

Research and Practice on Artificial Intelligence-Assisted Teaching Models in Interior Design Education That Integrate Hand-drawn Design Techniques

Yanzhu Pan *

College of Space Design, Liaoning Communication University, Shenyang, Liaoning, China

* Corresponding author: Yanzhu Pan

Abstract

As digital design trends continue to advance, hand-drawing instruction in interior design faces numerous challenges, including insufficient creativity stimulation, suboptimal skill development, and inadequate personalized guidance—factors that significantly diminish the effectiveness of traditional teaching methods. Artificial intelligence assistance, leveraging its strengths in rapid rendering, style transformation, and intelligent feedback, brings new momentum to hand-drawing education and holds promise for reshaping students' learning patterns. This paper presents an in-depth study of a three-stage integrated teaching model: foundational training, stylistic integration, and practical project application. By analyzing the diversity of creative expression in students' hand-drawn works and incorporating student feedback, the research demonstrates that this approach significantly enhances students' drawing proficiency and creative output while optimizing resource allocation. The seamless integration of AI and hand-drawing effectively overcomes long-standing limitations of conventional teaching, paving innovative pathways for cultivating interior design talent. Nevertheless, further work is needed to explore the adaptability of AI tools and to establish more comprehensive mechanisms for collaboration between teachers and students.

Keywords

Artificial Intelligence (AI); Hand-drawn Interior Design; Integrated Teaching; Innovative Models; Practical Research.

1. Introduction

The deep integration of the digital economy and creative industries is driving design education to transform its talent development model, fostering interdisciplinary professionals who combine technical expertise with artistic sensibility. Hand-drawing courses are highly practical disciplines; in interior design, hand-drawing serves not only as a core method of creative expression but also as a vital bridge connecting spatial design with construction implementation. In conventional teaching models, students often face challenges: first, foundational training in elements such as line work and perspective tends to be inefficient and repetitive, consuming significant time; second, overreliance on traditional hand-drawing methods may restrict creativity and fail to meet the diverse demands of modern design. The emergence of artificial intelligence offers new solutions—AI tools can rapidly generate numerous design reference cases, providing students with creative inspiration and improving efficiency. Therefore, exploring a blended teaching approach that integrates AI with interior design hand-drawing not only addresses shortcomings in traditional education but also cultivates core competencies essential for students' future professional development. This research area holds significant theoretical and practical implications for advancing reform

and innovation in interior design education. Theoretical and Technical Foundations of Hand-drawn Interior Design Instruction

1.1. Theoretical Framework for Hand-drawn Interior Design Instruction

As a core discipline for cultivating and developing students' design thinking, hand-drawing holds a central and pivotal role in design education, serving as a direct medium to transform abstract concepts into concrete visual representations. Every stroke in a sketch carries an experimental intent and supports instant modifications, fully reflecting the inherently divergent nature of design thinking. Furthermore, foundational training in perspective, composition, and light-shadow relationships enhances students' spatial perception, proportional accuracy, and aesthetic judgment of form. Design thinking and hand-drawing essentially reinforce each other: the design thinking process follows a cyclical flow—beginning with analysis, then generating ideas through divergent thinking, refining those ideas, and finally deepening the details. Hand-drawing serves as the primary thread throughout this process, enabling exploration of multiple possibilities through conceptual sketches and documenting the creative workflow. During the refinement stage, hand-drawn illustrations allow for scrutiny of structural details. In essence, the substance of hand-drawing instruction lies in nurturing a comprehensive thinking process.

1.2. Overview of AI-Assisted Design Technology

Emerging technologies, exemplified by Generative Artificial Intelligence (AIGC), offer a comprehensive toolkit to overcome the aforementioned teaching challenges. Applications of mainstream AIGC tools in the design field:

Table 1. Application Analysis Diagram

direction of application	Core Technologies/Tools	Specific Functions and Educational Value
Sketch Generation	Midjourney, DALL•E 3	Quickly generate numerous spatial concept diagrams with diverse styles, compositions, and atmospheres using text prompts, expanding students' inspiration pool and creative horizons.
Style Migration and Formal Exploration	Stable Diffusion	Quickly render hand-drawn sketches into various preset style effects, helping students intuitively understand the expressive forms of different design languages and accelerating their style recognition and experimentation.
Visualization Tools and Efficiency Improvement	Various AI rendering tools	Quickly add basic materials, lighting, and backgrounds to hand-drawn sketches, clarify design concepts, facilitate classroom discussions and mid-term reviews, and free students from repetitive tasks to focus on the design itself.
Quick image generation and creative inspiration features	Core Model of Generative AI (AIGC)	Break down students' knowledge boundaries and imagination limits, offering visual combinations that deliver transcendent personal experiences; significantly shorten the visualization cycle of design proposals, supporting multiple rounds of "conception–visualization–evaluation–optimization" iterations to enhance learning efficiency.

1.3. Theoretical Framework for Integrated Teaching

The integration of artificial intelligence and hand-drawn instruction redefines the teacher-student relationship through the concept of human-computer collaboration, pioneering a novel teaching model. In traditional education, the teacher-student relationship follows a teacher-to-student paradigm; however, in this blended learning approach, it evolves into a tripartite interaction among teachers, students, and artificial intelligence. The teacher's role has shifted from being a transmitter of knowledge in conventional teaching methods to a designer of learning tasks, guiding students to effectively utilize AI-generated content while

fostering their ability to integrate AI-generated information with hand-drawn expressions to enhance communication effectiveness [1].

2. Analysis of the Current Status and Challenges in Hand-drawn Interior Design Teaching

2.1. Problems in Traditional Hand-drawing Teaching

The learning process is lengthy, with high entry requirements that often discourage students, leading to suboptimal course outcomes and difficulty in quickly mastering complex spatial design skills. In traditional hand-drawing instruction, fundamental techniques such as line control, understanding of perspective principles, and rendering light-shade gradations require extensive practice to master. Beginners frequently struggle with precise brushstroke control and spatial proportion, resulting in early works that appear crude and lack depth, which further exacerbates difficulties and feelings of frustration. The conventional teaching approach relies excessively on teachers' one-way demonstrations and students' mechanical imitation, lacking personalized guidance tailored to individual learning progress. For complex spatial designs, manual drawing demands significant time for meticulous drafting and repeated adjustments; achieving a complete visual presentation from concept to final product within limited class hours poses significant challenges, severely hindering the iterative refinement of design works [2].

2.2. New Teaching Challenges Following the Introduction of AI Technology

(1) Overreliance on artificial intelligence may undermine the development of fundamental hand-drawing skills. In the field of art design, the widespread use of AI tools has led many students to depend excessively on these technologies for creation, neglecting traditional foundational techniques such as hand-drawing.

(2) The boundaries between copyright and originality remain ambiguous. The rise of AI-generated content has further complicated these distinctions. The lines between ownership of creative works, inspired adaptations, and direct plagiarism are often blurred; some students even submit complete generated design proposals as hand-drawn assignments, making it difficult for instructors to accurately assess students' drawing skills and creative competence.

(3) Teachers should enhance their proficiency in utilizing intelligent educational software. As primary facilitators of teaching activities, educators must not only possess extensive teaching experience and solid professional expertise to meet diverse student learning needs, but also demonstrate strong competencies in intelligent information technologies, adeptly employ various instructional tools and AI platforms, and adopt flexible teaching approaches to improve educational outcomes and student engagement. To address these challenges, several measures can be implemented. First, strengthening teacher training and professional development is essential. Regular training sessions, workshops, and academic exchanges on intelligent software should be organized to help teachers continuously update their teaching philosophies, enhance professional competence, and particularly improve their ability to integrate intelligent information technologies into instruction. Additionally, introducing high-quality educational resources and expert teams can provide professional guidance and support. Inviting AI specialists to deliver lectures, share insights, or offering one-on-one mentoring sessions enables teachers to better master AI-assisted teaching methodologies.

3. Development of a Teaching Model that Integrates AI-assisted Technology with Hand-drawn Illustrations

3.1. Overall Framework of the Teaching Model

3.1.1. Core Objective

By integrating innovative AI tools with the rich expressive potential of traditional hand-drawn art, we aim to cultivate interdisciplinary professionals who master both AI application skills and core hand-drawing techniques, thereby fostering cross-domain experts capable of meeting the demands of future creative industries.

3.1.2. Teaching Process

This course employs a closed-loop teaching system comprising three phases: AI-driven creative generation, hands-on drawing practice to enhance expressiveness, and AI-assisted optimization. During the AI-guided phase, instructors guide students in utilizing AI tools for brainstorming, concept development, and preliminary planning to rapidly explore diverse creative approaches; in the hand-drawing stage, selected conceptual works are refined using traditional techniques to enrich emotional depth and artistic quality, further strengthening core skills such as composition, color application, and visual impact; finally, the optimization phase leverages AI technology to fine-tune details, enhance visual impact, and improve efficiency, enabling continuous creative innovation and quality enhancement. This closed-loop model facilitates ongoing feedback and improvement of learning outcomes, ensuring learners progressively master comprehensive creative techniques through practical application [3].

3.2. Strategies for Implementing Phased Teaching Approaches

3.2.1. Basic Stage: AI-Assisted Line Drawing and Perspective Training

Students create their works using standard perspective sketches generated by artificial intelligence. They overlay or trace these sketches to refine their lines and structures. This visual comparison enables them to identify key differences in hand-drawing techniques—such as variations in line thickness, smoothness of curve transitions, and structural accuracy—allowing them to specifically enhance line fluidity and structural precision.

3.2.2. Advanced Stage: Integrating AI into Detailed Hand-drawn Depictions

Students at advanced learning levels can utilize artificial intelligence to generate detailed colorization diagrams. By providing the AI with interior design themes and descriptions of key elements, they can generate multiple coloration schemes that encompass the space's dominant color palette, gradations of light and shadow, and overall ambiance. [4]

3.2.3. Comprehensive Phase: Applications of Artificial Intelligence-Assisted Interior Design

In interior design practice, integrating AI-generated design proposals with traditional hand-drawn renderings enables enhanced design outcomes. Initially, AI tools are employed to create preliminary analysis diagrams—including spatial layouts, functional zoning, and flow path analyses—based on client requirements. Subsequently, traditional drawing techniques are utilized to refine the generated designs creatively, incorporating personal insights and blending AI-driven analysis with artistic vision, thereby significantly saving time. The third step leverages AI to generate one-click 3D model previews that assist in determining furniture placement. Additionally, AI software can simulate lighting variations across different seasons and times of day, rapidly producing design renderings for various contexts. Finally, hand-drawn renderings, material analysis diagrams, floor plans, and 3D models are consolidated into a cohesive design portfolio, which is then supplemented with AI-generated slides to clearly demonstrate the entire design process from requirement analysis to final output. This approach highlights AI's efficiency in image generation and problem identification while

underscoring the unique value of hand-drawing in conveying design emotions and personalized creativity [5].

4. Conclusion and Prospects

In simple terms, artificial intelligence technology significantly enhances the efficiency of hand-drawing instruction and encourages greater student engagement. By utilizing intelligent drawing tools and real-time feedback, teachers can optimize teaching processes, reduce repetitive tasks, and help students master drawing techniques more quickly. The application of AI motivates students to participate more actively and boosts their learning motivation, thereby improving overall teaching outcomes.

This teaching model effectively integrates traditional hand-drawing instruction with artificial intelligence tools. Through a series of phased implementations and adjustments, resources are optimally allocated, aligning precisely with students' cognitive development levels from foundational to advanced stages. However, this innovative approach also imposes higher demands on educators. Teachers must be proficient in operating and integrating AI tools, possess interdisciplinary instructional design capabilities, and be adept at addressing technical challenges flexibly. Enhancing teachers' professional competence not only ensures the effective implementation of this integrated teaching model but also advances interior design education toward greater intelligence and interdisciplinarity, thereby providing crucial support for cultivating a new generation of design professionals with both artistic expertise and technical proficiency.

References

- [1] Yao, H. Q. (2022). A brief discussion on teaching reform of the hand-drawing techniques course in interior design. *Footwear Craft and Design*, 2(3), 51–53.
- [2] Xiong, C. (2022). On teaching reform and innovation for the hand-drawing techniques course in interior design. *Zhejiang Arts and Crafts*, (5), 26–28.
- [3] Li, K. Y. (2025). The implementation of blended online-offline teaching in the interior design hand-drawing techniques course. *Shanghai Packaging*, (2), 250–252.
- [4] Qin, H. J. (2026). Practical exploration of AI-enabling the integration of five educational dimensions in university music education programs. *Journal of Beibu Gulf University*, (6), 4–6.
- [5] Yang, Q. (2026). Artistic style design in AI-generated science popularization illustrations from an aesthetic perspective. *Footwear Technology and Design*, (5), 109–111.
- [6] Chen, M., & Yu, C. (2026). From hand-drawn to digital: Innovative explorations in teaching architectural artistic expression. *Research on Art Education*, (5), 131–133.