

Teaching Reform and Practice of AI Technology in the Interior Design Curriculum System of Modern Industry Colleges

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Abstract: Digital technological innovation has accelerated the transformative upgrading of traditional industrial sectors, and artificial intelligence (AI)-driven intelligent design has evolved into a pivotal development trend in the field of interior design. Taking the interior design curriculum system of modern industry colleges as the core research subject, this paper first explores the multi-dimensional empowering effect of AI technology on design teaching practice. It further systematically sorts out the prominent deficiencies of traditional interior design courses in terms of teaching content, classroom modes, practical training, faculty construction and assessment mechanisms. Based on the school-running characteristics of integrating industry and education in modern industry colleges, this research proposes a complete set of teaching reform implementation strategies adapted to the developmental demands of the digital industry from five dimensions, including curriculum framework optimization, teaching mode innovation, practical system upgrading, faculty team construction and assessment mechanism improvement. Centering on the school-running orientation of industry-driven talent cultivation, the research outcomes can help universities optimize the talent training model for art design majors, realize the precise docking of professional teaching and industrial digital transformation, and provide practical and referable reform schemes for intelligent teaching innovation of design majors in domestic colleges and universities.

Keywords: Artificial intelligence technology; Modern industry college; Interior design; Curriculum system; Teaching reform

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1. Introduction

The in-depth penetration of the digital economy and artificial intelligence technology has profoundly reshaped the production modes and developmental patterns of the interior design industry, making digitalization and intellectualization the distinctive developmental features of the industry. The widespread

application of new design technologies and standardized digital working procedures has put forward higher requirements for the digital literacy and innovative practical capabilities of interior design practitioners. As a new type of school-running carrier integrating higher education and industrial development, modern industry colleges undertake the core mission of cultivating applied and innovative design talents for regional industries. The teaching quality of interior design majors directly determines the talent supply level and sustainable development vitality of the local decoration industry. Accordingly, actively responding to the industrial digital transformation trend and promoting the intelligent reform of interior design professional courses bears important practical significance and educational research value for improving the quality of applied talent cultivation in art design majors.

2. Transformative value of AI technology for interior design teaching in modern industry colleges

2.1. Matching industrial transformation to refine talent cultivation orientation

The comprehensive digital transformation of the interior design industry has completely updated the industrial talent competency standards and post requirements. Traditional interior design posts mainly rely on manual drawing, CAD drafting and basic 3D modeling technologies, which are accompanied by cumbersome operating procedures and low efficiency in scheme revision and iteration. With the popularization of AI generative design, intelligent space layout planning, automatic rendering and intelligent soft furnishing matching technologies, repetitive basic design work has been greatly simplified. At present, design enterprises pay more attention to designers' core comprehensive capabilities, including creative conception, user demand interpretation, scheme optimization and on-site implementation control, rather than simple operational skills. Relying on school-enterprise cooperative resources, modern industry colleges can integrate AI digital technology into daily professional teaching, break the skill training limitations of traditional talent cultivation modes, and realize the precise connection between talent cultivation objectives and digital design post competency requirements.

2.2. Optimizing teaching logic to break traditional classroom teaching bottlenecks

Traditional interior design teaching is restricted by technical limitations, showing obvious deficiencies in teaching efficiency and creative cultivation. In the traditional classroom environment, students often face practical problems such as long modeling cycles, slow effect drawing output, a single design scheme, and insufficient creative expansion. In contrast, AI technology has unique advantages in rapid creative generation, visual effect presentation and multi-angle scheme iteration, which can effectively reconstruct the inherent logic of classroom teaching. In daily teaching practice, various AI design tools can assist students in completing basic learning tasks including preliminary market research, space sketch creation, rapid rendering and intelligent soft furnishing collocation. This enables students to save a large amount of time spent on repetitive mechanical work, and focus more on polishing design thinking, innovating design schemes and refining implementation details, so as to realize the transformation from skill-oriented learning to thinking-oriented learning.

2.3. Deepening industry-education integration to build a collaborative talent cultivation ecosystem

The core competitive advantage of modern industry colleges lies in in-depth integration of industry and

education as well as school-enterprise collaborative education. The integration of AI technology can effectively break the boundary barriers between campus theoretical teaching and enterprise practical production. At present, mainstream decoration and design enterprises have fully popularized AI digital design processes, and completed the whole industrial chain work from scheme conception and effect display to scheme optimization based on intelligent tools. Introducing enterprise mainstream AI design technologies and digital project operation procedures into college classrooms can realize the seamless docking of teaching content and industrial practical scenarios. Colleges carry out targeted curriculum training based on real digital projects provided by cooperative enterprises, while enterprises reserve high-quality professional talent by relying on college teaching resources. This two-way empowering and interactive developmental mode constructs a new industry-education integration ecosystem adapted to industrial digital development, and effectively solves the structural talent mismatch problem between college talent cultivation and enterprise post demands.

3. Deficiencies of traditional interior design curriculum system in modern industry colleges

3.1. Outdated curriculum content and lack of systematic digital teaching modules

The curriculum system update speed of interior design majors in most industry colleges lags far behind industrial technological iteration. The existing teaching content is still dominated by traditional theoretical knowledge and practical skills, including interior design principles, hand-drawing techniques, CAD drawing, 3DMAX modeling, and traditional soft furnishing design. Systematic digital teaching modules such as AI design foundation, AIGC creative design, intelligent space optimization, and digital scheme implementation are lacking in the overall curriculum framework. Only a small number of courses involve sporadic explanations of simple digital tools, failing to form a complete, hierarchical, and systematic AI teaching system, which cannot meet the basic digital learning demands of students.

3.2. Rigid teaching modes restricting students' innovative ability development

At this stage, the classroom teaching of interior design still adopts the traditional teacher-dominated teaching mode centered on lecture explanation, operation demonstration and student imitation. The teaching process overemphasizes the standardized training of professional operational skills, while ignoring the cultivation of students' personalized creative thinking and independent innovation ability. Restricted by unified teaching templates and standardized assessment standards, students mostly complete drawing creation and model production in a fixed way, with extremely limited space for independent creative expression. The rigid and single teaching mode leads to the common learning phenomenon of "valuing technology over creativity" among students, resulting in homogeneous design works and insufficient innovative awareness, which cannot adapt to the demand of the AI-era design industry for innovative and compound talents.

3.3. Superficial practical teaching and insufficient industry-education integration

Practical teaching is the core link of talent cultivation in industry colleges, but the current practical teaching work of interior design majors has obvious problems of formalism and superficiality. The existing practical courses are mainly composed of on-campus simulation training and virtual project design, lacking high-value practical training based on real enterprise digital projects. School-enterprise cooperative practice is mostly

limited to enterprise visits and short-term internship activities, failing to integrate enterprise mature AI digital design processes and industrial standard specifications into daily curriculum teaching. The traditional design processes mastered by students in campus learning are disconnected from the current mainstream digital working modes of enterprises. Graduates need to spend a lot of time adapting to industrial digital design work after employment, which makes it difficult to realize the practical educational advantages of industry-education integration fully.

3.4. Uneven faculty digital competence and inadequate teaching support

The digital comprehensive literacy of teachers is the core guarantee for promoting curriculum intelligent reform. At present, the overall digital teaching capability of interior design teachers in industry colleges needs to be improved urgently. Most full-time teachers have a solid theoretical foundation and skilled traditional design practical ability, but lack systematic learning and practical experience in emerging AI design tools, intelligent scheme optimization, and digital project operation. Meanwhile, enterprise part-time teachers with rich project experience mainly focus on practical project implementation and lack standardized teaching methods and classroom teaching experience, so they cannot provide systematic and targeted AI digital teaching guidance for students. The overall insufficient digital competence of the teaching team has become a key bottleneck restricting the in-depth integration of AI technology and the interior design curriculum system.

3.5. Single assessment system with ambiguous comprehensive talent cultivation orientation

The traditional assessment mode of interior design courses is a typical result-oriented evaluation system. The assessment indicators mainly focus on task completion degree, drawing standardization and picture aesthetic effect, while ignoring the evaluation of students' core comprehensive qualities, including creative innovation ability, scheme iterative thinking, AI tool application level and project collaborative implementation ability. The single and rigid evaluation mechanism cannot comprehensively and objectively reflect students' comprehensive design literacy and practical innovation ability. It also fails to guide students to balance technical learning and innovative thinking training, which is not conducive to the cultivation of high-quality compound digital design talents adapted to industrial development.

4. Practical paths of AI technology empowering interior design curriculum reform

4.1. Reconstructing curriculum framework to build hierarchical digital curriculum system

Combined with the industry-education integration school-running characteristics of modern industry colleges and the digital post competency standards of the interior design industry, this study reconstructs the traditional curriculum system and constructs a four-level progressive digital curriculum framework including foundation laying, core empowerment, professional training and comprehensive innovation, realizing full coverage and systematic application of AI technology in professional teaching ^[1].

The basic laying layer is oriented to first-year students' introductory teaching. Basic AI design knowledge is integrated into core basic courses such as Interior Design Introduction and Design Foundation, focusing on explaining AI design basic principles, industrial AI tool classification and digital design standard

specifications. This part aims to cultivate students' basic digital literacy and help them establish preliminary digital design thinking. The core empowerment layer targets sophomore professional core teaching. New courses including AIGC Interior Creative Design, AI Intelligent Space Design and Digital Rendering Post-processing are added to the curriculum. The teaching content integrates mainstream industrial intelligent tools such as AI space layout and digital soft furnishing matching, systematically explaining the practical operation methods of AI creative generation, scheme iteration and intelligent optimization, and replacing part of the inefficient repetitive basic drawing teaching content in traditional courses.

The professional training layer relies on school-enterprise cooperative resources, takes real enterprise AI digital projects as the teaching carrier, and carries out scenario-based professional digital training in core professional courses such as Interior Space Design, Commercial Space Design and Whole-house Decoration Design. It provides targeted skill training for different application scenarios, including residential, commercial, and office spaces. The comprehensive innovation layer focuses on the advanced training of juniors and seniors. It sets up special courses on digital design innovation and graduation design guidance courses based on AI technology, guiding students to carry out original design and scheme innovative optimization. Meanwhile, it encourages students to participate in various industrial digital design competitions to comprehensively improve their innovative practical ability and industrial post adaptation ability.

4.2. Innovating teaching modes to construct interactive intelligent classroom

Based on the intelligent and interactive advantages of AI technology, the research breaks the traditional one-way knowledge indoctrination teaching mode, and constructs a student-centered two-way interactive teaching mode featuring "teacher guidance, AI empowerment and student independent exploration", which balances the training of basic professional skills and innovative design thinking. In the new teaching mode, teachers transform from simple skill demonstrators to design thinking guides, scheme optimization consultants, and innovative direction controllers.

In the pre-class preparation stage, teachers adopt AI data analysis tools to sort out students' learning weaknesses and knowledge blind spots, formulate personalized teaching plans combining course key points and difficult points, and push digital design cases, AI tool operation tutorials, and industrial frontier dynamic information to realize targeted preview guidance. In the in-class teaching stage, teachers simplify the demonstration teaching of repetitive basic skills, and use AI tools to complete rapid case demonstration, scheme generation and effect contrast analysis, so as to reserve sufficient classroom time for students' independent conception and scheme optimization^[2]. Aiming at common problems in students' design practice such as creative bottlenecks, unreasonable space layout and disordered soft furnishing matching, teachers combine multi-dimensional alternative schemes generated by AI to carry out comparative analysis and targeted explanation, guiding students to independently evaluate scheme advantages and disadvantages and complete design optimization. In the after-class evaluation stage, teachers rely on intelligent AI teaching platforms to realize automatic homework correction and precise problem feedback, summarize common learning problems through platform big data analysis, and form teaching analysis reports to provide data support for continuous teaching optimization.

4.3. Upgrading practical teaching system to deepen industry-education integrated training

Giving full play to the school-enterprise collaborative education advantages of modern industry colleges, the research builds an integrated practical teaching system of “on-campus training + enterprise internship + project actual combat” centering on enterprise real digital project demands, realizing the organic transformation of AI design teaching from theoretical explanation to practical application. In the on-campus training link, colleges build professional AI digital design training platforms and configure mainstream industrial intelligent design tools based on campus digital training rooms. Combined with enterprise industrial standards, colleges standardize students’ practical operation procedures, enabling students to master the whole process operation skills of AI digital design ^[3].

In the enterprise internship link, colleges deepen in-depth cooperation with local high-quality decoration design enterprises, jointly build industry-college integrated digital training bases, and employ enterprise front-line designers and technical backbones as off-campus practical tutors. Enterprise tutors regularly enter the campus to carry out AI digital project practical teaching, and colleges organize students to enter enterprises for phased internship training, allowing students to fully participate in real residential and commercial decoration digital design projects. Students follow enterprise professional designers to complete the whole work chain, including demand docking, AI scheme generation, scheme iteration optimization, and construction drawing docking, so as to become familiar with the industrial digital project operation mode. In the project actual combat link, the study implements the integrated training mode of “course projects + enterprise real projects + discipline competition projects”. Enterprise real digital design projects are transformed into course training topics, requiring students to complete full-process design scheme creation based on AI technology, and the final design achievements are jointly evaluated and screened by school teachers and enterprise tutors for practical application.

4.4. Optimizing faculty construction to build dual-qualified digital teaching team

The improvement of teachers’ digital comprehensive ability is the key guarantee for the smooth implementation of curriculum teaching reform. Industry colleges should build a sound faculty training mechanism of “internal training and upgrading + external high-level talent introduction + school-enterprise two-way co-education” to cultivate a professional dual-qualified digital teaching team ^[4]. For on-campus full-time teachers, colleges regularly carry out special training covering AI design technology, digital teaching methods, and industrial frontier dynamics, and arrange for teachers to take up post-training in cooperative enterprises to participate in the actual operation of digital design projects. This helps teachers proficiently master mainstream AI design tools and digital project implementation processes, and effectively improve their digital technology application ability and practical teaching level.

For external part-time teachers, colleges optimize the selection criteria, prioritizing the employment of enterprise technical directors and senior designers with rich digital design project experience to form a professional enterprise digital tutor team. Meanwhile, targeted teaching ability training is carried out for enterprise part-time teachers to help them master college classroom teaching methods and talent cultivation rules, making up for their lack of systematic teaching experience. In addition, colleges should establish a long-term two-way communication and learning mechanism between schools and enterprises. On-campus teachers regularly enter enterprises for learning and communication, and enterprise tutors regularly carry out campus lectures and practical guidance, forming a complementary and collaborative dual-qualified teaching

team, which provides solid talent support for the in-depth development of digital curriculum reform.

4.5. Improving assessment mechanism to construct multi-dimensional comprehensive evaluation system

Colleges should abandon the traditional single result-oriented assessment mode, and construct a multi-dimensional comprehensive evaluation system integrating process assessment, ability assessment, innovation assessment and enterprise assessment in combination with the characteristics of AI intelligent teaching reform and industrial digital talent cultivation standards, realizing all-round and three-dimensional evaluation of students' comprehensive literacy^[5]. Process assessment accounts for 30% of the total score, focusing on evaluating students' classroom participation, pre-class preview effect, practical training performance and the whole iterative process of design schemes. Ability assessment accounts for 30% of the total score, relying on big data analysis of AI teaching platforms to objectively evaluate students' AI tool application proficiency, design scheme completeness, space layout rationality and construction standardization. Innovation assessment accounts for 20% of the total score, focusing on investigating students' design originality, scheme personalization, digital technology innovative application ability and scheme iterative thinking, so as to avoid homogeneous and template-style design works. Enterprise assessment accounts for 20% of the total score, which is scored by enterprise off-campus tutors based on students' project internship performance, focusing on evaluating students' post adaptability, team collaboration ability and project comprehensive implementation ability.

The diversified comprehensive evaluation system breaks the limitations of traditional single achievement assessment, fully covers students' professional skills, innovative thinking, professional quality and practical ability, and can objectively and comprehensively reflect students' comprehensive design level and post competency.

5. Conclusion

This paper systematically discusses the empowering and transformative value of AI technology for interior design teaching in modern industry colleges, analyzes the main problems existing in the traditional curriculum system from multiple dimensions, and constructs a complete set of systematic teaching reform and practical implementation systems adapted to industrial digital development, which optimizes the digital and industrialized talent cultivation mode of interior design majors. In view of the continuous iterative upgrading of AI technology and dynamic adjustment of industrial market demands, future teaching construction needs to keep pace with technological and industrial development. Colleges should continuously optimize curriculum content, innovate teaching modes and improve collaborative education mechanisms, further deepen the depth and breadth of school-enterprise industry-education integration, and steadily transport high-quality digital and innovative professional talents for the sustainable development of the interior design industry.

Disclosure statement

The author declares no conflict of interest.

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