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Research on the Innovative Talent Training Mode of "Three Chain Synergy" in Design Specialty of AIGC

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Abstract: The rapid iteration and practical deployment of generative algorithms present a paradigm shift in higher education pedagogical models. This technological intervention systematically forces the trajectory of design discipline talent development to pivot toward computational intelligence, cross-disciplinary synthesis, and structural innovation. The "Three-Chain Synergy" - the deep integration of educational chain, talent chain, and industrial chain - represents the core pathway for design disciplines to align with industry demands and cultivate innovative talents in the new era. Current challenges in university design programs include lagging industrial chain alignment, insufficient cultivation of innovative capabilities, and slow digital transformation of educational chains. AIGC technology provides a paradigm-shifting mechanism to address these structural deficiencies. This paper examines AIGC technology from a research perspective, defining its core significance in empowering "Three-Chain Synergy" talent development in design disciplines. It analyzes existing issues in current cultivation models, explores innovative talent development frameworks under AIGC empowerment, and proposes practical implementation pathways. The study aims to provide theoretical references and practical paradigms for universities to achieve deep "Three-Chain" integration through AIGC technology, thereby cultivating innovative design talents aligned with industry development needs.

Keywords: AIGC; Design Studies; Triple Chain Synergy; Innovative Talent Cultivation; Model Research

1. Introduction

In the context of deep integration between the digital economy and creative industries, design studies-as a core discipline bridging creative innovation and industrial applications-must align talent development with the trends of industrial digitalization and intelligent transformation, achieving synchronized resonance among education, talent cultivation, and industrial chains [1]. National directives concerning modern vocational education reform structurally mandate the organic integration of education, talent, industrial, and innovation chains to cultivate interdisciplinary professionals oriented toward industrial advancement. AIGC technology, with its core capabilities in content generation, creative assistance, process optimization, and data modeling, has transcended traditional design constraints [2]. It not only redefines job requirements and work models in the design industry but also provides technical support for innovating the concepts, content, and training models of design programs in higher education [3].

The current "triple-chain synergy" training model in university design programs still faces multiple challenges: the disconnect between educational and industrial chains, with curricula failing to align with AIGC-era design industry demands; talent development that doesn't meet innovation requirements, as students struggle to balance creative design skills with digital implementation capabilities; and the lack of technical platforms for tri-chain integration, resulting in low collaboration efficiency and insufficient depth of convergence [4]. Consequently, investigating algorithmic-driven pedagogical frameworks within design programs constitutes a structural necessity for aligning with

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the industrial digital transition. It simultaneously functions as the foundational mechanism for higher institutions to execute advanced human capital development and elevate the epistemic standards of design education. This initiative holds significant practical implications for enhancing design education quality and fostering innovation in the design industry.

2. The Core Connotation and Value of AIGC Empowering the "Three-Chain Synergy" Talent Cultivation in University Design Programs

2.1. The Methodological Mechanism of Algorithmic Multi-Chain Integration

The structural intervention of generative algorithms fundamentally reconfigures the topological relationship among educational frameworks, human capital development, and industrial praxis within design disciplines [5]. Rather than functioning merely as an auxiliary software update, AIGC acts as the core epistemic engine that alters the fundamental logic of design pedagogy [6]. It forces an institutional shift from manual drafting and linear knowledge transmission toward a non-linear, parameter-driven heuristic model [7]. By embedding diffusion models and adversarial networks directly into the educational nodes, the framework cultivates advanced cognitive synthesis, enabling students to navigate complex latent spaces rather than executing repetitive rendering tasks [8,9]. This transition establishes a robust algorithmic foundation that precisely satisfies the digital transformation imperatives of the contemporary design sector.

2.2. Structural Reconfiguration of the Pedagogical Ecosystem

The inherent value of this algorithmic synergy manifests in the systematic eradication of traditional collaborative barriers. Pedagogically, the integration of generative AI compresses the foundational skill acquisition phase, reallocating academic focus toward conceptual curation, semantic prompt engineering, and critical visual analysis [10]. This elevation of the competency matrix aligns the talent chain directly with the analytical demands of high-level industrial operations. Furthermore, AI interfaces act as infrastructural bridges, facilitating real-time synchronization with commercial design workflows. Through algorithmic mediation, academic institutions can directly absorb enterprise-level data models, material constraints, and output standards, effectively institutionalizing industry parameters within the academic assessment matrix [11]. Consequently, this continuous feedback loop of human capital and technological exchange transforms the multi-chain synergy from a conceptual administrative goal into a quantifiable, data-driven operational reality.

3. Existing Issues in the "Three-Chain Synergy" Talent Cultivation of Design Studies in Universities under the Background of AIGC

3.1. The education sector's digital transformation lags behind, failing to meet the demands of the AIGC era.

A systemic latency persists within the pedagogical frameworks of numerous institutional design programs, which predominantly retain a focus on conventional manual competencies. These traditional structures frequently exhibit a procedural lag in systematically embedding generative visual models, algorithmic workflows, and computational design methodologies into their core operations. Core courses like "AIGC Creative Design" and "AI-Driven Visual Design Implementation" are notably absent, resulting in curriculum content that is severely disconnected from the job market demands of the AIGC era [12]. Moreover, the teaching model remains dominated by "lectures + hands-on practice," with AIGC technology merely serving as an auxiliary tool rather than transforming the instructional process. The slow digital and intelligent transformation of the education ecosystem struggles to meet the talent development needs of the "three-chain synergy" (industry-academia-government collaboration).

3.2. Imbalance in Talent Chain Cultivation Capacity, Difficulty in Balancing Innovation and Technical Capabilities

The current design education system exhibits a "polarization" issue: some universities overemphasize creative design and aesthetic cultivation while neglecting students' practical digital skills, leaving graduates ill-prepared for the AIGC-era design industry [13]. Conversely, others blindly adopt AIGC technology in teaching, overlooking the development of students' creative innovation and aesthetic literacy, reducing them to mere "AI tool operators" devoid of core design thinking. This imbalance in cultivating creative innovation, technical application, and industry implementation capabilities across the talent chain makes it difficult to nurture innovative design professionals aligned with the "three-chain synergy" framework.

3.3. Insufficient depth of industrial chain docking and lack of technical carriers for "three chains" coordination

The collaboration between university design programs and the design industry remains superficial, limited to "corporate internships and project partnerships" without a standardized digital platform. This hinders the real-time integration of industry needs, design standards, and pain points into the educational process. Furthermore, AIGC technology, as the core enabler of the "three-chain" synergy, has not been fully utilized. Universities and industries have not leveraged AIGC for joint design, collaborative R&D, or talent co-cultivation, resulting in a lack of technical support for the "three-chain" integration, low collaborative efficiency, and insufficient depth of convergence [14].

3.4. Insufficient faculty capacity, lacking the ability to integrate AIGC with design education

The design faculty predominantly comes from traditional design disciplines, lacking systematic AIGC (Artificial Intelligence Generated Content) technical knowledge and practical skills, which hinders the integration of AIGC with design education. Additionally, some instructors lack industry experience and insufficient understanding of AIGC-era design industry demands and operational models, making it difficult to incorporate industry needs into teaching. This faculty competency gap has become the core bottleneck constraining AIGC-enabled talent cultivation for the "Three-Chain Synergy" initiative.

3.5. Insufficient teaching resources and platforms, with an incomplete support system

A structural deficiency exists in the software and hardware infrastructure for generative AI instruction within certain design programs, manifesting as an absence of specialized algorithmic labs, enterprise-licensed tools, and integrated digital platforms. Additionally, there is a lack of a systematic AIGC design resource repository, such as teaching cases, practical training projects, and industry-specific exam questions. The incomplete teaching support system hinders the effective implementation of AIGC technology in design education and fails to support the talent cultivation practice of the "three-chain" collaboration.

4. AIGC Empowers the Construction of an Innovative Talent Cultivation Model for "Three-Chain Synergy" in Design Studies Majors at Universities

By integrating AIGC's core competencies, the distinctive features of design studies, and the "three-chain synergy" training requirements, we establish an innovative talent development model for design disciplines under AIGC empowerment. Guided by the principles of "AIGC as the core driver, three-chain integration as the goal, innovation capability as the orientation, and industry needs as the foundation," this model—referred to as the "one-core drive, three-dimensional integration, four-tier cultivation, and five-dimensional safeguards" framework—achieves deep integration of the education chain, talent chain, and industrial chain, while systematically nurturing innovative design professionals.

4.1. Core-Driven: AIGC Technology Empowers All Dimensions

Positioning AIGC technology as the core driver for talent development, we integrate it throughout the entire "triple-chain synergy" process. By leveraging AIGC to restructure the curriculum, teaching models, and practical training systems of design disciplines, we break down digital collaboration barriers between universities and the design industry. This enables digital transformation of the education chain, innovative cultivation of talent pipelines, and precise alignment of industrial chains, ultimately establishing AIGC as the pivotal technological platform connecting the "three chains" and driving their convergence.

4.2. 3D Fusion: Intelligent Deep Integration of Education Chain, Talent Chain, and Industrial Chain

Through AIGC technology, we drive three-dimensional synergy and deep integration among the education chain, talent chain, and industrial chain. The education chain adapts to industrial chain demands and talent development goals, leveraging AIGC to innovate curricula, teaching methods, and evaluation systems. The talent chain combines digital education with industrial practice, using AIGC to cultivate integrated capabilities in creative innovation, technological application, and industrial implementation. The industrial chain provides real-world demands and practical scenarios for education, while offering job opportunities and career growth for talent development. By harnessing academic research and development capacities, the industrial sector accelerates its structural upgrades, establishing a systemic feedback loop of human capital and technological exchange.

4.3. Four-level Cultivation: Building a Step-by-Step Innovative Talent Development System

By aligning with the developmental patterns of design students, we employ AIGC technology to establish a four-tiered talent development framework: foundational skills, integration skills, innovation skills, and implementation skills, ensuring systematic cultivation of the talent pipeline. The foundational skills tier focuses on building students' traditional design fundamentals, aesthetic literacy, and AIGC technology proficiency, enabling them to master basic AIGC design tool operations and achieve initial integration of design basics with digital technology. The integration skills tier develops students' ability to apply AIGC in design, empowering them to visualize creative concepts and optimize design solutions through AIGC, thereby achieving deep integration of technical tools and design thinking.

Innovation Capability Layer: Develop students' creative innovation and AIGC-driven creativity, empowering them to transcend conventional thinking through AIGC, explore diverse design approaches, and enhance core innovation capabilities.
Implementation Capability Layer: Through real-world industry projects, cultivate students' ability to translate AIGC-designed solutions into practical applications, enabling them to optimize designs according to industry needs and seamlessly integrate creative innovation with industrial implementation.

4.4. Five-dimensional Support: Comprehensive Support in Faculty, Resources, Platforms, Mechanisms, and Evaluation

We will establish a five-dimensional support system encompassing faculty, resources, platforms, mechanisms, and evaluation to provide comprehensive support for implementing the "AIGC Empowerment + Triple-Chain Synergy" talent development model. By building a multidisciplinary faculty team, developing systematic teaching resources, creating digital collaboration platforms, establishing regular collaborative mechanisms, and formulating diversified evaluation systems, we will ensure the sustainable operation of the talent development model and the deep advancement of the "Triple-Chain Synergy".

5. The Practical Path of AIGC Empowering the Innovative Talent Cultivation of "Three Chain Synergy" in Design Studies Majors of Universities

5.1. Reconstructing the Curriculum System to Promote the Digital Transformation of the Education Chain

With AIGC technology at its core and industry needs as the guide, we are restructuring the modular curriculum system of design studies into "foundations + core competencies + integration + practice" to achieve precise alignment between the education chain and the design industry in the AIGC era. First, we will introduce AIGC core courses such as "Fundamentals of AIGC Creative Design," "AI-Driven Visual Design and Implementation," and "AIGC Design Process Optimization" to cultivate students' practical AIGC skills. Second, we will integrate traditional design courses with AIGC, incorporating AIGC into subjects like "Graphic Design," "Environmental Design," and "Product Design" to achieve blended teaching of traditional design knowledge and digital technology. Third, we will add industry-integrated courses such as "AIGC Application Standards in the Design Industry" and "Practical Implementation of AI Design Projects" to help students understand industry demands and enhance their industry adaptability.

5.2. Innovating Teaching Models to Enhance the Creativity and Effectiveness of Talent Chain Development

The teaching model for Design Studies majors leverages AIGC (Artificial Intelligence Generated Content) technology to transform traditional "teacher-centered instruction" into a student-driven, innovation-focused, and technology-supported approach. The pedagogical framework initiates an algorithmic generation alongside physical mentorship mechanism. Here, students harness generative tools for initial conceptualization; instructors, shifting from primary creators, pivot towards conceptual optimization, aesthetic curation, and cognitive scaffolding. Second, it adopts "project-based learning + interdisciplinary collaboration," building a cross-disciplinary design platform through AIGC to foster synergy between Design Studies and fields like computer science, AI, and marketing, thereby cultivating students' interdisciplinary innovation capabilities. Third, it promotes an "online-offline integration" model, utilizing AIGC's digital teaching platform to achieve intelligent resource distribution, personalized instructional guidance, and real-time interactive engagement.

5.3. Enhancing Industry-Education Synergy to Facilitate Precise Alignment of Industrial, Educational, and Talent Chains

By leveraging AIGC technology to establish a digital collaboration platform between universities and the design industry, we aim to deepen and institutionalize industry-education synergy. First, we will co-found the "AIGC Design Industry Academy" with design firms and creative industry parks, jointly developing talent cultivation plans, curriculum systems, and training bases to achieve shared talent development and resource sharing. Second, we will introduce real-world design projects from the industry, utilizing AIGC to conduct "real-world problem-solving" exercises, enabling students to enhance their design implementation capabilities through hands-on project completion. Third, we will collaborate with enterprises to establish an AIGC Design R&D Center, conducting AIGC application research in the design industry to bridge academic achievements with industrial demands, thereby achieving integrated development of "teaching-research-industry".

5.4. Building a Multi-skilled Faculty Team to Strengthen Core Support for Talent Development

Through the "integration of talent cultivation and industry-academia collaboration" approach, we aim to build a multidisciplinary faculty team with expertise in design pedagogy, AIGC technology, and industrial practice. First, specialized training programs will be implemented, including hands-on AIGC technology workshops and AIGC-integrated design instruction to enhance teaching capabilities. Second, we will recruit

interdisciplinary professionals with AIGC expertise and design industry experience as faculty or adjunct professors. Third, we will facilitate two-way exchanges between academia and industry, enabling faculty to participate in AIGC design projects at enterprises and inviting senior AIGC experts to serve as adjunct instructors for practical teaching.

5.5. Enhancing the Teaching Support System to Ensure the Sustainable Operation of the Training Model

To establish a systematic teaching support framework that provides both software and hardware infrastructure for AIGC-powered "triple-chain synergy" talent development, the initiative implements four key measures: 1) Establishing an AIGC Design Professional Laboratory equipped with licensed AIGC tools, high-performance computing systems, and digital presentation devices to create hands-on training platforms; 2) Developing an AIGC Design Teaching Resource Library that integrates instructional cases, practical projects, industry-specific challenges, and design standards to enable resource sharing; 3) Refining collaborative mechanisms through detailed implementation guidelines for university-local and university-enterprise partnerships, with clearly defined responsibilities to ensure sustained cooperation; 4) Implementing a diversified evaluation system that assesses students' comprehensive capabilities through "teacher evaluation + corporate assessment + AI data analysis," incorporating creativity, AIGC operational proficiency, and industry project execution skills.

6. Conclusion

The advancement of AIGC technology has not only redefined the development model and job requirements of the design industry, but also created new opportunities for innovating talent cultivation models in university design programs. It has become a core technological support for promoting the "three-chain synergy" in design education. Currently, the "three-chain synergy" in design education faces challenges such as lagging digital transformation in the education chain, imbalanced talent cultivation capabilities, and insufficient depth of industrial chain integration. The empowerment of AIGC technology can effectively break down the barriers to "three-chain synergy," driving intelligent and deep integration among the education chain, talent chain, and industrial chain.

The innovative talent cultivation model for design disciplines in higher education, developed under the "AIGC Empowerment" framework, achieves three-dimensional integration of educational, talent, and industrial chains through AIGC technology. This model proposes practical approaches including curriculum restructuring, teaching innovation, industry-education collaboration, faculty development, and support system enhancement. Design programs should seize AIGC opportunities to transcend traditional training paradigms, deeply integrate AIGC with design pedagogy and industry partnerships, and establish regular, precision-driven synergy among these three chains. The ultimate goal is to cultivate innovative design professionals with creative innovation capabilities, AIGC technical proficiency, and industry implementation skills. Such a paradigm elevates the structural quality of design pedagogy. Concurrently, it constructs a resilient human capital foundation for the sector's innovation-driven transition, manifesting a reciprocal structural evolution between academic instruction and industrial praxis.

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