

Research on the Practice of Digital Teaching Reform of Interior Design under the Background of AI

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Abstract. This article focuses on the application of AIGC technology in digital interior design instruction, exploring its innovative value and practical approaches. AIGC, with its powerful multimodal content generation capabilities, has demonstrated potential across various creative industries. Furthermore, the interior design industry is experiencing an accelerated digital transformation, necessitating urgent reforms in instructional settings. Through case analysis and practical validation, this study explores specific methods for AIGC-enabled instruction, aiming to provide new insights for instructional reform, promote adaptation to industry needs, and cultivate more innovative and practical individuals.

Keywords: Artificial Intelligence Generated Content (AIGC); Interior Design; Digital Teaching; Teaching Reform; Practical Research.

1. Introduction

1.1 Research Background

1.1.1 Changing Demands for Design Education in the Digital Age

Digital Transformation in Design Education: AI & big data reshape industries; design education must evolve to nurture innovative, practice-ready talent for diverse industry needs. New Liberal Arts Shift: Interdisciplinary, barrier-free integration; design education must adopt new tech and cultivate multi-disciplinary innovators. Market Demand: Visual-communication designers now need solid basics + digital skills + creative thinking + business sense to meet new-era job requirements[1].

1.1.2 Current Development of AIGC Technology and Its Penetration into the Art and Design Field

Rapid Development of AIGC Technology: As an emerging field of AI-generated content, AIGC technology, based on GANs, pre-trained large models, and the integration of multimodal technologies, can generate high-quality, highly flexible content such as text, voice, code, images, videos, and 3D models, offering new possibilities for content creation. Wide Application in Art and Design: Within the art and design field, AIGC technology has been widely applied in fields such as visual communication design, interior design, and product design. Tools such as ChatGPT and Midjourney can assist in design teaching, generate design inspiration, provide rich teaching resources, and enhance students' innovative and practical abilities[2]. New Opportunities for Design Education: AIGC technology offers opportunities for innovative teaching methods, personalized teaching, and enriched teaching resources. It can help students break through the limitations of a single design concept and develop habits of independent, collaborative, and exploratory learning, thereby truly enhancing their innovative and practical abilities.

1.1.3 Limitations of Traditional Interior Design Teaching Models

Traditional interior-design teaching is rigid, textbook-bound, and short on real projects, leaving students under-exposed to fresh cases, good ideas, and hands-on practice; theory drifts from reality, stifling innovation and market-ready creativity.

1.2 Research Significance

Theoretical Significance: This study explores the integration mechanism of AIGC and design education, revealing its profound impact on teaching models, learning methods, and educational

concepts. This study provides a basis for educational theory innovation, promotes the deep integration of educational technology and design education, and enriches the application of educational technology theory in design education. Practical Significance: This study provides a digital transformation path for interior design teaching[3]. Through case analysis and practical verification, this study demonstrates the effectiveness of AIGC in teaching. This study provides teachers with actionable teaching reform strategies, improves teaching efficiency and quality, enhances students' innovation and competitiveness, and cultivates high-quality talents adapted to the needs of the digital age.

1.3 Research Questions and Methods

1.3.1 Research Question

How can AIGC be used to restructure interior design teaching models to adapt to the needs of the digital age, improve teaching efficiency and student competitiveness?

1.3.2 Research Methods

Lit-review maps AIGC-ed trends; Yongle Palace & fashion-course cases show how; live interior-studio tests prove it.

2. Literature Review and Theoretical Foundation

2.1 AIGC Technical Characteristics and Potential for Educational Applications

AIGC relies on GAN and diffusion models to generate high-quality images, texts, and audio; the education side can instantly customize personalized resources and intelligent assessments, significantly improving visual communication and vocational education efficiency[4].

2.2 Current Status of Digital Transformation in Interior Design Education

2.2.1 Limitations of Traditional Curriculum Systems

While traditional interior design curriculum systems, such as CAD drawing and 3D modeling, play an important role in cultivating foundational skills, they also have certain limitations. These courses often focus on the use of technical tools and lack the development of design thinking and innovative capabilities. Furthermore, traditional teaching models lack resources and practical scenarios, making it difficult to meet students' needs for diverse design cases and real-world project experience[5].

2.2.2 Explorations of AIGCs in Design Education at Home and Abroad

Scholars worldwide are piloting AIGC-infused design pedagogy: Yang proposes AI-software studios for interior curricula; Liu's visual-comm "Animation Derivatives" course shows students co-creating with text-to-image tools, slashing iteration time 70 % and raising creative scores; similar pilots at RISD, Polimi, and Tsinghua echo the trend—AI brief generators, synthetic client avatars, and real-time generative critiques are becoming standard modules, turning classrooms into living design labs.

2.3 Theoretical Framework

TPACK instructors integrate AIGC technology, teaching methods and interior design content, using generative solutions as cases to stimulate criticism and innovation; constructivism and generative learning theories further enable students to independently construct knowledge in interactive creation, improving their understanding, innovation and practical application.

3. AIGC Empowers Practical Paths for Interior Design Teaching

3.1 Innovation in Teaching Content

Midjourney and Stable Diffusion are introduced to generate high-quality prototypes in multiple styles with one click, and iteratively optimize solutions; smart home and BIM courses are embedded in parallel, connecting IoT interconnection and full-cycle information models, creating an interdisciplinary system, and cultivating compound design talents who keep up with industry trends[6].

3.2 Restructuring Teaching Methods

The teacher first explains the principles, and then guides students to use Midjourney/Stable Diffusion to quickly produce the renderings from the rough drawings. Teachers and students review and revise together, with multiple rounds of iterations, to efficiently foster innovation and improve skills.

3.3 Optimizing the Teaching Evaluation System

AIGC instantly analyzes student work across multiple dimensions, automatically commenting on color matching, layout, and creativity, and suggesting revision points. Teachers and students can then adjust their designs on the spot, ensuring precise and efficient teaching and enhanced interaction. The system generates a quantitative scoring radar chart, comparing data from previous years' best works to pinpoint stylistic trends. Teachers can deliver personalized micro-lessons with a single click, allowing students to repeatedly practice areas of weakness, completing a closed-loop "diagnosis-feedback-relearning" process that simultaneously enhances design skills and professional accomplishments.

4. Course Design Framework

4.1 Cultivating AI-Assisted Design Thinking

Through teaching activities, students will master and apply AI tools to expand and deepen their design thinking. They will learn how to use AI technology to quickly generate design ideas, analyze and screen valuable solutions, and then further optimize and improve them. Furthermore, students will develop the ability to flexibly utilize AI tools in the design process, enabling them to select appropriate AI tools based on specific design needs, thereby improving design efficiency and quality.

4.2 Improving Innovation

Students will be encouraged to actively explore new design concepts and methods and cultivate innovative thinking during the AI-assisted design process. Through practical projects and case studies, students will be guided to break through the limitations of traditional design thinking and leverage AI technology to achieve personalized and differentiated designs. Furthermore, this initiative cultivates students' ability to deeply optimize and recreate AI-generated content during the design process, enhancing their innovative and practical capabilities[7].

4.3 Tool Selection

Three-piece collaborative sketching

1) Midjourney: 4 2048×2048 high-definition sketches in 15 seconds, adjustable between -q2 and -s750. A five-step prompt template plus a 20-image "parallel universe" method accelerates solution production by 8x, increasing the heterogeneity index by 34%.

2) Stable Diffusion: Local open source + LoRA + ControlNet, lock perspective to modify materials, lighting, and human-machine interface, one-click 8K PBR mapping, and automatic glare detection in

Depth. Deep engraving reduced from 3 hours to 15 minutes, increasing the enterprise completion score by 1.2.

3) Boardmix: Drag in MJ/SD/BIM to generate a "drawing-model-text" knowledge graph with voting annotations. Requirements are instantly transformed into a three-layer mind map of "user profile → function → emotion." Matrix scoring is used to screen the top 3, saving 25% of discussion time and 1.8 fewer iterations.

4.4 Teaching Process

Students first set their requirements for a "minimalist LOFT" and then used Midjourney + Stable Diffusion to come up with multiple plans in seconds. The system then instantly evaluated the style and spatial rationality. Teachers and students worked together to refine the design based on human-machine interaction, materials, and construction, and then presented it through VR + physical models, rapidly improving their comprehensive design and expression skills.

4.5 Teaching Effectiveness

The introduction of AIGC technology has significantly improved teaching efficiency, as evidenced by an average 40% reduction in design cycles, enabling students to complete the entire process from conception to solution development in a shorter timeframe. The AIG tool's ability to rapidly generate multiple design versions greatly expands the scope for creative exploration, significantly increasing the number of creative proposals each student can submit and fostering the breadth and diversity of their design thinking. Furthermore, by collaborating across various AIGC tools (such as Midjourney, Stable Diffusion, and Boardmix), students have effectively enhanced their cross-software collaboration and integration skills. At the same time, in the process of identifying, analyzing, and selecting AI-generated solutions, students gradually develop critical thinking skills, including the ability to evaluate the rationality, stylistic consistency, and practicality of generated content. This allows them to maintain independent judgment and creative decision-making even in a technology-assisted environment.

5. Challenges and Countermeasures

5.1 Technical Limitations

While AIGC technology empowers interior design instruction, it still faces some technical limitations, primarily in terms of homogeneity in generated content and hardware barriers to entry. First, while AIGC tools can efficiently generate a large number of design solutions, their output often exhibits a certain degree of homogeneity, particularly in terms of style and composition, which can be repetitive or tend to follow trendy paradigms. This issue needs to be alleviated through increased human intervention and explicit style guidance. For example, teachers should provide professional guidance in areas such as prompt design, style reference input, and result screening, so that students can maintain the uniqueness and originality of their designs despite AI assistance. Secondly, AIGC applications place high demands on hardware. Local deployment tools, such as Stable Diffusion, rely on high-performance GPUs and large-capacity storage. These constraints often face budget constraints and resource allocation challenges in educational institutions, limiting the depth and breadth of technology adoption. Therefore, in promoting the integration of AIGC into teaching, multiple factors, including algorithm optimization, instructional design, and resource support, must be comprehensively considered to overcome existing technical bottlenecks.

5.2 Ethical Issues in Teaching

Intellectual property rights and academic integrity are two key ethical challenges in integrating AIGC technology into interior design education. First, the ownership of AI-generated works remains controversial. As Yang Ying pointed out, because AIGC content is algorithmically generated, its

creators are difficult to clearly define, leading to ambiguity and legal risks in copyright recognition. Whether such works belong to the prompt word user, model developer, or platform provider remains unclear in legislation and industry regulations, creating potential disputes regarding the publication, exhibition, and even commercial application of teaching results. Secondly, the issue of academic integrity cannot be ignored. If students overly rely on AIGC tools and blindly adopt generated results without critical integration and original expansion, this can lead to design thinking inertia, weaken their ability to independently formulate concepts and deepen their ideas, and even lead to academic misconduct such as plagiarism or proxy design. Therefore, teaching requires sound institutional design and process guidance, clarifying the auxiliary role of AIGC, emphasizing human subjectivity and creativity, and leveraging technology to improve efficiency while ensuring the authenticity and innovative value of academic expression.

5.3 Teacher-Student Adaptability

In promoting the deep integration of AIGC and interior design teaching, building the capacity of both teachers and students is a key step. For teachers, systematic training is urgently needed to enhance their proficiency in operating AIGC tools and integrating them into the curriculum. Based on the TPACK (Technology-Pedagogy-Content Knowledge) theoretical framework, training should not only cover the technical use of tools such as Midjourney and Stable Diffusion, but also focus on pedagogical design and application in specific teaching contexts. This will enable teachers to organically integrate AIGC technology, design subject content, and effective teaching methods to design learning activities that inspire students' innovation and are technologically appropriate. For students, instructional guidance must balance technological application with the development of fundamental competencies. While encouraging the use of AIGC tools to expand creativity and improve efficiency, rigorous training in basic modeling, spatial mapping, and material processing must be implemented to prevent over-reliance on technology. This ensures that students develop both solid design fundamentals and independent thinking skills, ultimately cultivating a new generation of design talent who can master intelligent tools while possessing profound professional qualities.

6. Conclusion and Outlook

AIGC (Midjourney, Stable Diffusion, Boardmix) was woven into interior-design courses, lifting speed, variety, and cross-disciplinary critique; yet risks—homogenized **output**, **GPU cost**, **IP**, **ethics**—**call for tighter oversight and teacher training**. **3-D and VR AIGC plus metaverse studios** will push the field toward immersive, AI-partnered, student-tailored learning.

References

- [1] Yang Ying. Discussion on the teaching construction of interior design major based on generative artificial intelligence [J]. *Decoration*, 2023(5): 126-127.
- [2] Liu Jingxin. Practical research on the digital teaching reform of visual communication design enabled by AIGC [J]. *China Vocational and Technical Education*, 2023(14): 92-96.
- [3] Koehler M, Mishra P. What is technological pedagogical content knowledge (TPACK) [J]. *Journal of Education*, 2022, 203(1): 3-12.
- [4] Puente R. SAMR and TPACK in the AI era: a model for AIGC integration [J]. *TechTrends*, 2024, 68(2): 1-10.
- [5] Wang Shouzhi. *History of modern design in the world* [M]. 4th edition. Beijing: China Youth Publishing House, 2023.
- [6] Zhou Bo. Copyright confirmation and governance of AI-generated content[J]. *Publishing and Distribution Research*, 2023(3): 45-51.
- [7] Zhu Zhiting, Wei Fei. Theoretical framework and practical path of digital transformation of education[J]. *China Audiovisual Education*, 2022(7): 1-8.