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Research on the "Four-Dimensional Drive" Transformation Path for Interdisciplinary Integration of Digital Media Art in Private Universities

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Abstract: In the digital-intelligent era, digital media art urgently needs to cultivate interdisciplinary innovative talents through interdisciplinary integration. Although private universities are constrained by limited resources, they can build characteristic transformation paths with their flexible mechanisms. Based on analyzing the current dilemmas in interdisciplinary integration, this paper proposes that the underlying logic of interdisciplinary integration should shift from a "disciplinary patchwork" to a "chemical fusion", with curriculum restructuring driven by a project-based system. Furthermore, integrating reform experience from multiple domestic universities, this paper designs a systematic transformation model driven by the "four dimensions" of technology, art, business, and cognition: the technology dimension empowers light-asset infrastructure construction with AIGC; the art dimension promotes the integration of Oriental aesthetics and digital-intelligent technology; the business dimension deepens industry-education collaboration for agile responsiveness; the cognition dimension strengthens critical thinking and ethical literacy. This model provides an operable overall framework for the high-quality development of digital media art in private universities.

Keywords: Interdisciplinary integration; Digital media art; Four-dimensional drive; Talent training mode

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1. Introduction

As a comprehensive discipline integrating natural sciences, social sciences, and humanities, digital media art has become increasingly interdisciplinary. Against this background, intelligence and internetization have become important directions of the new round of scientific and technological revolution. Digital media art is rapidly extending to computer science, psychology, and other disciplines, giving birth to richer art forms and creative languages through multi-disciplinary collaboration. With continuous technological evolution, future digital media art will center on immersive interaction and multi-sensory experiences, continuously expanding

the boundaries of aesthetic perception [1]. However, current interdisciplinary integration in talent cultivation is seriously insufficient: art-oriented students lack technical knowledge, while technology-oriented students lack aesthetic literacy, resulting in a single knowledge structure [2]. Meanwhile, professional talent training faces multiple challenges: disconnection between teaching and market demand, outdated teaching content lagging behind technological iteration, insufficient interdisciplinary integration, and weak practical teaching [3]. Although private universities have limited resource endowments, they have flexible mechanisms and high market sensitivity, showing great potential in building characteristic interdisciplinary integration mechanisms. This paper aims to explore a transformation path suitable for private universities and proposes a "four-dimensional drive" model to provide a practical guide for professional reform.

2. Definition of core concepts

The interdisciplinary integration mechanism refers to breaking disciplinary barriers between computer science, cognitive psychology, communication, and art, and establishing stable and sustainable operational rules for factor flow, knowledge integration, and collaborative innovation. The construction of New Liberal Arts has promoted the interdisciplinary transformation of educational models, and the in-depth integration of technology and humanities has become a core orientation. Its goal is to cultivate interdisciplinary talents with an innovative spirit and critical thinking.

The interdisciplinary integration of digital media art requires talents to have both artistic creation skills and AI technology application capabilities, and the in-depth integration of the two [4]. In the artificial intelligence era, digital media art talents need solid computer technical skills as well as profound cultural and artistic accomplishments. Such interdisciplinary talents must have the ability to break disciplinary boundaries, integrate diverse knowledge and skills, and possess strong professional literacy. Specifically, the digital media art major aims to cultivate students' comprehensive abilities in multiple dimensions: artistically, they should have aesthetic judgment and expressive ability, and realize the integration of art and technology; in application, they need to master design skills such as digital film and television production, interactive design, and image and audio processing [5].

3. Underlying logic and implementation path of interdisciplinary integration

3.1. Underlying logic: From "disciplinary patchwork" to "chemical fusion"

The interdisciplinary reform in many universities remains formal, manifested as a patchwork model where "the computer department offers several design courses and the art department offers several programming courses". Teaching content is limited to a single field, leading to an overly simplistic knowledge structure that cannot meet the urgent demand for cross-border integration and comprehensive literacy in the digital media industry. With the accelerated convergence of the metaverse, artificial intelligence, and art, the existing training model has shown obvious limitations in cultivating interdisciplinary talents.

Real integration should be based on "common problems" — the intersection of art and technology in the digital-intelligent era is "user experience" and "information interaction", and the logical starting point of integration is to solve the core problem of "how humans perceive and act in the digital world". Digital media art integrates art, design, computer science, communication, and other disciplines [6]. In teaching, engineering knowledge can be used to strengthen the technical foundation to support the achievement of interactive effects,

and the cultivation of interdisciplinary thinking ability should be taken as an important focus.

Dongfang College, ShanDong University of Finance and Economics has constructed a "1314" interdisciplinary education framework. Taking value guidance as the original intention, it takes art, technology, and humanities as three knowledge pillars, takes post-adaptation as the foothold, and builds an integrated curriculum system of "art-based, technology-driven, and humanities-nurtured" with four measures: school-enterprise linkage, diversified faculty, resource coordination, and dynamic optimization. In terms of ability development, the art line focuses on the two-way integration of aesthetic perception and creative practice; the technology line achieves the leap from tool mastery to scenario application; the humanities line completes the organic unity of cultural inheritance, literacy improvement, and responsibility.

3.2. Implementation path: Project-driven curriculum restructuring

Break the discipline-centered curriculum system and establish curriculum modules centered on the "project life cycle". Based on the "four new" characteristics (new connections, new technologies, new tools, new ecology) of new-quality productivity, Nanning University of Technology has constructed a "four new + project-based" teaching model, combining basic disciplinary courses, professional courses, intensive practical courses, and corresponding projects. In project-based courses, teachers design specific project tasks, teaching students basic software operations and guiding them to use cutting-edge technologies for creative design, which not only improves software application ability but also encourages students to pay attention to cutting-edge technologies.

In the process of promoting project-based curriculum reform, Ningbo City College of Vocational Technology has gradually formed a clear implementation route and constructed a "three-level" professional curriculum structure that connects with each other. The system is hierarchically designed according to the law of students' cognitive development, with three curriculum modules: general education, technology, and innovative practice, which undertake the training functions of cognitive construction, ability training, and innovative breakthrough, respectively. The specific promotion path is divided into three progressive levels:

(1) Level 1: Cognitive Construction Stage

Replace the original *Programming Fundamentals* with *Creative Programming*, and build a cognitive starting point based on AIGC technology. Add courses such as *AI Creative Thinking Introduction* and *AI Image and Video Generation* to help students form basic abilities in cross-media content generation, and gradually establish the ability to understand and apply cutting-edge generative models such as Transformer, GAN, and Diffusion Models.

(2) Level 2: Ability Expansion Stage

Offer interdisciplinary courses such as *Interactive Engine Application*, *AIGC Digital Painting*, *Next-Generation 3D Model Design*, and *XR Virtual Reality Technology*, and introduce the "dual-teacher co-teaching" method. Taking projects as the carrier, relying on professional studios such as image editing, 3D animation, digital illustration, and new media operation, a complete teaching closed loop of "problem discovery – technology matching – scheme implementation" is constructed.

(3) Level 3: Innovation Breakthrough Stage

Establish interdisciplinary innovation studios to carry out practices facing real industry projects. Teachers guide students to break away from a single technical framework and cope with complex creation scenarios through multi-model fusion and cutting-edge technology integration. For example, Nanning University of Technology cooperated with Babishu Culture Media to complete Guangxi intangible cultural heritage-themed

animations *Ten Flavors of Guangxi* and *Xiancao Qinghao*, realizing the organic unity of teaching, practice, and innovation. In the Oriental College of Shandong University of Finance and Economics, "dual-teacher joint guidance" is launched after enterprises issue project tasks: campus teachers are responsible for standard control, and enterprise tutors impart industry experience and practical methods.

4. Transformation Path Design: "Four-Dimensional Drive" Model

Based on the above analysis and integrating reform experience from multiple domestic universities, this paper proposes a "four-dimensional drive" transformation model suitable for private universities, constructing a systematic transformation framework from four dimensions: technology, art, business, and cognition, to cope with resource constraints while giving play to the advantages of flexible mechanisms.

(1) Dimension 1: Technology — AIGC-Empowered Infrastructure Construction

Private universities generally face the dilemmas of slow update of experimental equipment and insufficient hardware investment. In the AIGC era, this disadvantage can be surpassed through the "cloud + terminal" light-asset model. Universities can use cloud computing power to build an AIGC training platform, reduce dependence on high-performance graphics workstations, and invest limited funds in network bandwidth, cloud service subscriptions, and teaching resource development. Focus on cultivating students' "human-computer dialogue" ability (prompt engineering) and digital asset optimization ability, shifting the technical focus from "making tools" to "using tools to create tools".

The teaching focus should shift from traditional software operation training to AIGC technology application ability. In the past, digital media art design teaching focused on software skills such as Photoshop and 3ds Max. These stylized technical operations occupy most of the curriculum system but are easily replaced by AIGC technology [7]. In the AIGC era, teachers should enhance students' ability to use AIGC and weaken mechanical training on software tools [8]. For example, a 3D animation studio can use tools such as Stable Diffusion for image generation, Runway ML for image-to-video, and Rodin for image-to-model to realize AI-assisted generation, allowing students to devote more energy to creative conception and artistic expression.

The reform practice of Jilin Engineering Normal University shows that the AIGC-empowered intelligent teaching mode can effectively improve students' innovation efficiency and practical ability [9]. In 3D creative design courses, students input design themes into the AIGC generation platform to quickly obtain materials such as 3D concept drawings and texture reference drawings, and then import them into 3D modeling software for in-depth design, significantly shortening the time for creative conception and material preparation.

(2) Dimension 2: Art — Integration of Oriental Aesthetics and Digital-Intelligent Technology

The key to breaking the increasingly serious homogeneity in creation is to truly integrate artificial intelligence and traditional culture. At present, many creators indulge in the fixed paradigm preset by AI and rarely delve into thematic connotation and personalized expression, resulting in similar works lacking identification. To reverse this situation, AI should be positioned as a creative partner rather than a dominant force, serving the deepening of themes and the transmission of emotions.

Rooted in local culture, the contemporary translation of intangible cultural heritage resources and regional symbols with digital technology is an effective way to shape the unique temperament of works. Creators can use AI systems to systematically mine and digitally reconstruct traditional materials, transforming ancient patterns and folk images into algorithms-interpretable languages, and realizing the integration of traditional heritage and contemporary aesthetics in intelligent generation. In the basic design teaching of the Oriental

College of Shandong University of Finance and Economics, traditional patterns are introduced into the classroom to guide students to integrate cultural thinking into creation and subtly cultivate cultural roots. The logo and IP design inspired by Nuo opera elements by students of the university is a vivid example of the collision between traditional context and digital technology.

In addition, AI technology developers and cultural institutions can jointly build a digital asset library and style algorithm system exclusive to traditional culture, comprehensively collect intangible cultural heritage resources from all over the country, and cultivate AI generation capabilities deeply rooted in traditional implications. On this basis, a creative hub connecting AI and traditional art is further built, and a series of creation and exhibition activities are planned around traditional culture, so that traditional elements can glow with new life and take root in digital art creation.

(3) Dimension 3: Business — Agile Response for In-Depth Industry-Education Integration

Private universities should establish flexible forms such as "micro-majors" and "industrial training camps", build a "front store back factory" model with MCN institutions, game companies, and other enterprises, and introduce a practical teaching mechanism of "project import – post connection – dual-teacher guidance" to improve students' project management and collaboration abilities. New enterprises can provide high-quality teaching environments for students, and enterprise experts participate in teaching to bring industry experience and cutting-edge technologies, optimizing the allocation of school and enterprise resources.

Schools and enterprises jointly build a long-term education mechanism: enterprises provide internship positions and arrange enterprise tutors to provide practical guidance for students. Students can learn in a real working environment driven by projects and improve their ability to solve practical problems. For example, the Oriental College of Shandong University of Finance and Economics has built a "project library" with Perfect World: enterprises release industrial tasks, campus teachers control design standards, enterprise tutors impart practical skills, and both parties jointly accept and evaluate the quality of results.

In terms of practical resources, private universities can focus on local small and medium-sized enterprises. Although large enterprises have high cooperation thresholds, small and medium-sized enterprises have flexible needs and rapid decision-making, which are more suitable for the practical teaching needs of private universities. By undertaking real projects of local enterprises, students can not only gain practical experience but also serve local economic development, forming a virtuous cycle.

(4) Dimension 4: Cognition — Critical Thinking and Ethical Literacy

With the wide application of AIGC technology, ethical issues such as copyright ownership, content authenticity, and algorithmic value deviation have become increasingly prominent. Teachers should carry out targeted technical ethics education in teaching to help students establish a correct technological outlook and use AI tools rationally and in compliance. Add courses such as *Media Ethics* and *Artificial Intelligence Ethics* to improve students' information discrimination ability and social responsibility.

The core of critical thinking is to understand the AIGC generation mechanism and have the ability to rationally analyze and judge the generated content. In the past, teaching focused on practical skills and insufficiently cultivated critical thinking, leaving students at a loss when facing massive amounts of generated information [10]. Teachers should guide students to shift from skill imitation to innovative logic construction, strengthen problem definition and cross-model collaborative thinking, so that they can creatively identify problems, formulate solutions, and flexibly switch between multiple tools to achieve optimal effects.

At the same time, it is necessary to deeply cultivate humanistic literacy and protect the uniqueness of human creativity and emotional expression. At present, some AIGC works have similar styles and lack vitality,

which is rooted in creators' over-reliance on technical tools, creation staying in the shallow combination of algorithms, and a lack of cultural temperature. The focus of education should be on guiding students to deeply understand painting techniques, literary narration, historical inheritance, and aesthetic essence, and to forge aesthetic judgment and creative vitality in humanistic accumulation. Through the infiltration of courses such as traditional painting and design introduction, students can continuously improve creativity and artistic perception under the influence of classic art, and truly become the masters of AIGC rather than executors manipulated by technology.

5. Conclusion

Interdisciplinary integration is the core driving force for the development of digital media art in the digital-intelligent era. Facing the iteration of artificial intelligence technology and profound industrial changes, private universities should seize the opportunity of AIGC and realize the transformation from "disciplinary patchwork" to "chemical fusion" through project-based curriculum restructuring. The "four-dimensional drive" model provides a systematic transformation path: the technology dimension empowers light-asset infrastructure construction with AIGC, realizing the transformation from software operation to AI application ability; the art dimension promotes the integration of Oriental aesthetics and digital-intelligent technology to form differentiated characteristics with local cultural resources; the business dimension deepens industry-education collaboration for agile response, realizing precise connection with the industry; the cognition dimension strengthens critical thinking and ethical literacy, cultivating digital media art talents with social responsibility. Integrating the reform experience of domestic universities, this model provides an operable practical framework for private universities to explore characteristic development paths under resource constraints.

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