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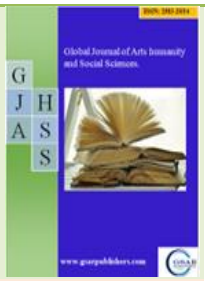

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Research on Digital Construction of Animation Design Curriculum in Applied Universities: A Case Study of Female Mythology Design based on the "Tao, Vessel, Change and Comprehensiveness" Paradigm

By

Wen-Ting Fang[1*], Le Meng[1], Qi Wang[1], Jing-Yi Wu[1]

[1]School of Art and Design, Shanghai Dianji University, Shanghai 200240, China

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Corresponding author
Wen-Ting Fang

Abstract

This study focuses on the digitalization of the Animation Design course at applied universities, using the "Tao, Vessel, Change and Comprehensiveness" female myth design practice as an example to explore innovative pathways for animation design education in the era of AI. The study constructs an innovative teaching model for animation design courses based on the philosophical ideas of the I Ching. This model comprises four dimensions: 'Tao' represents the reconstruction of the course system using AI technology, 'Vessel' means the application of AI to assist in animation design teaching, 'Change' represents the establishment of a comprehensive feedback mechanism, and 'Comprehensiveness' represents the formation of an industry-academia collaboration mechanism for talent cultivation. Through case analysis, it is demonstrated that the application of this model in female mythological animation creation enhances students' cultural confidence and innovative capabilities while promoting the digital transformation of design education. The study recommends enhancing the cultural adaptability of the curriculum, improving teachers' digital application capabilities, strengthening students' project-based learning experiences, constructing a diverse feedback evaluation system, and forming an effective learning feedback loop.

Keywords: Tao, Vessel, Change and Comprehensiveness; Animation Design course; digitalization; AI

1. Introduction

Driven by the global wave of digitalization, the paradigm of design education is undergoing fundamental changes, which are reflected not only in the continuous innovation of teaching methods and concepts but also in the deep integration between educational systems and technological development. The report of the 20th National Congress of the Communist Party of China proposed the "implementation of a national digital culture strategy." Furthermore, the 2022 document titled "Opinions on Promoting the Implementation of the National Digital Culture Strategy" explicitly states that "by 2035, a national cultural big data system will be established, enabling a panoramic presentation of Chinese culture and universal sharing of the outcomes of Chinese cultural digitization". In addition, a series of policy documents, such as the "Outline of National Medium- and Long-Term Education Reform and Development Plan (2010-2020)" and the "Opinions of the Ministry of Education on Accelerating the Reform and Development of Application-Oriented Undergraduate Universities in the New Era," all emphasize the strategic orientation of deeply integrating education and modern information technology. Their goal is to promote the development of digital education and cultivate high-quality, interdisciplinary talent that can adapt to the digital economy era. The rapid expansion of scenarios for digital technology applications is reshaping the internal logic of the educational ecosystem. Traditional teaching models, which focused solely on the transmission and unilateral output of knowledge, can no longer meet the diverse demands for talent development in the new era. Especially in disciplines such as art and design, where creativity and practical ability are central, digital transformation has become an irresistible trend.

At the same time, the introduction of artificial intelligence (AI) is profoundly transforming the teaching paradigm of animation design, prompting significant changes in educational practices and

methodologies. This transformation is characterized by collaborative innovation, which not only enhances the teaching and learning experience of animation design but also provides new possibilities for students' creative expression. The application of AI technology in educational settings enables students to effectively utilize AI tools, further stimulating their learning motivation and creativity. However, current animation design education faces numerous challenges: first, there is a need to strengthen the transformation of educational concepts and promote the exploration of diversified teaching models. Modern educational methods, such as project-based learning and task-driven instruction, should be introduced to encourage students to actively participate in practical projects, experience real-world project scenarios, and develop their innovative capabilities. Second, how to fully leverage digital technologies such as virtual reality (VR), augmented reality (AR), and online learning platforms to create a more enriched learning environment. Third, the interdisciplinary nature of the field should be strengthened. Animation design courses should be integrated with other disciplines, seamlessly combining art with technology, design with programming, enabling students to acquire cross-disciplinary knowledge and skills through creation and cultivate comprehensive, innovative thinking.

2. Literature Review

2.1 AI-driven Transformation of Design Teaching Models

In recent years, Chinese scholars have conducted extensive research on AI-enabled education and teaching, particularly in the innovative development of teaching models for the intelligent era. Some scholars have analyzed the transformation of teaching models in the AI era from the perspective of design program development, proposing a theoretical framework for "design program development in the AI era" and emphasizing the necessity of deeply integrating AI technology with design education (Gao, 2025). Other scholars have focused on AI-enabled reforms in design education, constructing an innovative teaching model system based on AI, and highlighting the new characteristics of artistic development in the AI era (Zhu Jiang, 2025). Additionally, some scholars have explored the impact of AI on the animation industry and education from the perspective of AIGC applications, providing new insights for teaching practices (Huang & Ye, 2025). Notably, some scholars have studied the new characteristics of artistic creation in the AI era from the perspective of paradigm shifts, pointing out that AI technology not only alters designers' creative thinking but also brings new possibilities and challenges for creation (Xu & Li, 2024). From an international perspective, the theoretical framework of AI-empowered innovative teaching models has become a research hotspot. Caccamo (2020) proposed the Innovation Spaces theoretical framework, emphasizing the promotional role of technology-enabled environments in fostering collaborative innovation, achieving personalized learning guidance, and providing a theoretical foundation for AI education applications. This perspective was further developed by Klooker and Hölzle (2023), who constructed the Generative Collaborative Innovation Space model, elucidating the mechanisms of deep integration between technology and education, and establishing a new teaching model based on "human-machine collaboration and innovation-driven development." Thus, research indicates that AI-enabled innovative teaching models can meet the needs of modern education and cultivate talent with innovative thinking.

2.2 AI-empowered Design Teaching Innovation Practices

The rapid development of AI technology has enabled design education to adopt a "collaborative co-creation" approach, with teachers transitioning from knowledge transmitters to learning facilitators. In some design courses, faculty and students collaborate through workshop-based models to explore AI applications, optimize design solutions, and integrate teachers' pedagogical expertise, aesthetic sensibilities, and AI's efficient generative capabilities (Romero, 2024). Another interdisciplinary teaching practice project has achieved innovative integration between traditional crafts and modern design, utilizing the STEAM-E framework to explore students' abilities to use AI tools for cultural symbol extraction and prototype design (Jin, 2024). Some scholars have researched the deep integration of AI technology and traditional design processes, incorporating the "generation-evaluation" dual-diamond model into industrial design education. In the first phase (divergence phase), tools like Stable Diffusion are used to generate diverse design solutions and expand design boundaries; in the second phase (convergence phase), machine learning classification models are used to screen suitable design solutions, which are then optimized through human evaluation (Murray-Rust, 2024). This practice demonstrates that AI is not only a technical tool but also an important medium for cultivating students' creativity and teamwork skills. In teaching, the core responsibilities of teachers shift to setting learning objectives, designing AI application scenarios, and guiding students in using methods. For example, research indicates that teachers can effectively stimulate students' higher-order design thinking activities, enhance learning engagement, and improve knowledge mastery through prompt engineering techniques (Gligorea, 2023).

2.3 Digitalization of Design Courses

AI technology provides dynamic and personalized learning environments for design courses. The courses build intelligent learning environments to optimize teaching assessment, enabling factual tracking and feedback on students' learning processes (Wang, 2025). Technological advancements have also expanded the boundaries of physical and digital integration in learning environments. Through AR and VR technologies, students can quickly build prototypes in virtual spaces. This multimodal environment lowers the practical barriers of hardware equipment in traditional design education and enhances students' spatial thinking and practical skills. Additionally, AI-driven personalized learning paths are the core technological support for the digitalization of design courses, relying on machine learning algorithms for in-depth analysis of user profiles and predictive analysis of learning behaviors. The system can dynamically adjust learning weights by analyzing data from modules such as creative design, deployment strategies, and user profiling. For example, students skilled in

visual design can receive optimized guidance on AI-generated materials (Duan, 2021). This "on-demand" learning path demonstrates the feasibility of personalized education.

3. Methodology

3.1 The design concept of Tao, Vessel, Change and Comprehensiveness

The concept of "Tao, Vessel, Change and Comprehensiveness" originates from Chapter 12 of the "Xī Cí Shàng" section of the Book of Changes: "That which is beyond form is called the Tao; that which is within form is called the Vessel. To transform and adapt it is called Change; to apply and implement it is called Comprehensiveness; to undertake and apply it to the people of the world is called Business." This emphasizes that, based on adherence to objective laws (the "Tao"), through the flexible adaptation of tools and methods (the "Vessel" and 'Change'), one ultimately achieves the state of "Comprehensiveness" (Fang, 2023). Its core philosophy emphasizes the dynamic balance between creation and use, understanding the intrinsic laws of things, and then flexibly applying tools and techniques for design.

3.2 Course Model of "Tao, Vessel, Change and Comprehensiveness" Paradigm

This study explores the theoretical framework of a "Tao, Vessel, Change and Comprehensiveness" course design model guided by the needs of the cultural and creative industries, trends in socio-economic development, national policy and regulatory support, and individual capacity development needs, as shown in Figure 1. The animation design course in this study is a static "method" guided by the core concept of "Tao, Vessel, Change, and Comprehensiveness," as well as a dynamic "process" for talent cultivation. It provides systematic planning ideas for analyzing talent cultivation objectives, constructing a cultural and creative course system, designing innovative teaching methods, improving the educational evaluation system, optimizing teaching management systems, and aligning with the policy of industry-education integration. It closely integrates teaching capabilities with practical capabilities to achieve deep industry-education integration and coordinated development.

The governance philosophy of "Change leads to transformation, transformation leads to communication, and communication leads to longevity" from the Book of Changes offers specific approaches to addressing the challenges in design processes, design management, and design education. First, 'Tao' represents essence and laws, manifested in curriculum design as clear course objectives. Second, "Vessel" refers to form and tools, specifically applied in curriculum systems and innovative teaching methods. It can be said that the "Vessel" of creation guides the transformation of the "Tao", while the "Tao" permeates the materialization of form, which is the innovation of design methods and design management. The ultimate result is the elevation and qualitative breakthrough of artifacts. Specifically, starting from the educational objectives of the curriculum, new technologies and methods are integrated to achieve the fundamental goal of cultivating animation design talent. Third, "Change" refers to the redevelopment of the educational evaluation system and the continuous improvement of curriculum construction. "Comprehensiveness" refers to the realization of innovation, verifying works in the market through industry-education integration. After awakening to the "Tao-Vessel" perspective, individuals can adapt and transform, distilling guiding academic ideas and research methods for application in practical operations and teaching, ensuring that both ideas and methods yield results, which is termed "career achievement". Creation or management often evolves with the times. The design philosophy of "Tao, Vessel, Change, and Comprehensiveness" also breaks away from existing rules and principles based on creative experience, establishing new paradigms of thought for practical application and learning.

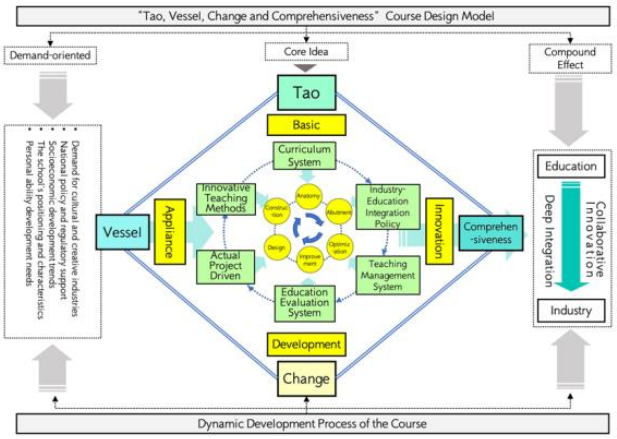

Figure 1. "Tao, Vessel, Change and Comprehensiveness" Course Design Model

4. Case Study: Animation Design Course Based on the Theme of female mythology

This study employs the "Tao, Vessel, Change, and Comprehensiveness" teaching model, with female mythology as the theme, to design an animation course curriculum. By integrating theoretical knowledge of Eastern design thinking, the study conducts creative practice in transforming female mythology into animation design. It combines communication, cognitive patterns, and aesthetic theory, and through the design creation process, proposes a creative model for conceptualizing and creating mythological subjects from text to imagery. In animation design courses, the visualization of female mythological imagery in animation provides practical design cases for the effective application of the design model.

4.1 Dao - Foundation: Reconstruction of the Curriculum System

In response to the new trends in the animation industry in the AI era, this course systematically outlines the core competency framework for the Digital Media Design program, establishing new standards for knowledge structure, skill requirements, and innovative literacy, as shown in Figure 2. Building on this

foundation, the course structure has been optimized to seamlessly integrate AI technology with professional courses, forming a modular, tiered curriculum system. The course places a strong emphasis on practical teaching modules based on AI, aiming to enhance students' ability to collaborate with AI in creative processes and elevate their practical innovation capabilities. Additionally, the course develops intelligent teaching resources and digital courses, establishing a digital course resource repository that includes content such as AI tool applications, creative generation, and work optimization, thereby providing support for educational reforms.

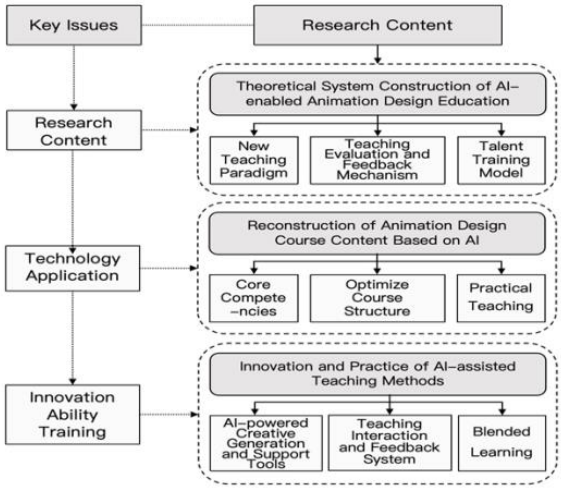

Figure 2. Reconstruction of the Animation Design Curriculum System

4.2 Vessel - Application: AI-assisted animation design

4.2.1Innovation and Practice of AI-Assisted Teaching Methods

This course delves into innovative teaching models supported by AI technology, designing intelligent teaching strategies tailored to various educational scenarios. It focuses on applying AI-based creative generation and tools to provide students with intelligent creative support, enhancing both creative efficiency and the quality of their work. For instance, AI image generation software such as Midjourney, Stable Diffusion, and Jiemeng can assist students in quickly generating concept art and sketches during the initial storyboard design phase. These tools can automatically generate high-quality images based on textual descriptions, providing students with rich visual references and improving creative efficiency. Additionally, AI tools are used for character design, allowing students to input specific parameters (such as style, clothing, expressions, etc.) to automatically generate multiple character design options. Students are encouraged to use AI technology to generate multi-style design concepts based on the project theme of Chinese female mythological stories provided by teachers, inspiring creative ideas, and combining relevant cultural characteristics for “re-design” artistic creation. The music and voiceover components of the final works were also optimized throughout the production process using AI software such as Suno AI and Tian Gong SkyMusic. This phase of teaching practice established students' confidence and ability to use new tools for innovative design, laying the foundation for subsequent animation production using animation design software.

Currently, the sources of female mythological tales in animation can be categorized into three types. First, they are based on folk mythology, reimagined by contemporary creators to form "original mythological" characters, such as "Liang Shanbo and Zhu Yingtai" and "Butterfly Spring." Second, they are adapted from contemporary literary works, where creators use imagination to create artistic interpretations based on the original texts, such as "The Golden Conch", adapted from a fairy tale poem. and "The Peacock Princess." Third, they originate from the compilation and reorganization of mythological stories by literati throughout history, with clear literary sources, forming "inherited myths," such as "The Legend of the Heavenly Book" from "The Demon-Subduing Tale," "The Legend of the Magpie Filling the Sea" from "The Classic of Mountains and Seas," and "The Lotus Lamp" from multiple "Splitting the Mountain to Save the Mother" plays. Students propose creative concepts and design creative works based on these three categories of themes.

Case Study 1: Character Design for "Zhu Yingtai" The inspiration for this work comes from Zhu Yingtai in the Yue opera "Liang Zhu," as shown in Figure 3. The colors of the character's headdress and clothing draw inspiration from the original appearance of the character in the Yue opera. During this period, Yue opera makeup absorbed the vibrant color palette of traditional watercolor makeup techniques while incorporating the soft, natural qualities of film and theater, resulting in a style characterized by bright yet soft colors, clean lines, distinct facial features, and a balance between realism and artistic exaggeration, evoking a sense of delicate, lyrical beauty. Zhu Yingtai wears a traditional Yue opera costume with water sleeves, and the hem features the classic "butterfly transformation" pattern from the story. She wears a pair of blue sparkling diamond headpieces, which resemble stars from afar and flowers up close, exuding a luxurious and elaborate charm. AI technology was utilized to assist in creative conceptualization and design multiple schemes, which were then modified, optimized, and reimagined based on the character's traits.

Figure 3. Zhu Yingtai Animation Character Design

Case two: The animation character design of Yaojī (the Goddess of Wushan) from the Classic of Mountains and Seas, as shown in Figure 4, embodies the character's role as the guardian of the Three Gorges, revered as a natural deity symbolizing mist, abundance, and the power to control water. As a classic mythological figure, Yaoji's symbolic objects vary across different versions of the legend, primarily categorized into three types: natural spirits, love

tokens, and magical artifacts, each carrying rich cultural metaphors. Based on the character's traits, key attributes such as wisdom, vigilance, and the transformative power of clouds and rain were identified, and AI technology was employed to inspire diverse design concepts.

Figure 4. Yaoji (Goddess of Wushan) Animation Character Design

4.2.2 Practical Project-driven, Intelligent Project Management

The "Animation Design" course utilizes an intelligent teaching interaction and feedback system to enable real-time interaction between teachers and students and provide personalized guidance. At the same time, it explores effective implementation strategies for blended learning, seamlessly integrating online and offline instruction with theoretical and practical teaching to create an immersive learning environment. Through innovative teaching methods, the course enhances teaching effectiveness and cultivates students' innovative abilities. Students are encouraged to participate in real-world projects, gaining hands-on experience throughout the entire process from design to production. Artificial intelligence tools are utilized for project management and tracking, helping students better plan and execute projects. The system automatically reminds users of project progress, assigns tasks, and provides best practices for project management. The animated work "Bamboo Branch" employs intelligent project management practices based on an actual project involving the adaptation of a female mythological animation. This animation is inspired by the story of "Xiangfei Bamboo" from the Classic of Mountains and Seas, narrating the tale of Ehuang sacrificing herself to become bamboo for Emperor Shun, as shown in Figure 5. Intelligent project management methods were applied throughout the pre-production, production, and post-production phases of the work, as shown in Figure 6. First, AI technology was used to optimize the storyboard script. Second, AI technology was employed to generate multiple versions of character and scene designs, which were then refined based on the storyline at each stage. Third, the Super-Star platform was utilized to track students' creative progress, thereby enhancing the efficiency of post-production animation work.

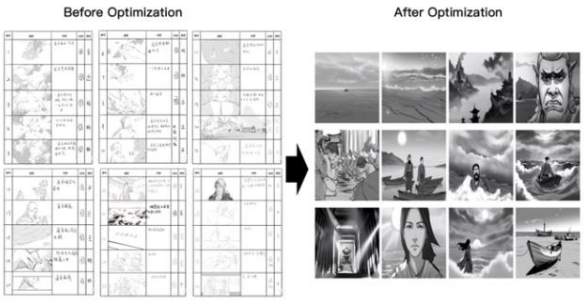

Figure 5. AI Optimization Assists Storyboard Creation

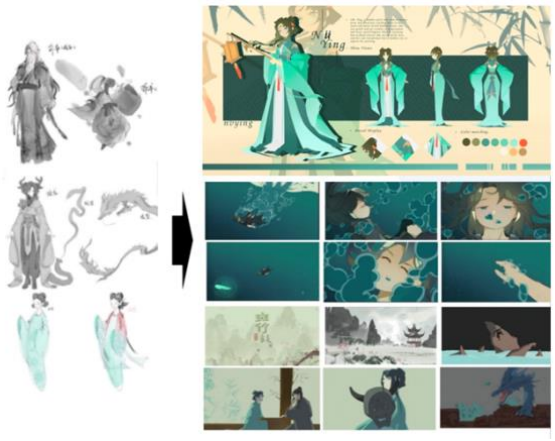

Figure 6. Project Management Animation Post-Production for "Bamboo Branch"

4.3 Change-Development: A Comprehensive Feedback Mechanism

4.3.1Implementation of Flipped Classroom Teaching

This course fully employs the flipped classroom teaching method, providing students with an animation creation task on the theme of female mythology prior to class. Students are required to engage in practical creation through pre-class preparation, online discussions, and other methods. During the pre-class preparation phase, teaching videos, interactive courseware, and related resources are released via an online platform, with students required to complete the pre-class preparation tasks beforehand. Students can use the knowledge map created by the teacher to pre-learn and expand their knowledge. Through pre-class quizzes and online discussions, students can gain an understanding of the course content in advance and enter the classroom with specific questions. During the in-class interaction phase, the teacher focuses on addressing issues encountered by students during the pre-class preparation phase. Through group discussions, case analyses, and hands-on demonstrations (such as models illustrating the laws of motion), the teacher summarizes key knowledge points. This student-centred teaching model enhances classroom interaction and engagement.

4.3.2Artificial Intelligence Empowers Student Learning

To further enhance students' learning experience and self-directed learning abilities in the 'Animation Design' course, the course has introduced an intelligent teaching assistant system to provide

students with intelligent question-and-answer functionality, real-time interactive learning, and practice environments.

First, the course implements intelligent question-and-answer and real-time interactive functions. Students can interact with the intelligent teaching assistant via text or voice to ask questions about course content, assignments, and other topics, and receive immediate and accurate responses. The intelligent teaching assistant system provides a real-time interactive learning environment, including virtual experiments, interactive courseware, and simulated operations. Students can perform practical operations in the virtual environment to deepen their understanding of theoretical knowledge.

Second, the course provides students with personalized learning paths. Based on students' learning progress and interests, the Super-Star platform intelligently recommends relevant teaching resources. For example, if the system identifies that a student is weak in the principles of animated motion, it can automatically recommend related teaching videos, literature materials, and virtual experiment projects. Second, the intelligent teaching assistant system will dynamically adjust the difficulty and type of learning content based on students' learning performance. For topics they have mastered well, the system will provide more challenging exercises; for topics they have mastered poorly, the system will provide more foundational exercises and explanations. Third, the system provides self-assessment tools to help students regularly evaluate their learning outcomes. The system generates detailed assessment reports, highlighting students' mastery of each topic and providing improvement suggestions. Students can adjust their learning strategies based on this feedback to enhance learning effectiveness.

4.4 Comprehensiveness: Industry Collaboration in Talent Cultivation Mechanisms

To achieve deep integration between industry and education, this course designs a new model of talent cultivation through university-industry collaboration, establishing a training mechanism with extensive industry involvement. The focus is on building a practical teaching platform for industry-education integration, integrating high-quality resources from universities and enterprises to provide students with a real-world project practice environment. It explores a resource-sharing mechanism for cross-industry collaboration to promote the effective flow and integration of educational resources, innovative resources, and industrial resources. Concurrently, a multi-party collaborative quality assurance system is established, incorporating an evaluation and supervision mechanism involving universities, enterprises, industry associations, and other stakeholders to ensure the quality of talent cultivation. Through the innovation of collaborative talent cultivation mechanisms, a new ecosystem of talent cultivation deeply integrated with industry-academia-research-application is formed.

This course is based on a cross-disciplinary team formed according to industrial needs, incorporating technical experts from the front lines of enterprise production to bring high-quality enterprise resources into the classroom and cultivate applied professional talent. For example, mentors employed by Disney Animation Studios will lecture on the current state of the animation design industry, such as visual development positions, and introduce actual projects from industry mentors, including the art direction and episode direction work on animated projects like 'Frozen' and 'Disenchantment.' Mentors employed by Shanghai DreamWorks will lecture on their work as art directors and episode directors on TV animation projects such as 'Peking Duckling 1&2' and 'Naive and Kung Fu Socks.' Many industry cases draw inspiration from female myths and legends from around the world to create animated works with high market acceptance, providing rich references for the implementation of this course's theme. The course invites industry experts to deliver specialized lectures on the current state of the animation design industry, the industrial chain ecosystem, and future trends. Based on the industry's development status, students are guided to optimize female mythological animation works from scriptwriting, character design, storyboarding, and animation effects implementation. This phase aims to deepen industry-academia integration through industry considerations, transforming creative ideas in course design into value-added innovations, and cultivating high-level innovative talent.

5. Conclusions and Suggestion

This study aims to explore effective strategies for the digital transformation of the 'Animation Design' course in applied universities, with a particular focus on the implementation process of a teaching case study based on the "Tao, Vessel, Change and Comprehensiveness" teaching model for the design of female mythology. The research findings indicate that this teaching model not only redefines the traditional classroom environment but also enhances students' cultural confidence and innovative capabilities, thereby promoting the diversification and digital transformation of design education. By integrating human-machine collaborative work, AI-assisted creation, and online learning platforms, combined with the "Tao, Vessel, Change, and Comprehensiveness" teaching model, the study effectively enhances students' ability to creatively transform between traditional culture and modern design, thereby promoting the development of their comprehensive literacy. Additionally, this research advances the digital and intelligent transformation of the course by leveraging the guidelines from the 'Management Measures for the Construction and Operation of Online Open Courses' to build rich and high-quality digital teaching resources. The content of this study thoroughly considers the relationship between cultural context and educational needs, organically integrating AI technology with the traditional wisdom of Chinese culture to create an educational model aligned with modern learning concepts.

To further deepen the outcomes of this research and enhance the digital construction and teaching quality of the 'Animation Design' course in China's applied universities, the following recommendations are provided. First, enhance the cultural adaptability of the course. The study suggests that the course content should fully consider local culture and regional

characteristics to create an animation design course with local characteristics, thereby enhancing students' sense of national identity and participation. Second, promote teachers' digital application capabilities. Improve teachers' ability to use new technologies in teaching and encourage interdisciplinary collaboration among teachers to jointly explore strategies and new paths for teaching reform. Third, strengthen students' project-based learning experiences. Encourage students to participate in real-world corporate projects to enhance their practical animation production skills and innovative thinking, enabling them to apply their knowledge and skills in real-world environments, such as animation movement principles, character design, and software application capabilities. Fourth, establish a comprehensive and diverse feedback and evaluation system. Provide students with comprehensive assessments of course outcomes and opportunities for self-reflection to continuously refine their learning strategies and improve learning outcomes. Ultimately, based on the "Tao, Vessel, Change, and Comprehensiveness" teaching model, create an effective learning loop through online learning and offline classroom interaction.

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