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Article

The Creative Translation of Materials--Teaching Reform and Thinking of Comprehensive Materials Course of Jewelry

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Abstract: This study examines curriculum reform in the "Comprehensive Jewelry Material Techniques" course, a core component of the jewelry design program at West Yunnan University of Applied Sciences, drawing on curriculum theories and Torrance's principles of creative thinking, it addresses persistent challenges in applied undergraduate art education: outdated content, pedagogical monotony, limited material diversity, superficial applications, and constrained instructional time. These impede students' innovatnment with industry demands in a digital-era art and design landscape. This study adopts a progressive, student-centered pedagogy integrating material cognition, deep practice, themed jewelry creation, multi-dimensional evaluation, and achievement exhibitions. This fosters interdisciplinary knowledge synthesis, psychological safety, and holistic competencies—enhancing material mastery, aesthetic literacy, and practical innovation. Empirical outcomes demonstrate elevated teaching efficacy, as evidenced by student works exhibiting novel material fusions, creative potential. The reforms model a transformative paradigm for vocational art curricula, bridging experiential transmission with autonomous exploration to cultivate adaptable, creatively resilient designers responsive to societal and technological shifts.

Keywords: Curriculum Reform; Jewelry Materials; Creative Pedagogy; Applied Undergraduate Education; Design Thinking

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1. Introduction

Curriculum constitutes the core and foundation of education. It addresses fundamental questions about the kind of individuals schools should cultivate and how to achieve this. Not only does it influence the quality of school education, but it also directly impacts societal development. According to the curriculum classification proposed by Chinese scholar Shi Liangfang, curricula can be broadly categorized into six types:

1. Curriculum as teaching subjects;
2. Curriculum as planned teaching activities;
3. Curriculum as expected learning outcomes;
4. Curriculum as learning experiences;
5. Curriculum as the reproduction of social culture;
6. Curriculum as social transformation [1].

The author takes the opportunity of the "Jinke" project to carry out the course reform of the compulsory course "Comprehensive Material Techniques of Jewelry" for three years, and intends to summarize and explain the experience of the reform practice.

Curriculum reform has consistently been a pivotal research focus in global education. Since the 1960s, countries worldwide have successively initiated waves of curriculum innovation. Notable examples include: the "New Three Arts" curriculum reform guided by Jerome Bruner's "Subject Structure Curriculum Theory" in the United States; the 20-year "Teaching and Development" curriculum experiment conducted by Soviet educators like Alexander Zankov; and the curriculum reform inspired by German educator Wagenstein's "Exemplary Teaching" philosophy [2]. China has also undergone multiple curriculum reforms, each reflecting distinct value orientations across different historical periods. Current curriculum research primarily examines reforms implemented after the Reform and Opening-up era. These reforms demonstrate two overarching trends: adapting to modern societal demands for productive and technological advancement, while ensuring holistic development of students 'physical and mental well-being. In the contemporary era of digital transformation in art and design, art education must not only leverage cutting-edge technological support but also cultivate students' comprehensive competencies to achieve authentic artistic creation.

In the talent development model of our applied technology university, the Jewelry Comprehensive Materials Techniques course for the jewelry design program stands out as a distinctive feature. Breaking free from the constraints of conventional precious metal jewelry design, this course transcends the limitations of traditional metalworking techniques, offering students a platform to express their creativity and emotions through imaginative exploration.

However, liberating students from the rigid framework of metalworking techniques and fixed mindsets is no easy feat. Traditional teaching methods and monotonous instructional approaches confine courses to a teacher-centered model where knowledge is passively transmitted. While this approach ensures knowledge delivery, it overlooks students' autonomy and individualized learning needs.

In the teaching practice of "Comprehensive Material Techniques in Jewelry," the author employs diverse learning methods to stimulate students' creativity and curiosity. Beyond traditional lectures and demonstrations, the author introduces various instructional approaches such as heuristic guidance, encouragement-driven progression, and creative motivation techniques, aiming to create a multifaceted and interactive learning environment for students.

2. Current Status of Comprehensive Materials Courses

2.1. Current Status of the Course

Chapter 7 of the National Medium-and Long-Term Education Reform and Development Plan (2010-2020) emphasizes that higher education should "facilitate resource sharing among universities, research institutions, and enterprises, promote innovative organizational models in universities, and cultivate interdisciplinary teams integrating research and teaching. It should also enhance the interaction between research and teaching, as well as the cultivation of innovative talents [3]." Under this framework, the course "Comprehensive Jewelry Material Techniques," as an interdisciplinary comprehensive course, holds undeniable significance [4]. The course aims to:

1. Enhance students 'understanding of materials and break down traditional barriers to jewelry material knowledge;
2. Foster students' innovative application of materials and aesthetic literacy;
3. Develop students' capabilities in foundational techniques, design methodologies, and design thinking.

This course not only integrates theoretical knowledge with practical application, but also focuses on cultivating students 'innovative thinking, enhancing design capabilities,

and improving aesthetic appreciation. However, during the initial implementation of the course, the author identified several pressing issues:

1. The market research and data collection for jewelry composite materials in the course were repetitive and lacked diversity;
2. The teaching content was outdated and failed to keep pace with industry trends and the introduction of emerging technologies;
3. The course lacked distinctive features and unique teaching philosophies, making it difficult to engage and motivate students;
4. In terms of material application, the course often oversimplified the use of various materials, failing to fully explore their characteristics and potential, resulting in designs lacking depth and uniqueness;
5. The limited course duration also impacted teaching effectiveness. The absence of diverse design methodologies and innovative thinking cultivation would restrict students' creative development and design capabilities.

This paper is based on the construction of the golden course project of "Comprehensive Jewelry Materials and Techniques", and carries out a series of comprehensive material exploration and curriculum reform for the above problems. Through the improvement and promotion of the curriculum, it can better adapt to the development of the industry and the market demand, and cultivate high-quality talents with innovative spirit and practical ability.

2.2. Curriculum Design

The "Comprehensive Jewelry Material Techniques" course is a core requirement for jewelry design majors at the Department of Design and Craft, School of Jewelry, West Yunnan University of Applied Sciences. Typically offered in the first semester of the third year, this 32-hour course consists of 8 theoretical sessions and 24 practical sessions, delivered over 4 weeks with 8 weekly classes. As a mandatory course for design and art majors in higher education, it integrates multidisciplinary knowledge. Students must develop comprehensive understanding of materials—from initial contact and comprehension to mastery, application, and emotional interpretation—ultimately culminating in finished jewelry pieces. Through spatial composition, form, color, texture, and patterns, students express their creative vision and aesthetic sensibilities.

3. Practice of Curriculum Reform

For decades, art and design education has emphasized the transmission of experience, where instructors imparting personal or others 'design expertise to students has proven effective. However, this reliance on experiential knowledge transfer often leads to repetitive approaches in future design projects, fostering intellectual inertia—a natural barrier to creativity [5]. American educator and psychologist Ellis Paul Torrance proposed six principles for teachers to follow and apply to stimulate creative thinking:

1. Identify students' potential;
2. Respect their diverse questions and ideas;
3. Ask challenging and thought-provoking questions;
4. Recognize and value students 'uniqueness;
5. Enhance students' refinement skills;
6. Organize non-evaluative discussion exercises and experiments;
7. Cultivate creative readers rather than critical or passive ones;
8. Anticipate behaviors;
9. Plan lessons systematically;
10. Guide students to seek truth and methods through scientific research;

11. Develop creative problem-solving skills.

These principles not only form the foundation of innovative art education—establishing a platform for an educational philosophy that respects individuality, creativity, and exploration—but also serve as the guiding philosophy for this course's teaching practice.

In this course, material research serves as the cornerstone. Profound understanding and flexible application of materials constitute a vital link in translating conceptual expansion into practical implementation. Students must not only grasp the intrinsic properties of materials but also master their deconstruction and recombination to transform them into distinctive creative elements. The key lies in avoiding reducing material exploration to mere accumulation, which would obscure the true value of creation—innovation and integration. Therefore, the curriculum design should guide students through a progressive learning journey, cultivating a critical and innovative mindset that balances depth with breadth.

3.1. Cognitive Construction of Material Diversity

3.1.1. From Material Cognition

In the fields of art design and related disciplines, a thorough understanding of material properties is essential. This not only enhances students 'professional competence but also stimulates their innovative thinking. To comprehensively explore the diverse characteristics of materials, the course adopts an integrated teaching approach that combines instructors' professional explanations, students' active research, and hands-on experience with physical materials. The curriculum categorizes materials into conventional and unconventional jewelry materials, analyzing their physical and chemical properties from multiple perspectives.

3.1.2. From the Perspective of Work Cognition

In theoretical instruction, the author employs theoretical frameworks and visual aids (digital courseware, practical works, etc.) to analyze exemplary composite material jewelry designs. The study focuses on the design process and conceptual development behind these outstanding works, not only evaluating their artistic value and outcomes but also encouraging students to share their personal perspectives and reflections. Through visual stimulation and guided inspiration, this approach maintains sustained cognitive engagement while igniting students' creative passion.

3.2. Deep Practice of Materials

3.2.1. Material Practice Process

After mastering fundamental material knowledge, students transition to practical application. Using everyday materials as starting points, they unleash creativity to experiment with bold material transformations. This process moves beyond surface-level understanding to explore materials 'intrinsic properties. Through 5-10 hands-on experiments with small samples, students discover each material's unique charm and value. By analyzing materials' physical, chemical, and emotional symbolism, they uncover hidden connections and complementary potential between materials (Figure 1).

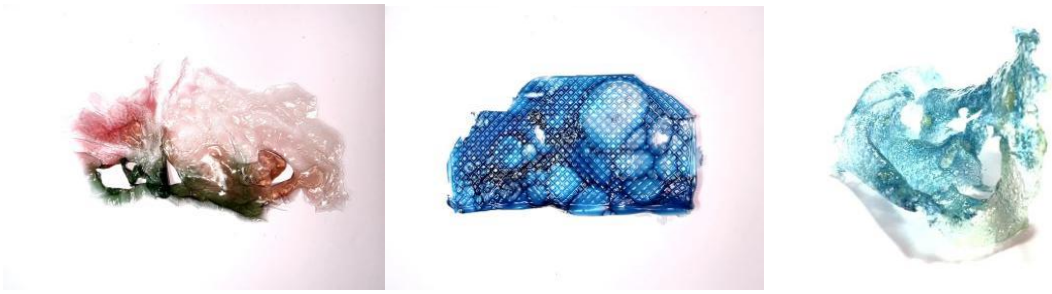

Figure 1. Material experiment by Xie Fang (student)

3.1.2. The "Disassembly and Reconstruction" of Materials

In material re-creation, when working with inherently defined attributes and functional orientations (such as medical supplies 'purity and sterility, building materials' structural integrity and morphological diversity, everyday items 'practicality and warmth, or food's visual appeal and taste allure), the creative process becomes an exploration and reconstruction journey. After understanding material properties, we encourage a "deconstruction-reconstruction" mindset in practice—treating materials as malleable, living elements. By deconstructing them to study their structure and performance, and then creatively reassembling them, we achieve innovative combinations and functional expansions. The following case demonstrates students using masks—essential during the pandemic—as creative elements, deconstructing and reorganizing them to reshape materials (Figure 2).

Figure 2. Works by Cao Qidi (student)

3.1.3. Material Shaping Construction

After gaining a thorough understanding of materials, it becomes essential to explore the nuanced relationship between material properties and artistic form. In the previous experimental phase, students have acquired preliminary insights and hands-on experience with various materials including metals, gemstones, and wood. However, the integration and combination of these materials still present both challenges and possibilities. In this practical phase, instructors will further guide students in exploring the morphological shaping of non-traditional materials in jewelry design to achieve more complete visual presentations. The 3D modeling skills acquired in earlier courses can be fully utilized to create intricate and detailed models for subsequent printing. A wide range

of materials is available, from photosensitive resins, PLA, nylon, and PETG to PHA-based biodegradable materials, all of which can be printed and then polished by hand to enhance their texture. Additionally, combining traditional metalworking techniques with modern design approaches can effectively showcase the material effects.

In every class, many students choose biodegradable and moldable materials as experimental components, such as coffee grounds, gelatin sheets, agar, and recycled plastics. These materials are not only eco-friendly but also offer unique textures and colors that spark fresh inspiration for jewelry design. Their creations often combine biodegradable plastics with metals, undergoing reprocessing through techniques like cutting, polishing, and inlaying (Figure 3).

Figure 3. Experimental sample of Xie Fang's (student) material

Some students ingeniously repurposed existing materials through artistic transformations, endowing their works with profound cultural significance via ingenious designs. This showcased the boundless charm of material regeneration and creative fusion (Figure 4).

Figure 4. Chen Xinpeng (student) mixed media work

Through experimentation, creators will discover the magical chemical interactions between different materials. When combined and blended, they produce unexpected effects. These effects not only enhance the visual appeal of jewelry but also make each piece unique and full of personality.

3.3. Jewelry-themed creations

This phase evaluates students 'creative application of diverse materials. When instructors propose design themes, the materials students select for their creations essentially reflect their understanding of the materials themselves. For instance, during the second semester of 2022-2023, the instructor assigned jewelry creation using composite materials under the theme "Traces of Time." Ancient metals, rusted copper, and time-worn gems—all imbued with a sense of historical depth—along with the collision, contrast, and fusion of modern and traditional materials, or even the transformation of an apple over time (Figure 5), became sources of inspiration for students. In this process, teachers should focus on encouraging and stimulating creative thinking. They must be adept at identifying every "valuable" signal emerging from students' creative processes and provide encouragement to continuously develop and expand these ideas.

In jewelry creation, mere material application and form shaping often fail to produce works that truly resonate. This course therefore emphasizes the deep integration of personal emotions with creative themes, ensuring each piece tells a unique story and conveys profound feelings. Students are encouraged to draw inspiration from their own experiences, social phenomena, or cultural symbols, infusing emotions into material selection, processing, and design. This approach transforms jewelry into not just physical objects, but emotional vessels that carry personal narratives.

To further cultivate students 'design thinking, the course introduces the concept of narrative design. Students are encouraged to approach jewelry design as a storytelling medium, crafting a cohesive and dynamic narrative structure through material combinations, morphological variations, and meticulous detail work. Throughout this process, they learn to capture life's subtle details, transform them into design elements, and convey these through the medium of jewelry to the audience.

Figure 5. Project creation by Lu Guangze (student)

3.4. Achievement Evaluation

The "Comprehensive Jewelry Materials Techniques" course has assembled a panel of faculty members and industry experts to evaluate final projects. The panel assesses each piece through multiple dimensions including creative concepts, material application, innovative execution, and market potential. During the evaluation, instructors and panelists focus not only on technical execution and visual presentation, but also on the underlying design philosophy, creative thought processes, and students' individual artistic expression.

In evaluating creative approaches, students are encouraged to break free from conventional frameworks and boldly explore uncharted territories. Under the theme "Traces of Time," for instance, students demonstrate remarkable creativity by

materializing and artistically interpreting time through diverse perspectives—be it historical-cultural exploration, reflections on natural transformations, or personal emotional expression. The judging panel highly commends those who deeply uncover the theme's essence and skillfully translate it into design language.

Secondly, regarding material application, both instructors and the judging panel emphasized the diversity and innovation of materials. Students not only utilized traditional jewelry-making materials like metals and colored gemstones, but also boldly experimented with unconventional, eco-friendly, and even discarded materials such as volcanic rocks, coffee grounds, and recycled plastics. Through skillful processing and refinement, they breathed new life and value into these materials. The instructors and judges praised the students' unique perspectives and creative approaches in material selection, encouraging them to explore even more possibilities in their future designs.

Furthermore, when evaluating innovative applications, instructors and the review panel prioritize how students integrate their personal perspectives and creativity into designs, resulting in works with distinctiveness and recognizability. Innovations in form, structure, color, or functionality--provided they reflect the students' individuality and ideas--are all worthy of recognition. Ultimately, this approach guides students to explore how to strike a balance between tradition and modernity, East and West, technology and art, creating jewelry pieces that align with contemporary aesthetics while carrying cultural depth.

Finally, the market foresight evaluation dimension aims to cultivate students 'market sensitivity and business acumen. While the course primarily focuses on artistic creation, instructors and the review panel encourage students to consider market demands and consumer psychology, reflecting on how their designs align with market trends and gain broader acceptance and popularity. Industry experts analyze and evaluate students' works from a market perspective, providing valuable feedback and suggestions.

Outcome evaluation serves not only as a test and recognition of students' creative achievements, but also as a guide and motivation for their future learning and development. The instructors and the review panel believe that through such a comprehensive and in-depth evaluation system, more outstanding jewelry designers with innovative thinking, practical skills, and market sensitivity can be cultivated.

3.5. Achievement Display

Upon completion of the course, students are organized to present their final project outcomes. The course finale showcases the learning achievements through various visual formats such as photographs and videos, providing students with a platform to demonstrate their work and exchange ideas, while also attracting widespread attention and participation from both faculty and students within and outside the institution (Figure 6).

Figure 6. Course creation by Fan Junrun (student)

The exhibition features interactive sessions, allowing students to directly present their creative concepts, material choices, and the stories behind their works to visitors. This face-to-face interaction not only boosts students' confidence and communication skills but also enables the audience to gain a deeper appreciation of the unique value of each piece.

For students, this final exhibition serves not only as a comprehensive showcase of their academic achievements but also as a valuable opportunity for career and life planning. Through interactions with industry professionals, they gained a clearer understanding of their strengths and weaknesses, while further clarifying their career development direction and goals.

4. Summary

Throughout this course's training process, the author strives to create an environment that supports innovators and unconventional thinkers, ensuring students experience "psychological safety" and "psychological freedom." In class, students are encouraged to approach art design intuitively, trusting their instincts and recognizing that their most natural response to artworks is genuine perception and understanding. The author also creates opportunities for students to articulate their perspectives and clarify their thoughts [6].

The journey from misunderstanding to comprehending the design of composite material jewelry is fundamentally a collaborative process of mutual learning and refinement. Students should courageously voice their personal perspectives on the artwork while boldly challenging others 'viewpoints. Applying rigid or authoritative standards may lead students to adopt an avoidance mentality, discouraging them from expressing ideas freely or questioning others' opinions. When educators recognize the inherent diversity in artistic interpretation, the classroom should embrace a relaxed atmosphere. Teachers must demonstrate adaptability, resourcefulness, and organizational skills, offering guidance while openly sharing their judgments and interpretations-allowing others to use these insights as references.

As students transition from unfamiliarity to mastery in comprehensive material jewelry design, educators should encourage them to boldly articulate original perspectives and constructively challenge others 'viewpoints. If teaching practices rigidly

apply singular or authoritative standards to evaluate student creations, this may stifle creative expression, causing students to avoid challenges, hesitate to speak their minds, and even refrain from questioning others' ideas. The essence of instructional practice lies in guiding collaborative exploration and mutual growth. When teachers recognize the value of diverse artistic interpretations, they should cultivate a relaxed and open classroom environment. Here, educators must demonstrate remarkable adaptability, organizational skills, and intellectual flexibility. With an inclusive mindset, they should freely share personal insights while encouraging students to view others' perspectives as valuable references rather than absolute standards.

Art design is creation itself. Based on this scientific principle, combined with the training of observation and thinking skills, and fully utilizing students' imagination, the course at this stage focuses on developing their expressive abilities. This forms a systematic, scientific, and comprehensive training program.

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