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Research on AIGC-Enabled Strategies for Cultivating Interdisciplinary Talents in Digital Media Art toward the Integration of "Design + Technology"

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Abstract: ***With the rapid development of generative artificial intelligence, the creative paradigm of digital media art is shifting from a linear process centered on manual techniques and software operation to a cyclical system driven collaboratively by conceptual reasoning, cross-modal generation, and technological integration. The deep involvement of AIGC not only transforms the tool system of professional creation but also reshapes the interrelationship between "design" and "technology" within talent cultivation. Based on a review of existing literature and an analysis of instructional workflows, this study proposes a comprehensive competency framework aimed at integrating design and technology, consisting of four dimensions: cognitive structure, generative expansion, technological integration, and reflective control. Furthermore, it constructs an AIGC-oriented curriculum network that spans multiple courses, demonstrating the mediating role of generative technologies in design thinking, visual generation, and technical implementation. Building on these foundations, the study proposes talent cultivation strategies centered on competency restructuring, process-driven learning mechanisms, and integrated project-based practice. The findings suggest that in the context of AIGC, talent development in digital media art should shift from a model of skill accumulation to one of structural capacity building, forming a new interdisciplinary training system aligned with future creative industries through the systematic organization of human–AI collaborative processes.***

Keywords: Generative artificial intelligence, Digital media art, Interdisciplinary talent cultivation, Design–technology integration.

1. Introduction

The rapid penetration of generative artificial intelligence into fields such as visual design, digital imaging, and interactive experience has begun to profoundly reshape the creative processes and division of labor within digital media art. Existing studies indicate that within the context of design education, the introduction of AIGC tools not only brings higher creative efficiency but also prompts classroom activities to shift from "software operation exercises" to learning structures centered on conceptual organization and critical thinking (Lee, 2025). Against this backdrop, the core question faced by digital media art programs is no longer simply "whether AI tools should be used," but rather how to redefine the relationship between design competencies and technological competencies at the level of professional training objectives, and how to construct an interdisciplinary talent cultivation framework that aligns with emerging paradigms of human–AI co-creation.

In China, some studies have examined the integration of artificial intelligence into digital media art and design education from the perspective of educational reform. These works point out issues such as ambiguous course objectives, the disconnect between design modules and technology modules, and lagging evaluation mechanisms, emphasizing the necessity of restructuring talent cultivation through curriculum optimization and pedagogical innovation (Li, 2024). Other scholars, focusing on "applied digital media creative talent," propose that under AIGC conditions, the competency goals should be reconstructed into a three-dimensional system composed of artistic innovation, technological application, and integrated literacy, and that modular courses and human–AI collaborative project studios can better respond to industry needs (Zhu & Guo, 2024).

Meanwhile, research on human–AI co-creation within the design process suggests that generative artificial intelligence can play a critical role in facilitating creative divergence, iterative development of design solutions, and the reorganization of workflows, while simultaneously introducing new challenges to designers' authorship, agency, and professional judgment (Wang et al., 2025). Building on these preceding studies, this paper adopts "AIGC-enabled interdisciplinary talent cultivation for digital media art with a focus on design–technology integration" as its point of departure. Rather than conducting quantitative experiments or data-driven analyses, it employs literature review and instructional workflow analysis to concentrate on three major aspects:

(1) mapping the key stages through which AIGC intervenes in digital media art creation and identifying its impacts on competency structures;

(2) proposing a competency framework for interdisciplinary talent cultivation from the perspective of design–technology integration;

(3) constructing curriculum and instructional models characterized by task-chain learning and human–AI co-creation, thereby providing a conceptual foundation for subsequent educational reform.

2. Research Progress on AIGC and Digital Media Art Education

The application of generative artificial intelligence in the

fields of art and design has become a major topic of international research. Manovich (2022) points out that generative models not only transform how visual media are produced but also drive a broader shift in creative labor—from "handcrafted construction" toward "algorithm-driven visual exploration." This shift, in turn, provides design education with new epistemological foundations and new aesthetic conditions for artistic practice. In more specific instructional contexts, Fleischmann (2024) examined the learning experiences of design students who used generative image tools and found that while such tools significantly enhance students' ability to diversify conceptual directions during the ideation phase, they also require teachers to reorganize creative workflows and evaluation strategies so that the dominance of tools does not weaken students' learning processes or diminish their creative agency.

From the perspective of visual arts education, Bian et al. (2025) analyzed the pedagogical effects of integrating AI-generated imagery through experimental teaching cases. Their findings suggest that generative images can enhance students' visual expressiveness, but also emphasize the need for structured prompting strategies that guide students toward controlled creative pathways, thereby helping them maintain authorship and design subjectivity. Domestic research has similarly focused on the influence of generative technologies on design education. For example, Fu and Tan (2024) argue that the introduction of AIGC has accelerated the transformation of knowledge structures within artistic creation, further dissolving the boundary between visual expression and image-generation technologies. As a result, digital art education must redefine the constitution of creative competencies at both theoretical and curricular levels.

Within research specifically concerned with digital media art, 骆(2025) highlights that as digital imaging and interactive technologies become increasingly integrated, digital media art education must strengthen the parallel development of design thinking and technical abilities. Otherwise, it will be difficult to meet the demand for interdisciplinary talent. This issue becomes even more prominent under AIGC conditions: although intelligent tools lower the technical barriers in production, they simultaneously raise the requirements for students' understanding of generative logic, their capacity for cross-modal coordination, and their ability to make structural design judgments. Extending this argument, Feng (2023), writing in Digital Creativity, states that human–AI co-creation will become a core competency for future creative practice, calling for an educational framework that integrates design thinking, generative control, and technological integration.

In summary, existing research has already extended beyond discussions of "how generative tools are used," moving toward a broader consideration of "how creative logic and competency structures are being reconstructed." However, a systematic training framework specifically tailored to digital media art remains insufficiently developed. Notably, there is a clear lack of theoretical foundations that address the deep integration of "design + technology." Building upon this research gap, the present study further develops a competency structure model suitable for talent cultivation in digital media art under AIGC conditions.

3. Reconstruction of Interdisciplinary Competency Structures in Digital Media Art Driven by AIGC

The intervention of generative artificial intelligence has transformed digital media art production from a linear workflow into a cyclical structure characterized by "concept–generation–integration," and, correspondingly, the competencies required of practitioners have shifted from singular skill sets to increasingly integrated and composite structures. Traditional talent cultivation in this field has emphasized visual modeling, software operation, and project-based practice. However, within an AIGC environment, the core of creative work is no longer confined to tool proficiency; instead, it hinges on the creator's understanding of generative logic, their ability to exercise cross-modal control, and their capacity for technological integration. Students must take the initiative during the conceptual stage to plan narrative structures and visual languages; during the generative stage, they must understand the characteristics of models and engage in meaningful intervention; and during the integration stage, they must complete engine deployment, interaction construction, and multimodal compositing. This signifies a transition from being "operation-centered" creators to "structure-oriented" creators.

Based on these changes, the interdisciplinary competencies required in digital media art in the AIGC era can be categorized into four interconnected layers: the cognitive layer, the creative layer, the technical layer, and the reflective layer. The cognitive layer emphasizes cross-modal comprehension and conceptual organization; the creative layer emphasizes visual generation and rapid prototyping; the technical layer emphasizes engine integration and data flow processing; and the reflective layer emphasizes aesthetic judgment, ethical awareness, and control over generative outcomes. These four layers collectively constitute a progressive yet mutually constraining competency system, enabling students to complete a closed-loop creative process that moves from conceptualization to realization within complex digital production environments.

AIGC thus pushes digital media art talent development from a model of "skill accumulation" toward one of "structured and composite competencies." It highlights a cyclical workflow based on concept–generation–integration. The competency structure model proposed in this chapter, along with its corresponding table, provides a foundation for constructing subsequent curriculum systems and instructional models.

Table 1: Reshaping of Digital Media Art Competency Structures Under AIGC

Competency Dimension	Focus of Traditional Training	Competency Expansion in the AIGC Era
Cognitive Layer	Image/narrative comprehension	Cross-modal understanding, structured prompting, generative logic prediction
Creative Layer	Hand drawing, step-by-step modeling	Multi-version generation, rapid prototyping, visual style control
Technical Layer	Software skills, rendering workflow	Engine integration, motion/3D generation, data flow management
Reflective Layer	Aesthetic evaluation	Model controllability, ethical judgment, generative result filtering

4. Construction of an AIGC-Enabled Teaching Model for Integrating Design and Technology in Talent Development

The development of generative artificial intelligence has reshaped the knowledge structure of digital media art programs, shifting it from a linear system centered on tools and techniques to a networked system jointly shaped by conceptual structures, generative logic, and technological integration. Based on the generative characteristics of AIGC and the workflows of digital media art production, this chapter aims to construct a competency framework that reflects the bidirectional coupling between "design" and "technology," and to propose a corresponding instructional structure.

First, from the perspective of competency composition, AIGC causes the creative process to manifest across four interrelated dimensions: cognition, generation, technology, and reflection. From the bottom upward, these four layers respectively correspond to conceptual understanding, multimodal generation, technical integration, and aesthetic judgment. However, their mode of operation is not sequential; instead, the process is recursive, with generative feedback continually producing cycles of iteration. Based on this principle, the present study constructs a "Design–Technology Integrated Competency Framework" (Figure 4-1) to illustrate the interactive relationships among competency elements and the ways in which AIGC intervenes at different levels.

Second, from the perspective of instructional operation, the generative and iterative characteristics of AIGC require teaching structures to shift from skill training centered on individual courses to process-oriented learning that spans multiple courses. This study proposes a "Curricular Cluster–Integrated AIGC Competency Network" (Figure 4-2), in which design-thinking courses, technology-application courses, and integrated-creation courses are connected through three cross-cutting competency nodes—prompt structure control, multimodal generation management, and generative version integration—to form transferable learning pathways. This structure emphasizes that AIGC-related competencies should not be confined to a single course; rather, they should become essential, foundational elements that support learning across the entire program.

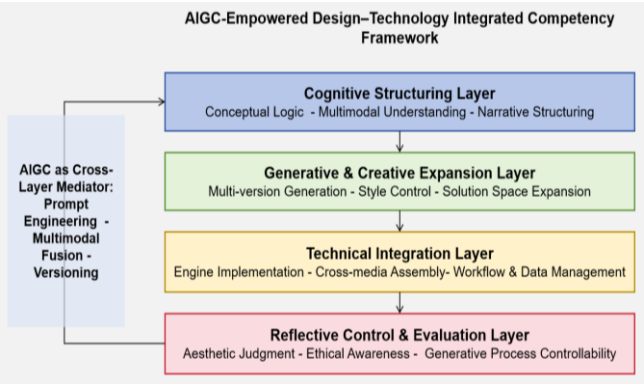

Figure 1: AIGC-Empowered Design–Technology Integrated Competency Framework

Finally, to clarify the functional role of AIGC within the talent cultivation process, this study identifies three key instructional mechanisms (Table 1):

(1) the generative mediation mechanism, which expands the boundaries of conceptual exploration;

(2) the workflow coupling mechanism, which supports the synchronous evolution of design decisions and technological implementation;

(3) the iterative convergence mechanism, which enables students to form stable bases for judgment through version comparison and the documentation of generative trajectories.

Together, these mechanisms constitute the core logic of AIGC-enabled teaching that fosters the integration of design and technology.

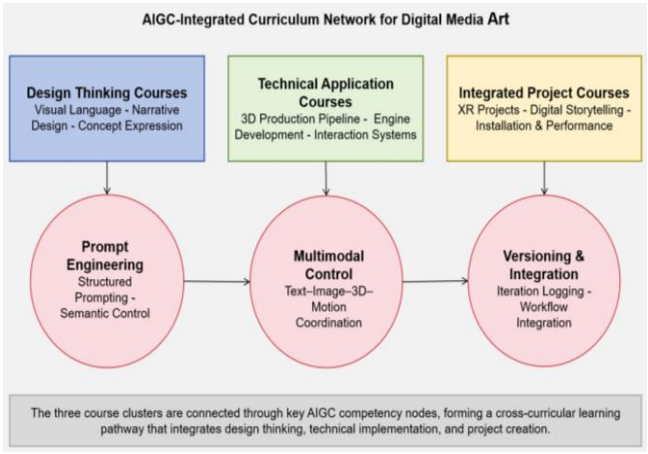

Figure 2: AIGC-Integrated Curriculum Network Map

In summary, the competency model and curriculum network framework proposed in this chapter provide a structured theoretical foundation for building a system of interdisciplinary talent development in digital media art under AIGC conditions.

5. Talent Development Strategies for AIGC-Enabled Interdisciplinary Training in Digital Media Art

Based on the previously established competency framework and curriculum network, the development of interdisciplinary talent in digital media art under AIGC conditions must move beyond fragmented course-level reform and instead construct a holistic system guided by competency progression, process organization, and human–AI collaborative creativity. To achieve this, the following strategies are proposed.

First, at the level of competency restructuring, digital media art programs must shift from traditional skill-oriented training toward a model that emphasizes design–technology integration and structural competencies. This requires clarifying the role of AIGC across different stages of creation, embedding generative logic into the cognitive layer of design ideation, and enabling students to develop multimodal conceptual expansion capabilities. At the same time, courses must strengthen students' understanding of generative models, enabling them not only to produce images or outputs but also to interpret model behavior, construct prompting strategies, and manage cross-modal data flows—thereby elevating technical learning from software operation to structural comprehension.

Second, at the level of curricular and instructional design, the incorporation of AIGC necessitates a shift from isolated, tool-based courses toward a multi-course, interconnected instructional structure. This study proposes that digital media art programs should build a "multi-course integrated learning mechanism" in which design-thinking courses, technology-application courses, and integrated-creation studio courses are linked through key AIGC competencies. For example, prompting logic learned in early conceptual courses should be transferred into generative image production; multimodal workflow knowledge should flow into interaction design; and generative version control should become a transferable method used across project-based courses. In this way, students experience a learning structure that progresses from "conceptual expansion → multimodal generation → engine integration → project assembly," forming a complete and coherent developmental trajectory.

Third, at the level of teaching process organization, AIGC-enabled learning should adopt task-chain and iteration-driven structures rather than discrete, single-output assignments. Each teaching unit should be structured around three cyclical components: conceptual divergence, generative intervention, and integrative convergence. Teachers should guide students to record generative paths, compare different versions, evaluate generative logic, and refine design decisions through iteration. This approach not only strengthens students' reflective awareness but also builds their capability for human–AI collaborative judgment—an indispensable competency in AIGC-driven creative processes.

Fourth, in terms of project-based practice, interdisciplinary projects should be constructed around real production environments that combine conceptual design, data preparation, multimodal generation, engine integration, and interactive deployment. Project outcomes should not merely evaluate final artifacts; instead, they should assess students' ability to coordinate design logic and technical implementation, their capacity to control generative processes, and their ability to document and interpret iterative trajectories. This ensures that the evaluation system aligns with the competency structure of design–technology integration.

Finally, at the level of value orientation, AIGC-driven talent cultivation must emphasize students' reflective and ethical competencies. With the expansion of generative technologies, issues such as authorship, creative agency, data ethics, and cultural representation are becoming increasingly prominent. Therefore, programs should incorporate ethical literacy, evaluation of generative authenticity, and critical understanding of AI-assisted creativity into the curriculum to ensure that students develop the capacity to manage generative risks and uphold responsible creative practices.

In summary, AIGC-enabled interdisciplinary talent cultivation in digital media art must construct a multi-dimensional strategy that combines competency restructuring, process-driven instructional mechanisms, integrated curriculum design, and reflective project practice. These strategies collectively support the transformation from skill-based education to structural competency development, forming a new model of interdisciplinary training aligned with future creative industries.

6. Conclusion

This study, conducted in the context of the paradigm shift in creative practice driven by generative artificial intelligence, proposes a four-dimensional interdisciplinary competency structure encompassing cognition, generation, technology, and reflection, in response to the talent development needs arising from the integration of "design" and "technology" in digital media art. It further constructs a curriculum network that supports the flow and transformation of competencies across multiple courses, thereby forming an instructional model in which AIGC functions not only as a technological mediator but also as a driver of cross-modal creative expansion.

The strategies proposed in this study—including competency restructuring, multi-course integrated learning mechanisms, iterative task-chain instruction, and reflective project-based practice—collectively provide a theoretical foundation and practical direction for cultivating interdisciplinary and future-oriented talent in digital media art. Under AIGC conditions, talent development must transcend the traditional separation between design and technology by guiding students to understand generative logic, navigate multimodal workflows, and exercise informed creative judgment within human–AI collaborative processes.

Ultimately, the goal of digital media art education should not be to train mere tool operators, but to cultivate creators with structural agency who can integrate conceptual thinking, generative intelligence, and technological implementation. By constructing a more integrated, iterative, and reflective training system, digital media art programs can better respond to the evolving demands of future creative industries and contribute to the formation of sustainable interdisciplinary talent cultivation models in the era of artificial intelligence.

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