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Exploration on the Teaching Reform of Cultural and Creative Product Design Based on the Cultivation of Art and Labour Integration Talents

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Abstract The teaching mode of art-industry integration talent cultivation is a project-driven design education mode based on the combination of art and skill constructed. The research in this paper explores the creative practice of cultural and creative product design, takes the effectiveness of the combination of art and craft and practice as the evaluation basis, and proposes a PCA point cloud alignment algorithm based on feature matching, so as to realize the innovation of teaching cultural and creative product design. The normalization of point cloud coordinates is achieved by PCA, and the current state prediction and covariance are obtained based on the normalized results. The results show that in the demand analysis of cultural and creative product design, the Kano value of students' knowledge development demand reaches above 0.703. It shows that in the art-industry fusion talent cultivation mode, the effectiveness of practical teaching should be taken as the research acceptance standard, so as to explore a new mode and a new path about the cultivation of talents of cultural and creative design in colleges and universities.

Index Terms art-industry integration, feature matching, PCA, point cloud alignment algorithm, cultural and creative design, design course

I. Introduction

The term "art" typically refers to artistic expressions and disciplines, whereas "work" encompasses technology, technical training, and craftsmanship. In the realm of higher education, there exists a bias towards perceiving "art" as purely artistic endeavors and "work" as scientific and technological disciplines [1-3]. The concept of "fusion," on the other hand, signifies the harmonious integration of diverse elements into a cohesive whole, aimed at achieving superior outcomes through synergy and integration [4-7]. Our research and practice on the art-industry fusion cultivation mode essentially endeavors to explore novel approaches and pathways for nurturing art and design talents in academic institutions.The contemporary society demands multifaceted talents who possess an intricate blend of interdisciplinary knowledge and skills [8-10]. This is particularly evident in the training of art and design professionals, where a balanced understanding of both artistic aesthetics and scientific-technological principles is crucial. For instance, students pursuing product design must not only master the aesthetics of product design but also be conversant with material properties, production processes, and manufacturing techniques. Similarly, environmental design students must comprehend spatial planning, color theory, and aesthetics while also gaining insights into construction materials, their characteristics, and production methodologies [11-14].

The creative principle of cultural and creative product design, along with the practical requirements of "art and industry integration," constitutes the core component of the art-industry integration talent cultivation program. This endeavor aims to harness students' youthful and imaginative creativity, while also involving the guidance of teachers and non-genetic inheritors [15-18]. It is crucial to analyze and refine students' unrestrained imagination, as many students' creative ideas face challenges in the practical realm of craft production. Thus, students are encouraged to delve into traditional crafts while maintaining a keen eye for the artistic merit of their products, ultimately fostering a seamless integration between art and craft.

The teaching mode for art-industry integration talent cultivation is grounded in a project-driven approach that intertwines students' artistic product design with technological proficiency. This structural framework encompasses both artistic and technological knowledge, with the cultural and creative product design knowledge serving as a pivotal component in the artistic dimension. This core knowledge is integral to the expression and conceptualization of cultural and creative product designs. Concurrently, the technological

composition within the design process is equally vital, as the manifestation and realization of designs are inherently reliant on technological support. The art-industry fusion talent cultivation model aligns with the knowledge creation paradigm of the design profession, exemplifying its interdisciplinary nature that integrates "art and industry" as well as fosters "literature and science" permeation.

The art-industry integration talent cultivation teaching model presented in this study adopts a project-driven approach, grounded in the fusion of students' product design artistry and technical skills. This model emerges from the practical endeavors in fostering cultural and creative design teams, evaluating the innovation process of individual expertise in cultural and creative product design, assessing the efficacy of integrating art and craft in practice, and embracing practical teaching effectiveness as the benchmark for study acceptance. Utilizing a PCA point cloud alignment algorithm, grounded in feature matching, this model aims to innovate in the design of cultural and creative products, thereby inspiring novel styling designs. Furthermore, the Kano model is empirically employed to delve into user needs for cultural and creative product design. Ultimately, a teaching reform strategy is proposed, aiming to enhance the educational effectiveness of cultural and creative product design courses in higher education institutions.

II. Teaching Mode of Cultural and Creative Product Design Based on Art-Industry Integration

In the realm of higher education, the concept of "art" is predominantly associated with artistic disciplines, whereas "work" is often understood in the context of science, technology, and their related fields. The term "fusion," in this context, refers to the integration of disparate elements into a cohesive whole, fostering an organic and harmonious blend that leads to superior outcomes, essentially achieving a state of synergy and integration. This paper endeavors to delve into a novel approach and pathway for nurturing talents in cultural and creative product design within universities and colleges, grounded in the research and implementation of an art-industry fusion cultivation model.

A. Orientation of talent training under the requirements of the new liberal arts

Talent cultivation in the new era needs to pay attention to the employment needs of students after graduation and the requirements of enterprises for recruiting freshmen. The ability demand for college students in the new era and the influence mechanism are shown in Figure 1, and these factors influence the direction of talent cultivation. The continuous improvement of rapid prototyping technology and related material science and technology has brought new methods and ideas for cultural and creative product design. And with the continuous development of science and technology, new trends such as Industry 4.0, Internet thinking, consumption upgrading and industrial upgrading continue to emerge, and the continuous improvement of the ability requirements of enterprises for

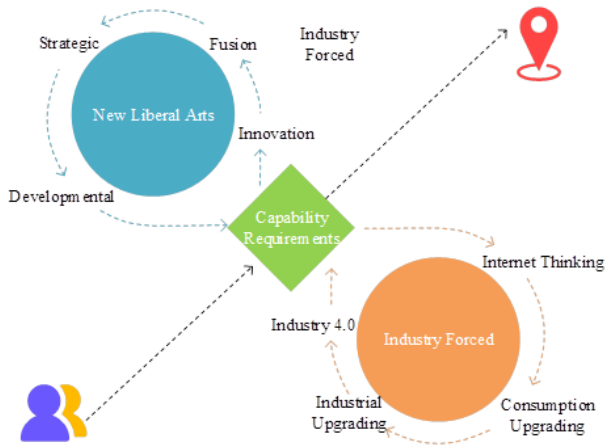

Figure 1: College students' ability needs and influencing mechanism

graduates in society, which prompts the education of cultural and creative product design to keep pace with the times and follow up on imparting new content.

Because of its practicality and creativity, Cultural and Creative Design places special emphasis on the technical development of the discipline, and disciplines often require students to develop valuable experience in cultural and creative product design by practicing to understand the process of designing cultural and creative products and applying product design ideas, and by learning how to think about cultural and creative product design.

The final course should inspire students to use what they have learned and combine it with innovation in order to fully stimulate the learner's creative abilities. In this learning process, students will make use of what they have learned and improve their ability to analyze and research independently. Evidence of design creativity, increased interest in design teaching and learning and an emotional understanding of the field of specialization will be achieved. Only in this way can the school more comprehensively cultivate innovative talents in cultural and creative product design, thus promoting the success of design teaching.

B. Cultural and creative product design method based on art and labor integration

1) Calculation of similarity of cultural and creative product design

User's behavioral data is able to reflect how much the user likes the cultural and creative product and how suitable the product is for the user. Based on the user-creation product rating information, user profiles can be portrayed with the aim of recommending products that users may like.

In this paper, we represent the user-literary product rating information by vectorizing the rating data. Assuming the user set $U = (U_1, U_2, \cdots, U_m)$ and n cultural and creative products $N = (N_1, N_2, \cdots, N_n)$ in the recommendation algorithm system, so the user-cultural and creative product

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rating information can be represented by matrix $R_{m\times n}$:

$$R_{m\times n}=\begin{bmatrix} R_{11} & R_{12} & \cdots & R_{1j} & \cdots & R_{1n} \\ R_{21} & R_{22} & \cdots & R_{2j} & \cdots & R_{2n} \\ \vdots & \vdots & & \vdots & & \vdots \\ R_{i1} & R_{t2} & \cdots & R_{ij} & \cdots & R_{mn} \\ \vdots & \vdots & & \vdots & & \vdots \\ R_{m1} & R_{m2} & \cdots & R_{mj} & \cdots & R_{mn} \end{bmatrix}. \quad (1)$$

In Matrix $R_{m\times n}$, R_{ij} is the rating of user U_i on the cultural and creative product j, and the value of ij is in the range of $(1\le i\le m, 1\le j\le n)$. The size of the rating value reflects the user's preference for its product. If two cultural and creative products are similar, then the users' ratings of them should also be similar. The use of user rating vectors for cultural and creative products to measure the similarity of the products is the essence of the collaborative filtering recommendation algorithm based on the project, which can be utilized to accurately achieve the product recommendation.

The rating vector of user U_i for product N_j, I_i, is:

$$I_i=\left(S_{1j},S_{2j},\cdots S_{(k-1)j},S_{kj},\cdots,S_{mj}\right)^T, \quad (2)$$

where, S_{kj} refers to the rating of product j by user k, k takes the value of $(1\le k\le m)$, and m represents the user.

In this paper, we use cosine similarity to calculate the measure of similarity of cultural and creative products as:

$$\begin{aligned} sim\left(I_i,I_j\right) &= \cos\left(S_i,S_j\right) \\ &= \frac{S_i\cdot S_j}{\|S_i\|\cdot\|\cdot S_j\|} \\ &= \frac{\sum_{k=1}^{m} S_{k!}\cdot S_{kj}}{\sqrt{\sum_{k=1}^{m} S_{ki}^2}\cdot\sqrt{\sum_{k=1}^{m} S_{kj}^2}}, \end{aligned} \quad (3)$$

where $sim\left(I_i,I_j\right)$ is the cosine similarity of product i and product j, S_i and S_j are the vectors of user ratings for cultural and creative products i and j, respectively, and S_{ki} is the rating of user k for i.

2) PCA-based design of cultural and creative products

Principal component analysis (PCA) point cloud alignment has a better alignment effect, this paper proposes a PCA point cloud alignment algorithm based on feature matching on the basis of art-industry fusion, so as to realize the innovative design of cultural and creative products, in order to provide ideas for the styling design of cultural and creative products.

PCA point cloud alignment is an alignment algorithm based on principal component analysis, which retains the maximum shared point cloud features and also has the feature of simple calculation, and its calculation process is shown in Figure 2. In the PCA alignment process, firstly, the two point cloud data models are assembled into a dataset, and PCA is used to realize the normalization of point cloud coordinates. Secondly, the current state prediction and covariance are obtained according to the normalized results, and the covariance is updated by obtaining the optimal calculation results of the current state

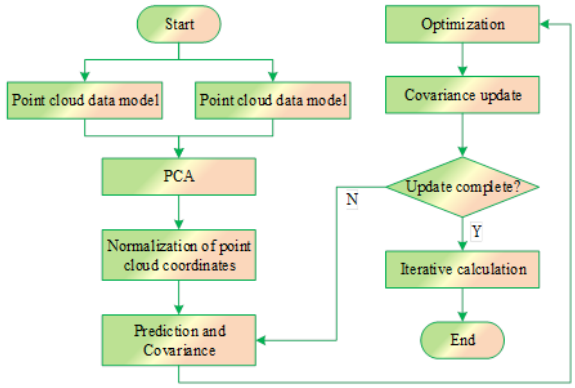

Figure 2: Calculation process of PCA point cloud registration

from them. Finally, determine whether the covariance update value satisfies the termination condition, i.e., whether the optimal state is reached.

If it is reached, iterative calculations are performed, and if it is not reached, the current state prediction and covariance are reacquired. In point cloud coordinate normalization for PCA, the center of the point cloud data model is first determined as:

$$O_i=\frac{1}{n}\sum_{i=1}^{n}P_i, \quad (4)$$

where O_i denotes the center of the ind point cloud data model, P_i denotes the matrix of the ith point cloud data model ensemble, and n denotes the amount of medium data.

Secondly, the covariance in the point cloud data model ensemble is calculated and its covariance matrix can be expressed as:

$$cov_P=\begin{bmatrix} cov\left(X,X\right) & cov\left(X,Y\right) & cov\left(X,Z\right) \\ cov\left(Y,X\right) & cov\left(Y,Y\right) & cov\left(Y,Z\right) \\ cov\left(Z,X\right) & cov\left(Z,Y\right) & cov\left(Z,Z\right) \end{bmatrix}, \quad (5)$$

where X represents the data of the image on the X-axis, Y represents the data of the image on the Y-axis, and Z represents the data of the image on the Z-axis.

In order to ensure the effectiveness of the design of cultural and creative products, the study introduces feature matching on the basis of PCA point cloud alignment algorithm to improve the point cloud alignment effect. In feature matching, the scale-invariant feature transformation (SIFT) algorithm is utilized to extract the feature points in the target image and assign a base direction for feature point matching. Afterwards, the histogram of the gradient direction of the feature points to the pixels in the domain space is constructed by combining the contribution relationship between the feature points and the pixel points in the domain space to realize the primary direction matching of the feature points.

$\theta\left(x,y\right)$ and magnitude $m\left(x,y\right)$ are denoted as:

$$\theta\left(x,y\right)=\arctan\left(\frac{L\left(x,y+1\right)-L\left(x,y-1\right)}{L\left(x+1,y\right)-L\left(x-1,y\right)}\right), \quad (6)$$

$$m(x,y) = \Big((L(x+1,y) - L(x-1,y))^2 + (L(x,y+1) - L(x,y-1))^2 \Big)^{\frac{1}{2}}, \quad (7)$$

where L is the Gaussian difference scale space of feature points.

The direction information of the feature point is combined with the coordinate information and scale information to form the descriptor of the feature point, in order to ensure the correct matching of the feature point in the same scene and the different scene feature point differentiation. In order to ensure that the descriptors of the feature points remain stable and unchanged when the image is rotated and scaled, firstly, the domain gradient direction of the feature points is consistent with the main direction of the feature points, and the domain position is selected with the feature points as the center, and the subregion is divided with the length of the side of 3σ, and the square domain is divided into 4×4 subregions on average. Let the main direction of the feature point be θ, then the coordinates of the pixel points of the adjusted domain are:

$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix}, \quad (8)$$

where (x, y) and (x', y') denote the pixel point coordinates before and after adjustment, respectively. The nearest neighbor method is used to match the feature points and measure whether there is a pairwise relationship between the 2 feature points. Let the feature point of the reference image be P, the feature point in the target image be Q, and the Euclidean distance $D(P, Q)$ between the two points is calculated as the function:

$$D(P,Q) = \sqrt{\sum_{n=1}^{128} (P_n - Q_n)^2}, \quad (9)$$

where P_n and Q_n denote the nth dimension of the P and Q descriptors, respectively.

After the above PCA point cloud matching process, we successfully completed the effective extraction of the product characteristics. In the course of teaching, the application of this technique can better help students understand the main points of product design.

C. Innovative mode of teaching cultural and creative product design

1) Pre-course tasks

The art-industry integration-based cultural and creative product design teaching model encompasses four key themes: figurative to abstract transition, geometric aesthetics cognition, structure and mechanism experimentation, and parametric interpretation (digital intervention). These themes are organized into four comprehensive sections: the foundational course in cultural and creative design, a cognitive course, a skill course, and an advanced course in cultural and creative design. The proposed pedagogical innovation model intertwines the latter three advanced course segments with the foundational design principles from the original curriculum, fostering a seamless transition to subsequent courses. Each of the four themes serves to enhance students' fundamental knowledge and skills in distinct domains. The figurative-to-abstraction theme fosters students' proficiency in material integration and abstraction techniques. The Geometric Aesthetics theme cultivates semiotic competence and three-dimensional compositional abilities. The Structures and Mechanisms Experimentation Course emphasizes material and engineering structure knowledge and application. Lastly, the Parametric Interpretation theme bridges art and technology, nurturing students' parametric modeling capabilities, programming mindset, and proficiency in digital tool utilization.

2) Course outline design

a) Course Introduction: The course on Cultural and Creative Product Design serves as a foundational pillar within the design discipline, boasting a high degree of relevance that closely aligns with the professional traits of cultural product design. It is characterized by its comprehensiveness, balance, and tailored approach to fundamental teaching topics, ensuring coherence, logical progression, and ease of execution, alongside the distinctiveness of its practical training exercises. This course integrates theoretical knowledge with skill development, employing a sequence of interconnected topics to solidify students' professional foundations and nurture their initial conceptualization skills in the realm of cultural and creative design.

b) Course Objectives: Upon completion of this course, students will acquire a comprehensive understanding of fundamental design principles, grasp the compositional elements of cultural and creative design forms, and become familiar with the basic principles of spatial construction. Additionally, they will master the utilization of digital tools. Students will develop an initial cognitive capacity to discern the interplay between planar and spatial structures, as well as motion mechanisms, and will attain proficiency in form shaping and foundational construction. Furthermore, they will gain the ability to abstractly generalize figurative forms and shape abstract forms, thereby enhancing their creative and analytical skills.

c) Teaching Content

i) Introduction to the basic concepts of cultural and creative design and training methods.

ii) Combined with the topic from figurative to abstract, animal forms and related abstract works are analyzed.

iii) Combined with the topic of geometric aesthetics cognition, introduction and appreciation of classic paintings, sculptures and architectural cases.

iv) Combined with the topic of geometric aesthetics cognition, the introduction and appreciation of space design concepts and forms.

v) Combined with the parameterization interpretation

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subject, the parameterization concept is explained and related works are appreciated.

vi) Combined with the structural mechanism experimental subject, mechanism explanation and structure explanation.

vii) Combined with specific topics, brief description of design ideas and the first exploration of design methods.

III. Analysis of the Effectiveness of Talent Training for Cultural and Creative Product Design Majors

A. Analysis of the demand for cultural and creative product design

This paper integrates the Kano model and the Quality Function Deployment Theory (QFD) in a coherent manner. Initially, the Kano model is employed to delineate a clear path for measuring user satisfaction with cultural and creative products, facilitating the identification of problems and the formulation of initial solutions. Subsequently, QFD is utilized to uncover technical issues encountered during the product design process and translate these into specific requirements for cultural and creative product design. Ultimately, the research delves into exploring solutions to these identified problems. This integrated approach ensures a comprehensive and systematic treatment of the design challenges, fostering the development of user-centric and technically sound products.

1) Kano questionnaire design

The Kano model describes the degree to which the attributes of a cultural and creative product or service satisfy user needs.

Through the binary Logistic regression analysis data of the survey questionnaire of the research questionnaire on the use satisfaction of the arts and crafts fusion classroom constructed in the previous section, the data of user interviews, field research, and the dispersion of the user's use demand within the use scenario, we comprehensively analyze the needs of the arts and crafts fusion experiments based on the virtual simulation in the following 12 aspects, including the interface recognition degree, the interface aesthetics, the loading speed, the quality of the exercise questions, the experiment duration, online communication, experiment restoration, ease of operation, experiment repeatability and safety, fun, knowledge expansion, and problem solving. By designing questionnaires for the 12 user requirements, we analyze the satisfaction of the 12 user requirements and rank the importance.

The overview of the user requirements Kano questionnaire distribution for the virtual simulation-based art-industry fusion cultural and creative product design experiment is shown in Table 1. The questionnaire was issued online for a total of 100 copies, 95 valid questionnaires were recovered, and the effective recovery rate was 95.00%.

2) Analysis of questionnaire results

Following a thorough investigation, encompassing comprehensive research, data analysis, and collation pertaining to the cultivation of art-industry fusion talents within the field of cultural and creative product design majors, a Kano evaluation results classification comparison table was constructed. This table integrates and statistically categorizes the outcomes of two distinct calculations. Specifically, the evaluation table delineates six key attributes: A, representing the charming attribute; O, the expected attribute; M, the necessary attribute; I, the indifferent attribute; R, the reverse attribute; and Q, the questionable attribute. This structured approach facilitates a clear and concise understanding of the evaluation outcomes, enabling a more informed analysis of the talent cultivation process.

The virtual simulation experiment user demand kano questionnaire survey		
Questionnaire fill total: 100	Effective number: 95	Invalid number: 5
Effectively fill in the number of women users: 38	Effective filling of male users: 57	
Main age:18∼25		
Major occupations: undergraduate, education practitioners, etc		

Table 1: The kano questionnaire was distributed

Product function	Better coefficient	Worse coefficient	Kano positioning
Interface recognition	89.23%	-76.11%	O
UI design	82.74%	-71.12%	O
Loading speed	29.54%	-81.22%	M
Problem sets quality	81.40%	-9.12%	A
Experimental duration	74.15%	-13.24%	A
Online communication	11.93%	-8.05%	I
Experiment reduction	12.74%	-91.74%	M
Operability	25.25%	-75.99%	M
Repeatability and safety	20.86%	-95.47%	M
Knowledge development	87.70%	-9.00%	A
Problem solving	8.74%	-0.86%	I

Table 2: User requirements attribute evaluation

The results of the questionnaire were brought in for calculation, and the collected data were visualized by cross-analyzing the results of the positive and negative questions, and the results of the Kano questionnaire analysis of user requirements for virtual simulation-based experimental art-industry fusion of cultural and creative product design were constructed, as shown in Table 2.The eleven cultural and creative product features contain two suspicious attributes (O), four required attributes (M), three attractive attributes (A), and two no difference attributes (I). It can be beneficial to prioritize cultural and creative product development functions based on the positioning results, helping to categorize requirements, prioritize importance, and hierarchize functions.

Substitute the results of user questionnaire research into the analysis table, calculate the absolute value of Better coefficient and Worse coefficient, get the percentage of functional attributes of each user demand, based on the value, make quadrant diagram and Kano model, and visualize and show the demand priority. The data is analyzed and processed, and the analysis results of the Better-Worse matrix analysis diagram for each requirement are shown in Figure 3. Among them, the Kano value of Interface recognition (0.8923, 0.7611) and Knowledge development (0.8770, 0.09) reaches above 0.703. After clarifying the user requirements and functional priorities, following the design idea of user requirements as the central orientation, we analyze the use scenario of the virtual simulation-based art-industry fusion experiment, and transform the requirements into the interactive prototype of

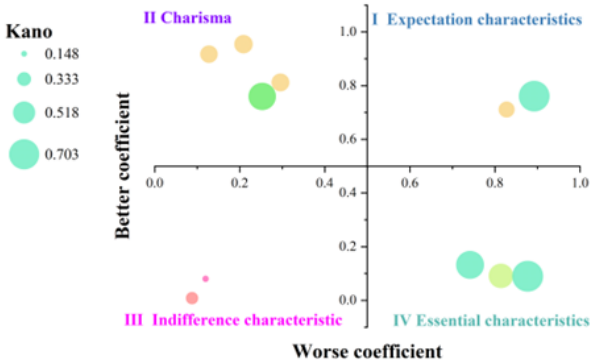

Figure 3: The Better-Worse Matrix analysis

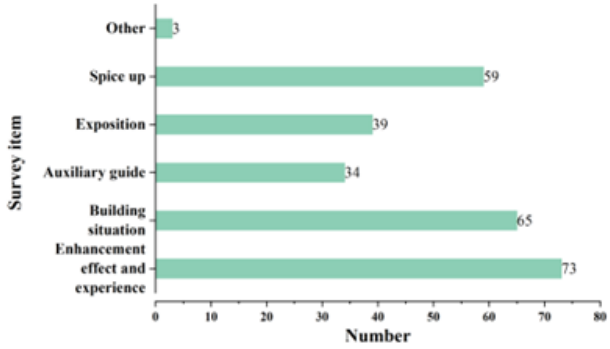

Figure 4: The need for the creative sense of the interactive text

cultural and creative product design.

B. Analysis of the effectiveness of cultural and creative design teaching and reform strategies

1) Analysis of teaching effectiveness

In the research crowd, the vast majority of the audience has a certain understanding of the teaching of interactive cultural and creative product design based on industrial fusion, and a considerable number of respondents said that they have had personal experience before, indicating that the concept of interactive cultural and creative has been popularized in the crowd. The perception of the meaning layer of interactive cultural creativity reflects the audience's demand for the function of cultural creativity. Considering that such perceptions vary from person to person, this paper lists some of the purposes and uses that the audience may choose as options to assist the respondents in their judgment. The statistical results of the demand for the meaning layer of interactive cultural creations are shown in Figure 4. It can be seen that "enhancing the effect and experience" and "creating a context" are the most selected functions of cultural creations, with 73 (76.84%) and 65 (68.42%) people respectively, which indicates that the audience values interactive cultural creations the most, and that the most important function is the interactive cultural creations. This shows that the audience values the visual and auditory effects and feelings brought by interactive cultural creations most.

2) Teaching reform strategies

Drawing upon previous research, the design elements of emotional interactive cultural creativity were refined, focusing on the pivotal aspects of interactive cultural creativity product design stemming from the integration of art and industry. Subsequently, an analysis was conducted on the design factors and methodologies pertaining to emotional interactive intervention. This led to the proposition of a design dimension model specifically tailored for emotional interactive cultural creativity within the context of museums. This model divides cultural creativity design into four distinct perspectives and categories, offering a multi-faceted definition of interactive cultural creativity that adheres to the principles of emotional interaction while being tightly aligned with the genuine needs of cultural creativity users. As a result, this model serves as a guiding framework for the implementation of cultural and creative product design education in universities and colleges, fostering the development of innovative and emotionally resonant designs.

a) Emotional shaping of cultural features: The foundation of cultural and creative product design ought to be grounded in cultural content, with the abundance of historical and cultural characteristics serving as a wellspring of inspiration and creative resources, particularly for visual design endeavors. These cultural features are derived from design elements extracted from the relics housed in collections, which are frequently incorporated into the form design of traditional cultural artifacts. The shaping of emotional interactive cultural and creative forms stems from the necessity for emotional expression, often emphasizing the emotional design aspect of cultural features, thereby enhancing the overall emotional resonance of the design.
b) Technical synergy of cultural and creative product design: Within the innovative model of talent cultivation for art-industry integration, interactive cultural and creative design encompasses a broader spectrum of technical considerations compared to its predecessors, such as digital displays and interactive works. Consequently, the decomposition of various functions within the cultural and creative product design system into multiple sub-functions and sub-modules not only rationalizes the application of diverse foundational and supportive technologies throughout the design and development process but also streamlines the design of cultural and creative endeavors, enhancing their overall effectiveness and efficiency.
c) Enhancement of Design Expression Skills in Art and Engineering Integration: Students are expected to proficiently articulate their design thinking utilizing both drawing tools and computers, while simultaneously presenting their design programs comprehensively through

written descriptions and verbal narratives. Teachers can adeptly integrate the design thinking and design expression experience of "Art and Engineering Integration" into their teaching methodologies, employing accurate and effective instructional strategies. This approach enables students to appreciate the significance of "art-industry integration," thereby fostering the acquisition of design knowledge and product innovation skills. Furthermore, it constitutes a crucial aspect in assessing the quality of teachers' instruction.

d) Enhance the ability to realize the design of art-industry integration: The main test is whether students can master the comprehensive design expression ability, on the basis of realizing the aesthetic expression of the product, taking into account the product structure, materials and technology, as well as the post-processing of the surface of the product and other issues related to the visual output of engineering design. The design of the product may need to be supported by the relevant equipment, which can consider working with local enterprises to build the common development mechanism of education and industry.

IV. Conclusion

This paper introduces the framework of the teaching mode for art-industry integration talent cultivation, which primarily encompasses art and technology knowledge. Within the knowledge structure of cultural and creative product design, the artistic factor stands as a pivotal component, intimately tied to the expression and thinking processes of such designs. Concurrently, design technology emerges as an equally essential element, as product design expression and realization are inherently reliant on technological support. By categorizing the eleven functions of cultural and creative products into four distinct groups—two suspicious attributes, four essential attributes, three charming attributes, and two undifferentiated attributes—we facilitate the determination of functional priorities in cultural and creative product development. This classification further aids in requirement prioritization and functional categorization. An assessment of teaching effectiveness reveals that the Kano value for students' knowledge development under this model surpasses 0.703, suggesting that the art-industry integration talent cultivation mode aligns well with the knowledge creation paradigm of design majors, which are characterized by the distinctive blend of "art-industry integration" and "interdisciplinary fusion of literature and science."

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