Reconstruction of Design Education Driven by the Dual Wheels of the 15th Five-Year Plan and AIGC Technology

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Abstract. Against the backdrop of the intersection between China's 15th Five-Year Plan and the AIGC technological revolution, this paper argues that the combined effect of policy and technology is propelling a paradigm shift in design education. It proposes that design education is undergoing a fundamental paradigm reconstruction from "tool training" to "meaning architecture", with the core goal of cultivating "meaning architects" who master human-machine collaboration and define Chinese aesthetic values. This study presents a systematic path guided by the "reverse reconstruction" methodology and centered on the "HCIE model" (Objective-Curriculum-Teaching-Evaluation), and verifies its effectiveness through a 32-week controlled teaching experiment. Students in the experimental class showed 15%-56% improvements in core indicators including technology integration, strategic thinking and commercial implementation, providing targeted and practical references for global design education reform in the AI era.

Keywords: Design Education; 15th Five-Year Plan; Generative Artificial Intelligence (AIGC); Reverse Reconstruction; Human-Machine Collaboration.

1 Introduction

The vision extending from the 15th Five-Year Plan period to 2035 outlines the blueprint of "Chinese-style modernization", placing "enhancing national cultural soft power and international cultural influence" in a prominent strategic position [1]. This requires design education to undertake the core mission of transforming Chinese cultural resources into global contemporary competitive advantages. Meanwhile, AIGC as "creative productivity" is reshaping the global design industry at an unprecedented rate. According to Adobe's 2024 Digital Trends Report, over 85% of global designers have integrated AI tools into their daily workflows, with 92% penetration in graphic design and 87% in brand design; nearly 48% apply AI to end-to-end commercial projects, reducing average design cycle time by 35% and increasing creative output volume by 2.3 times [2]. Against this backdrop, design education urgently needs to shift from cultivating "skilled executors" to nurturing "meaning architects" who can lead human-machine collaborative creation.

R. Zur et al. (eds.), *Proceedings of the 2026 5th International Conference on Art Design and Digital Technology (ADDT 2026)*, Advances in Computer Science Research 131,
https://doi.org/10.2991/978-94-6239-737-8_22

However, current design education exhibits significant "structural lag" globally, especially in Chinese applied universities. Most institutions have not yet integrated AIGC into core curricula, and this lag manifests in three fundamental dimensions of "disconnection":

Knowledge-technology disconnection: AIGC technology evolves at an annual iteration rate of approximately 100%, while university talent training programs typically have a 4-year adjustment cycle, creating a substantial "technology time gap" that leaves graduates' skills outdated before entry into the workforce.

Supply-demand disconnection: The global market demand for interdisciplinary design talents with AIGC application capabilities, data thinking and cross-media narrative skills is growing at an annual rate of 42%, but existing training systems cannot respond systematically due to rigid disciplinary boundaries.

Education-industry disconnection: Closed on-campus training diverges significantly from real industrial processes and evaluation standards, with over 70% of school-enterprise collaborations remaining at the superficial level of guest lectures.

These dilemmas reveal that the root cause lies in the fundamental mismatch between traditional static knowledge production modes and the dynamic knowledge network of the digital intelligence era [3]. Therefore, this study aims to build a new design education paradigm that organically integrates national strategic logic, AIGC technological momentum, artistic creation laws and commercial market insights. This is not merely a curriculum adjustment, but a systemic transformation that will determine whether design education can support the development of Chinese design's independent discourse system.

2 Paradigm Reconstruction: Four Shifts from "Tool Training" to "Meaning Architecture"

Design education requires a thorough paradigm reconstruction covering four interrelated dimensions: value logic, ability coordinates, curriculum system and faculty roles.

2.1 Value Logic Shift: From Instrumental Rationality to Value Rationality

When AIGC can complete 60%-80% of routine executive design tasks efficiently [4], the value foundation of design education must shift from the instrumental rationality of "aesthetics and efficiency" to the value rationality of "meaning construction and value creation".

Aesthetic literacy priority: Human aesthetic judgment becomes the irreplaceable core competitiveness [5]. Design education should strengthen classic work analysis and art history training, and implement "AI-generated vs. human-optimized" comparative training modules to help students clarify the unique value of human intervention.

Strategic thinking core: Designers must evolve from instruction executors to strategic architects. The core educational task is to train students to diagnose complex design problems through systematic user research and market analysis, with AIGC acting as an efficient auxiliary tool to provide diverse visual solutions.

Cultural confidence foundation: Training large models with Chinese cultural characteristics faces the challenge of insufficient high-quality Chinese design corpora. Design education should guide students to deeply explore local cultural resources and master the ability to translate them into contemporary global design languages.

2.2 Ability Coordinate Shift: From Single Skill to Interdisciplinary Competency Model

The traditional "software operation-visual expression-individual creation" competency framework can no longer address AIGC era challenges. It must be upgraded to an interdisciplinary competency spectrum integrating four core capabilities:

Cross-cultural translation ability: Designers should act as cultural translators, as demonstrated by Sichuan Fine Arts Institute's integration of the "Chinese space spirit" into Shenzhou series mission logos, achieving global communication of Chinese cultural connotations [6].

Human-machine collaborative thinking: Beyond basic prompt engineering, it requires establishing a creative dialogue mechanism with AI, implementing a four-stage integration strategy of "trend analysis-concept divergence-scheme deepening-outcome evaluation".

Narrative and emotional construction ability: Human designers' unique advantage lies in building emotional connections with audiences. The "cultural symbol anchoring method" can be used to achieve cross-style integration and targeted emotional expression.

Business thinking and cost awareness: Mature designers must systematically balance design decisions with commercial goals such as production costs, channel adaptation and market profitability (see Table 1).

Table 1. Reconstruction of Design Education Competencies.

Traditional Competency	Emerging Competency	Educational Response Strategy
Software Operation	Human-Machine Collaboration	Introduce AI-assisted workflows; build dual-track tool system
Visual Expression	Systematic Design Thinking	Adopt project-based learning; strengthen cross-media training
Individual Creation	Interdisciplinary Collaboration	Establish cross-professional teams; implement dual-tutor system
Cultural Application	Cultural Translation	Deepen intangible heritage practice; carry out regional innovation projects

2.3 Curriculum System Shift: From Knowledge Transmission to Innovation Ecosystem

The curriculum system must be transformed into a three-layer progressive innovation ecosystem that balances tool compliance and educational effectiveness:

Basic Layer: Integrate "culture, aesthetics and tools" as a trinity. Build a dual-track system of compliant foreign tools and prioritized domestic tools (Jimeng AI, Keling AI, Tongyi Wanxiang), and conduct four-stage tool training from initial understanding to practical application.

Project Layer: Reconstruct all core courses based on "AI-First" principles, adopt a "small, rapid steps" incremental update strategy to avoid conflicts with 4-year training program cycles, and implement a three-stage integration model of "basic penetration-advanced intersection-innovative expansion" (see Table 2).

Table 2. Progressive Curriculum Reconstruction.

Traditional Teaching Stage	Reconstructed Modules	Embedded Technology	Training Goal
Market Research	Intelligent Insight (15%)	Data science; AIGC user analysis	Data-driven thinking
Creative Divergence	Generative Creativity (25%)	Prompt engineering; multi-style generation	Accurate requirement translation
Visual Execution	Human-Machine Optimization (35%)	PS/AI refinement; AI assistance	Efficient collaborative creation
Scheme Evaluation	Cross-border Testing (25%)	Communication studies; AI demonstration	Commercial feasibility judgment

Breakthrough Layer: Establish cutting-edge laboratories aligned with national strategies [7]. For resource-limited private universities, adopt an asset-light co-construction model with local enterprises. At our university, the co-built "Ice and Snow Cultural Tourism Digital Creativity Laboratory" has reduced per-student technical costs by 72% compared to traditional rendering cluster solutions, and increased the number of industry collaborative projects undertaken by students by 210% within one semester of operation.

2.4 Faculty Role Shift: From Knowledge Authority to Innovation Catalyst

Faced with AIGC's 100% annual iteration rate, faculty must fundamentally transform from "knowledge authorities" to "innovation catalysts":

From transmitter to curator: Core functions shift to designing learning experiences and connecting academic-industrial resources.

From authority to collaborator: Form interdisciplinary teaching teams, and require faculty to obtain dual certifications of teaching qualification and AIGC professional training.

From evaluator to growth partner: Adopt a "process evaluation (60%) + outcome evaluation (40%)" system, focusing on students' iterative improvement process rather than final works alone.

3 Practical Path: HCIE Model and Reverse Reconstruction Methodology

3.1 Methodological Cornerstone: Deepened Reverse Reconstruction Thinking

The "reverse reconstruction" approach originates from Outcome-Based Education (OBE) principles but is significantly deepened for AIGC characteristics. Unlike standard backward design that starts from preset learning objectives, reverse reconstruction starts from structural changes in industrial ecological niches, fundamentally redesigns the entire "objective-competency-curriculum-evaluation" education chain, and drives three core shifts: from knowledge-based to competency-based goals, from passive adaptation to active planning of curriculum content, and from disciplinary silos to problem-oriented knowledge organization (see Table 3).

Table 3. Interdisciplinary Competency Goal System (Qualified Standards)

Competency Dimension	Core Observation Points
Technology Integration	Independently use ≥2 AIGC tools; provide ≥5 rounds of prompt iteration logs
Strategic Thinking	Analyze ≥200 target user data points; analysis report directly informs design decisions
Cross-Media Narrative	Generate consistent visual solutions for ≥3 media platforms

3.2 Practical Framework: Optimized HCIE Model

The HCIE model (Hybrid Objective-Core-course Remodeling-Integrated Implementation-Evidence-based Evaluation) is a systematic condensation of the four-dimensional reform path, validated through teaching experiments with strong replicability [8] (see Table 4):

Table 4. HCIE Model Implementation Framework.

Dimension	Core Task	Key Implementation Strategies
H:Hybrid Objective Objective Reconstruction	Four-dimensional competency indicators	Technology + culture + commerce + compliance
C:Core-course Remodeling Curriculum Reconstruction	Workflow-driven modular reconstruction	Minimally invasive transformation; 30% case update per semester

I:Integrated Implementation Integrated Implementation	Multi-party industry-education ecosystem	Four-party collaboration mechanism; project work order system
E:Evidence-based Evaluation Evidence-based Evaluation	Digital portfolio evaluation	Teacher (30%) + enterprise (30%) + peer (20%) + AI (20%)

3.3 Practical Verification: Controlled Teaching Experiment

This teaching reform experiment was conducted over two consecutive semesters (32 teaching weeks) in 2025, with two parallel classes of 2023 visual communication design majors as subjects: the experimental class (32 students) adopted the HCIE model and reverse reconstruction methodology, while the control class (30 students) maintained the traditional lecture-based teaching model. It should be noted that as an exploratory study in applied universities, the sample size is limited, but the controlled experimental design ensures the internal validity of the conclusions. Data were collected through three independent methods: blind work scoring by 5 industry experts, standardized skill assessment questionnaires, and enterprise adoption rate statistics (see Table 5 and Table 6).

Table 5. Core Competency Achievement Rate Comparison.

Indicator	Experimental Class	Control Class	Improvement Rate
Proficient in ≥2 AIGC tools	100% (3.4 types average)	43% (1.3 types average)	57%
Provide structured prompt logs	89%	33%	56%
Include data-driven insight	88%	42%	46%
Elaborate commercial logic	85%	50%	35%
Works adopted by enterprises	25% (8 pieces)	3% (1 piece)	22%

Table 6. Sub-item Enterprise Mentor Evaluation Scores (100-point scale)

Evaluation Dimension	Experimental Class	Control Class	Score Gap
Technology Application	82	68	14
Strategic Thinking	86	65	21
Cultural Expression	79	72	7
Commercial Feasibility	84	69	15
Comprehensive Score	84	70	14

The data show that the experimental class significantly outperformed the control class in all dimensions, with the largest gap in strategic thinking (21 points). Taking the "Ice and Snow World Cultural and Creative Ice Cream" project as an example, the student team used AIGC to analyze 3,200 social media comments to identify tourist preferences, generated 120+ conceptual schemes through human-machine collaboration, and the final adopted solution increased product pre-sales by 28% compared to the previous year. Enterprise mentors uniformly feedback that experimental class students possess rare commercial awareness and problem-solving abilities among new graduates.

4 Conclusion and Prospect

This study makes two key academic contributions: first, it deepens the reverse reconstruction methodology by clarifying its essential differences from traditional OBE and tailoring it to AIGC-driven design education; second, it proposes and validates the operable HCIE model for private applied undergraduate universities, filling the research gap in localized design education reform in the digital intelligence era. The study demonstrates that the deep integration of AIGC and design education is a systemic paradigm transformation with "reverse reconstruction" as the methodology and "mechanism innovation" as the core.

Successful integration requires four-dimensional collaborative evolution from objectives to evaluation. Building a stable four-party collaboration mechanism is the key fulcrum for resolving industry-education disconnection, while the "small, rapid steps" curriculum update strategy balances educational stability and technological adaptability. The HCIE model proves that China's independent design education knowledge system is rooted in countless micro innovation practices serving regional industrial development.

Looking ahead, future research will expand the sample size to include 8-10 universities across different regions to enhance the generalizability of conclusions, apply the HCIE model to digital media art and environmental design fields, and promote the construction of a regional open knowledge innovation community.

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