional boat houses into modern living room design schemes, preserving the recognizability of cultural symbols while meeting contemporary residential functional needs. In terms of teaching content, a "Local Cultural Symbol Library" was developed, integrating more than 200 digital models of Li ethnic patterns, arcade components, etc., to achieve full-process training from symbol deconstruction to design implementation. A student's work inspired by boat house patterns was adopted and implemented in a homestay project in Sanya, with enterprises feedback that it "combines cultural charm and modern minimalist style."

The reconstruction of the evaluation system is the key to implementing the mechanism. A dynamic evaluation system of "course credits + competition points + industry scores" was established, with industry scores accounting for 20%. Cooperative enterprises quantitatively assess students' works from dimensions such as cultural recognition and construction feasibility. Under this model, students actively participate in various competitions and have won multiple awards. However, two challenges have emerged during practice: first, 35% of students only stay at the formal imitation of cultural symbols and fail to deeply understand the connotation

of Li ethnic spatial philosophy; second, due to project cycle pressures, enterprises have insufficient timeliness in feedback, with only 68% of review comments returned on schedule. The above practices show that the three-dimensional interactive model has effectively improved the adaptability of design talent training through curriculum linkage and industry-education integration. However, it should be noted that there is still room for improvement in students' deep understanding of cultural connotations and the timeliness of school-enterprise collaboration.

5. Conclusions

Through the construction of a three-dimensional model of "goal coordination-content penetration-evaluation feedback," this study effectively addresses the disconnection between aesthetic education and professional teaching in higher vocational colleges. Practice has proven that this model can enhance students' cultural identification, technical application, and industry adaptability, with the combination of modular courses and dynamic evaluation forming a scalable solution. In the future, efforts will focus on developing intelligent evaluation tools, establishing school-enterprise incentive mechanisms, and constructing a "credit-competition-employment" cultivation pathway to promote the development of art and design education toward cultural inheritance, technological innovation, and industry-education integration. This will cultivate composite talents with cultural confidence and strong professional skills for industrial upgrading.

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