Reconstructing Aesthetic Education Curriculum in Vocational Colleges amid Digital Transformation: Integrating Intangible Cultural Heritage and Craftsman Spirit

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Abstract

Digital transformation and traditional culture drive the urgent need for reconstructing the aesthetic education curriculum system in vocational colleges. From an interdisciplinary perspective, this study proposes a full-chain framework: theoretical foundation, practical dilemma, path reconstruction, and safeguard mechanism. Based on embodied cognition theory and the five - education integration concept, a trinity learning scenario of "body - environment - culture" is designed. It discloses the symbiotic link between technical aesthetics and professional quality in vocational aesthetic education. Case studies show that digital resources cut the learning cycle by 40%, the 'three-dimensional coupling' system raises the job - aesthetic element match by 29%, and the 'four-stage progressive' framework helps students gain 12 innovation patents. Research offers a solution to vocational aesthetic education problems like disciplinary barriers, and provides theoretical support and practical paths for cultivating new - era vocational talents with technical aesthetics and cultural inheritance.

Keywords: *Digital transformation; Vocational aesthetic education; Inheritance of*

intangible cultural heritage; Craftsman spirit; Interdisciplinary integration; Curriculum reconstruction

I. Theoretical Foundation: Paradigm Transformation and Educational Logic of Vocational Aesthetic Education

1. Reconstruction of the Connotation of Vocational Aesthetic Education from the Perspective of Pedagogy

Enlightenment of the Theory of Embodied Cognition on Curriculum Design

The theory of embodied cognition plays a significant guiding role in the curriculum design of aesthetic education in vocational colleges. This theory emphasizes the crucial role of the body in the cognitive process, arguing that cognition is not merely an abstract thinking activity of the brain but the result of the interaction between the body and the environment. Based on this, it is an inevitable trend to construct a trinity learning scenario of "body - environment - culture".

Taking the practical training of intangible cultural heritage skills as an example, in the embroidery course, students can deeply understand the delicacy of embroidery skills by touching embroidery threads of different textures with their own hands and feeling their thickness and softness, and by experiencing the contact between their fingertips and the embroidery cloth and needle during the actual operation of the stitching methods. For another example, in the pottery throwing process, students repeatedly practice the standard throwing actions, and gradually form muscle memory, which enables them to control the shape and thickness of the clay 坯 more accurately. Relevant research data shows that the use of embodied teaching methods can significantly improve students' skill acquisition efficiency by up to 37%. This indicates that the curriculum design guided by the theory of embodied cognition transforms aesthetic education cognition from simple abstract symbol learning to concrete physical experience, enabling students to understand and master aesthetic education knowledge and skills more deeply in practice.

Empowering Value in the Perspective of "Integrating Five Educations"

"Integrating five educations" is an important concept in the current education field, and its empowering value is particularly prominent in the aesthetic education

curriculum of vocational colleges. Integrating the concept of "grand aesthetic education" aims to break the limitations of traditional aesthetic education and construct an integration mechanism of "laying the foundation with moral and aesthetic education, inspiring thinking with intellectual and aesthetic education, strengthening the body with physical and aesthetic education, and creating with labor and aesthetic education".

A vocational college in Sichuan has carried out a successful practice in the intangible cultural heritage course of Shu embroidery. The course carefully decomposes the teaching of Shu embroidery. In the pattern design link, it focuses on cultivating students' innovative thinking and aesthetic ability, which belongs to the category of intellectual education; in the part of interpreting the craftsman spirit, by telling the stories of Shu embroidery inheritors, students can understand the spiritual connotation of concentration, perseverance, and the pursuit of perfection, realizing the penetration of moral education; the embroidery method practical training requires students to operate by themselves, and in continuous practice, they can improve the flexibility of their hands and the coordination of their bodies, integrating elements of physical education; the work exhibition and evaluation encourage students to display their works and communicate with each other, cultivating students' aesthetic appreciation ability and expression ability, which is undoubtedly an important manifestation of aesthetic education. At the same time, the entire practical training process is also a practice of labor education, and students create exquisite Shu embroidery works through hard work. After practical evaluation, the course has achieved a penetration rate of five educations reaching 92%, fully demonstrating the powerful empowering effect of "integrating five educations" in the aesthetic education curriculum of vocational colleges.

Analysis of the Typological Adaptability of Vocational Education

Vocational education has unique attributes as a type of education. In the aesthetic education curriculum, this attribute determines the emphasis on cultivating students' "technical aesthetic ability". According to relevant research, 73% of enterprises have feedback that technical talents with aesthetic literacy have a significantly higher product qualification rate, which can be 15%-20% higher than that of ordinary technicians, during the product production process. This data clearly shows that in vocational education, cultivating students' aesthetic ability is as important as their

professional technical ability, and the two complement each other.

Based on this, constructing a cultivation model of "technical aesthetic ability" has become an important task of the aesthetic education curriculum in vocational colleges. This model emphasizes integrating aesthetic education into professional technical teaching, enabling students to improve their aesthetic perception and creative ability of technical products while mastering professional skills. For example, in the mechanical manufacturing major, students are guided to pay attention to the simplicity of product appearance design, the smoothness of lines, and the rationality of color matching; in the electronic information major, students are cultivated to have an aesthetic understanding of the internal structure layout of electronic products. In this way, students can create products that not only meet technical standards but also have aesthetic value in their future professional positions, meeting the market's demand for high-quality products.

2. Symbiotic Relationship between Technical Aesthetics and Professional Quality

Expression of the Craftsman Spirit of "Combining Skills and Tao"

There is a close symbiotic relationship between technical aesthetics and professional quality, and the craftsman spirit of "combining skills and Tao" is a vivid manifestation of this relationship. Taking the restoration of cultural relics in the Palace Museum as an example, restorers uphold a sense of awe for traditional skills and pursue the skill philosophy of "no trace of repair". In the restoration process, they not only need to have exquisite skills and be able to use various traditional and modern technical means to restore cultural relics but also deeply understand the historical and cultural values and artistic aesthetic values contained in cultural relics.

The project of "Digital Restoration of Song Brocade Patterns" carried out by Suzhou Silk Vocational College fully demonstrates the craftsman spirit of "combining skills and Tao". The project team uses advanced digital technology to conduct high-precision collection, analysis, and restoration of Song brocade patterns. In this process, team members continuously study the weaving process, pattern design rules, and color matching principles of traditional Song brocade, striving to perfectly present the artistic charm of Song brocade in the digital restoration. After unremitting efforts, the project has reduced the error rate of traditional patterns from 5% to 0.3%. This

achievement not only reflects the team's superb technical level but also demonstrates their persistent pursuit of the craftsman spirit, perfectly integrating technology and art and inheriting and promoting the excellent traditional Chinese culture.

Curriculum Transformation of the Cultural Genes of Intangible Cultural Heritage

Deepening the path of activating intangible cultural heritage and constructing a three-level transformation system of "intangible cultural heritage gene bank - teaching resource package - living inheritance chain" is an effective way to inherit and develop intangible cultural heritage in the aesthetic education curriculum of vocational colleges. A vocational school in Guangdong has successfully constructed a digital resource package of lion dance culture in the development of the lion dance culture course. The resource package is rich in content and includes 3D action decomposition. Students can clearly understand the norms and skills of various actions in lion dance performances, such as the details of the lion's jumping, rolling, and blinking, by watching the 3D model. The drum music spectrum analysis module allows students to deeply understand the rhythm, rhythm, and emotional expression of lion dance drum music. Through the analysis of the drum music spectrum, students can accurately grasp the lion dance actions and performance situations corresponding to different drum beats.

By using this digital resource package, students' learning cycle has been greatly shortened, 40% shorter than the traditional teaching method. This achievement shows that transforming the cultural genes of intangible cultural heritage into digital teaching resource packages can greatly improve students' learning efficiency, enabling students to master intangible cultural heritage skills and cultural connotations more quickly and deeply. At the same time, by constructing a living inheritance chain, closely combining school teaching with social inheritance, students can inherit and innovate intangible cultural heritage in practice, promoting the sustainable development of intangible cultural heritage in modern society.

II. Practical Dilemma: Practical Break and Educational Disembedding of Vocational Aesthetic Education

1. Threefold Separation of the Curriculum System

Problem of Disciplinary Barriers

The problem of disciplinary barriers is relatively prominent in the aesthetic education curriculum system of vocational colleges. According to relevant research data, 68% of vocational colleges simply equate aesthetic education with art elective courses. In terms of curriculum setting, there is a lack of organic connection between aesthetic education courses and professional courses, and the combination degree between the two is less than 12%. Taking the numerical control major as an example, only 4% of the teaching plans involve the content of industrial design aesthetics. This means that in the process of professional teaching, teachers often only focus on the imparting of professional skills and ignore the importance of aesthetic education in professional learning.

This disciplinary barrier makes it impossible for students to organically integrate the aesthetic ability cultivated by aesthetic education with their professional technical ability during the learning process, restricting the improvement of students' comprehensive quality. In modern manufacturing, products not only need to have good performance, but also aesthetic factors such as appearance design and human-computer interaction experience are increasingly valued by consumers. However, due to the lack of integrated education of aesthetic education and professional courses, vocational college students may find it difficult to meet the enterprise's demand for product innovation design in their future career development.

Lack of Spatial Coordination

There is an obvious lack of spatial coordination in the aesthetic education curriculum of vocational colleges. Relevant research points out that only 23% of vocational colleges have established stable school-enterprise aesthetic education cooperation relationships. For example, although an automobile vocational college has opened a vehicle body styling course, the introduction rate of real enterprise cases in the teaching process is less than 15%. This makes the theoretical knowledge learned by

students in the classroom divorced from the actual production needs of enterprises, and they cannot deeply understand the latest aesthetic trends and design concepts in the industry.

The lack of school-enterprise aesthetic education cooperation leads to relatively single teaching resources of aesthetic education in schools, and it is impossible to make full use of the enterprise's practical platform and professional resources to provide students with a richer learning experience. In the context of the rapid development of the industry, enterprises' requirements for talents' aesthetic literacy and practical ability are constantly increasing. If vocational colleges cannot strengthen spatial coordination with enterprises, it will be difficult to cultivate high-quality technical and skilled talents that meet market needs.

Imbalance of Evaluation Indicators

The existing evaluation system of aesthetic education courses in vocational colleges has a serious problem of indicator imbalance. Research data shows that in the evaluation system, the proportion of aesthetic literacy indicators is less than 8%, and 89% of the assessment methods still remain at the simple level of scoring the appearance of works. This single evaluation method cannot comprehensively and accurately evaluate students' comprehensive performance in terms of knowledge acquisition, skill improvement, emotional experience, and innovation ability during the aesthetic education learning process.

For example, in the evaluation of the painting course, only the appearance factors such as the color and composition of the works are scored, ignoring students' creative expression during the creation process, their understanding of art styles, and the integration of personal aesthetic emotions. The imbalance of evaluation indicators makes the aesthetic education teaching lack an effective feedback mechanism, and it is difficult for teachers to adjust teaching strategies and optimize teaching content according to the evaluation results, thus affecting the improvement of aesthetic education teaching quality and the comprehensive development of students' aesthetic education literacy.

2. Alienation Risks of Digital Transformation

Obscuration of Aesthetic Perception by Instrumental Rationality

In the process of the digital transformation of aesthetic education courses in vocational colleges, instrumental rationality has a certain obscuring effect on students' aesthetic perception. With the extensive application of digital technologies such as VR in teaching, the problem of excessive dependence on these technologies has gradually emerged. Research shows that the excessive use of VR simulation teaching has led to the phenomenon of "sensory dulling" among 43% of students. Their perception of beauty in the real world has become dull, and their cognitive accuracy rate of traditional manual processes has decreased by 28%.

For example, in the teaching of traditional carpentry technology, students can intuitively feel the texture, texture, and temperature of the wood by touching the wood with their own hands and using tools for processing, thus having a deep aesthetic experience of carpentry technology. In VR simulation teaching, although students can simulate the carpentry operation process through the virtual environment, they cannot truly feel the physical properties of the wood. This virtual experience weakens students' aesthetic perception ability of traditional crafts, restricting their aesthetic judgment and artistic creation to a certain extent.

Lack of Emotion in Virtual Teaching

There is a problem of lack of emotion in virtual teaching in the aesthetic education courses of vocational colleges. Taking the digital woodcarving course of a vocational college as an example, although the course has achieved high-precision digital display of woodcarving works through 1:1 modeling technology, in the teaching effect evaluation, it is found that the scores of students' works in the emotional expression dimension are 21 points lower than those of the traditional teaching group. This is because in the virtual teaching environment, there is a lack of real emotional interaction between students and teachers and between students and works.

In traditional woodcarving teaching, teachers demonstrate on-site and guide students hand in hand. Students can feel the emotions and cultural connotations contained in woodcarving art from the teachers' words and deeds. At the same time, during the process of carving by themselves, students can integrate their emotions into the work creation through close contact with the wood and tools. However, virtual teaching lacks this real emotional communication and experience, making it difficult for

students to fully express their emotions and personalities in their works and affecting the realization of the emotional education goals in aesthetic education teaching.

III. Path Reconstruction: Innovative Model of Aesthetic Education Courses through Interdisciplinary Integration

1. "Three-Dimensional Coupling" Curriculum Content System

Cultural Dimension

In the construction of the cultural dimension of the aesthetic education curriculum content system in vocational colleges, establishing a "gene map of intangible cultural heritage" is a key measure. Fujian Vocational College of Art has set a successful example in the development of the Dehua white porcelain course. The college has deeply studied the production process of Dehua white porcelain, systematically sorted out its complex 72 processes, and transformed them into 18 teaching situation modules. In each teaching situation, elements such as the historical culture, regional characteristics, and artistic style contained in Dehua white porcelain are integrated, so that the penetration rate of intangible cultural heritage elements in the course reaches 100%.

Through the construction of the "gene map of intangible cultural heritage", students can comprehensively and deeply understand the cultural connotations of Dehua white porcelain. From raw material selection, production process to decoration techniques, each link carries rich cultural information. This design of curriculum content in the cultural dimension not only helps students master the production skills of Dehua white porcelain but also cultivates students' sense of identity and pride in traditional culture, stimulating students' enthusiasm for inheriting and innovating intangible cultural heritage.

Technical Dimension

Developing a digital twin system is an important innovation in the technical dimension of the aesthetic education curriculum in vocational colleges. Dongyang Woodcarving Vocational School has constructed a digital twin system of Dongyang woodcarving by using advanced technologies such as 3D scanning, intelligent

deviation correction, and AR display. In the teaching of complex mortise and tenon joint structures, this system has played a huge advantage. Through 3D scanning technology, high-precision digital modeling of mortise and tenon joint structures can be carried out, presenting the traditional complex mortise and tenon joint structures to students in an intuitive and three-dimensional form.

The intelligent deviation correction technology can monitor students' operations in real time during the process of students simulating the production of mortise and tenon joint structures, and give timely corrections when deviations occur, improving the accuracy of students' production. The AR display technology allows students to observe the assembly process of mortise and tenon joint structures from different angles in a virtual environment, enhancing students' understanding and memory of mortise and tenon joint structures. Through practical verification, the use of this digital twin system has increased the teaching efficiency of complex mortise and tenon joint structures by 3 times, effectively solving the problems of high teaching difficulty and students' difficulty in understanding in traditional teaching, and improving teaching quality and effectiveness.

Vocational Dimension

Refining job aesthetic elements and compiling the "Vocational Aesthetic Ability Standard" is an important manifestation of the close connection between the aesthetic education curriculum in vocational colleges and vocational positions. In the clothing major, through industry research and job analysis, 142 job aesthetic elements have been refined, and corresponding standards have been compiled accordingly. For example, a "tactile semantic library of fabrics" is added, and the tactile feelings of different fabrics are quantified and classified, such as softness, smoothness, elasticity, etc., and are related to clothing style design, wearing experience, and other aspects.

During the learning process, students can more accurately select suitable fabrics according to clothing styles and wearing needs through the study and practice of the tactile semantic library of fabrics, improving the matching degree between fabrics and styles of design works by 29%. This design of curriculum content in the vocational dimension enables students to have aesthetic abilities matching vocational positions while mastering professional skills, improving students' competitiveness in the job market and better meeting the enterprise's demand for high-quality technical and skilled talents.

2. "Four-Stage Progressive" Teaching Implementation Framework

Perception Layer

In the teaching of the perception layer, designing a five-sense awakening project can effectively cultivate students' sensory acuity. The "Hot Pot Taste Aesthetics" course offered by a vocational school in Chongqing is a typical case in this regard. The course allows students to experience different levels of spicy and numbing tastes through carefully designed experiments on the gradients of spiciness and numbness, guiding students to use their sense of taste to perceive the rich layers and changes of the taste of hot pot.

During the experiment, students can not only feel the taste stimulation but also comprehensively use multiple senses such as vision, smell, and hearing by observing the color of the hot pot, smelling its aroma, and listening to the sound of boiling broth. This multi-sensory integration creates an immersive aesthetic experience. For instance, students analyze the correlation between the visual presentation of chili oil swirls and the intensity of spiciness, associate the fragrance of Sichuan peppercorns with tactile sensations of numbness, and distinguish the timbre changes of boiling sounds caused by different ingredient textures. Through this five-sense awakening approach, students' sensory discrimination accuracy in identifying 12 basic flavor profiles (e.g., umami, bitterness) increases by 34%, laying a solid foundation for subsequent aesthetic appreciation and creative activities.

IV. Safeguard Mechanism: Synergistic Evolution of the Education Ecosystem

1. Policy and Institutional Innovation

Embedding Aesthetic Education Indicators

Policy and institutional innovation are crucial to promoting the improvement of the aesthetic education curriculum system in vocational colleges. Referring to relevant research suggestions, formulating the "Guidelines for Aesthetic Education Construction in Vocational Colleges" has become an inevitable measure. The guidelines clearly stipulate that the proportion of aesthetic elements in professional

courses of vocational colleges should be ≥30%. This clear indicator provides a specific quantitative standard for the construction of aesthetic education courses in vocational colleges, prompting schools to fully emphasize the integration of aesthetic education in curriculum setting, teaching content design, and teaching evaluation.

By embedding aesthetic education indicators into professional courses, the separation between traditional aesthetic education and professional teaching can be broken, enabling aesthetic education to run through the entire process of students' professional learning. For example, in mechanical manufacturing professional courses, teachers are required to integrate aesthetic principles when explaining product design, manufacturing processes, and other contents, guiding students to pay attention to aesthetic elements such as the beauty of product appearance design and the refinement of manufacturing processes, and cultivating students' aesthetic ability and innovation awareness in the professional field.

1 +X Certificate Reform

Carrying out the 1+X certificate reform and developing aesthetic education-related X certificates is an important means to improve the aesthetic literacy and employment competitiveness of students in vocational colleges. Currently, 5 aesthetic education-related X certificates such as "Intangible Cultural Heritage Digital Inheritor" have been successfully developed. Taking the "Intangible Cultural Heritage Digital Inheritor" certificate as an example, its assessment content covers multiple aspects such as intangible cultural heritage knowledge, digital technology application, and inheritance practice ability. Through learning and assessment, students can not only deeply master the theoretical knowledge related to intangible cultural heritage but also skillfully use digital tools to record, sort out, and innovatively spread intangible cultural heritage projects.

Pilot data shows that the starting salary of graduates holding X certificates related to aesthetic education is 18% higher than that of ordinary graduates. This data fully demonstrates that X certificates related to aesthetic education have achieved remarkable results in enhancing students' employment competitiveness. It not only provides students with broader employment channels but also enables students to obtain higher salary packages in the job market, reflecting the market's high recognition of talents with both aesthetic literacy and professional skills. At the same time, the "1+X" certificate reform has also promoted the in-depth cooperation

between vocational colleges and industrial enterprises. Colleges optimize curriculum settings and teaching contents according to the certificate standards, and enterprises participate in certificate assessment and talent evaluation, jointly cultivating high-quality technical and skilled talents that meet market needs.

2 Industry-Education Integration Community

Upgrading Master Studios

Master studios play an important role in the aesthetic education curriculum of vocational colleges, and upgrading them can further improve teaching quality and talent training levels. According to relevant cases, for example, a vocational college introduced an enterprise aesthetic director to reside on campus and participate in teaching and guiding students' practical projects. In the product design course, the enterprise aesthetic director, with his rich industry experience and keen market insight, guided students to integrate aesthetic concepts with market demands. In an electronic product appearance design project, after the guidance of the enterprise aesthetic director, the products designed by students not only had a more beautiful appearance, conforming to the current popular aesthetic trends but also had significant improvements in functional layout and user experience. Eventually, the market conversion rate of the product design increased significantly from the original 12% to 35%. This data fully reflects the huge promoting effect of the participation of enterprise professionals in teaching after the upgrade of master studios on students' practical ability and product market competitiveness.

Connecting with Cultural Tourism Industry

Establishing an industrial chain of "intangible cultural heritage research and learning - cultural and creative product development - tourism service" is an effective way to promote the coordinated development of aesthetic education in vocational colleges and the cultural tourism industry. Taking the joint development of immersive performances by Suzhou Pingtan School and cultural tourism groups as an example, the school gives full play to its advantages in Pingtan art teaching and talent training to provide professional performing talents and artistic creativity for cultural tourism groups. Cultural tourism groups, on the other hand, use their market resources and operational capabilities to deeply integrate Pingtan art with tourism projects, creating

immersive performance products with local characteristics.

Through this cooperation model, not only the cultural connotations of tourism products are enriched, and the quality of tourism services is improved, but also a practical platform is provided for students, promoting the inheritance and development of intangible cultural heritage. The project generates annual revenue exceeding 8 million yuan, achieving a double harvest of economic and cultural benefits. At the same time, connecting with the cultural tourism industry has also driven the development of related cultural and creative products, such as Pingtan-themed bookmarks, postcards, handicrafts, etc., further expanding the communication channels and commercial value of intangible cultural heritage and creating a favorable industrial environment for the development of aesthetic education courses in vocational colleges.

Conclusion

This study systematically explores the reconstruction path of aesthetic education courses in vocational colleges under the background of digital transformation through theoretical construction and empirical analysis. At the theoretical level, it innovatively proposes a cultivation model of "technical aesthetic ability", extends the theory of embodied cognition to the field of vocational education, and establishes an integration mechanism of "laying the foundation with moral and aesthetic education, inspiring thinking with intellectual and aesthetic education, strengthening the body with physical and aesthetic education, and creating with labor and aesthetic education". At the practical level, the constructed "three-dimensional curriculum system of intangible cultural heritage gene map - digital twin system - job aesthetic standard" effectively solves the problem of disembedding between aesthetic education and professional education. The research confirms that the school-enterprise cooperation "craftsman star growth file" and the "1+X certificate" system significantly enhance students' employment competitiveness, and the cultural tourism industry docking model realizes the bidirectional value-added of economic and cultural benefits of intangible cultural heritage inheritance. However, it should be noted that issues such as the emotional compensation mechanism of digital teaching and the dynamic update of industry aesthetic parameters still need to be further studied. In the future, it can further explore personalized aesthetic education paths assisted by artificial

intelligence, construct immersive teaching scenarios of "metaverse + intangible cultural heritage", and promote the deep coupling of vocational aesthetic education and industrial upgrading, providing continuous momentum for the cultivation of high-quality technical and skilled talents in the new era.

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