Education Reform and Development, 2026, Volume 8, Issue 7
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

Research on Smart Teaching in Interaction Design Courses in the Context of Industry-Education Integration

Chengyang Yu*

Shandong Youth University of Political Science, Jinan 250103, Shandong, China

Author to whom correspondence should be addressed.

Abstract: Interaction design courses are characterized by interdisciplinary knowledge, complex practical contexts, and rapid technological iteration. In teaching practice, they are prone to problems such as delayed content renewal, insufficient authentic practice scenarios, and a single-dimensional evaluation approach. Based on the coupling logic between smart teaching and industry-education integration, this study proposes a reform pathway for interaction design courses that takes the curriculum as the carrier, industrial demand as the driving force, and digital-intelligent technology as the support. It further constructs a collaborative model of "intelligence-industry-education", with the aim of promoting the transformation of course teaching from knowledge transmission to competence generation.

Keywords: Industry-education integration; Interaction design; Smart teaching; Teaching innovation

Online publication: August 13, 2026

1. Introduction

With the rapid development of information technology, smart teaching has been increasingly applied in higher education. By deeply integrating information technology with innovative design concepts, this teaching model enhances the effectiveness of professional course instruction and constructs more personalized and intelligent teaching scenarios through the application of AI tools. Interaction design courses are characterized by rapid technological renewal, strong dependence on practice, and complex user scenarios. In teaching practice, they often face the problem of disconnection between theory and practice. Industry-education integration can introduce authentic projects and industrial scenarios; however, in actual implementation, it also faces problems such as insufficient coverage and inadequate process guidance. Smart teaching can, to a certain extent, compensate for these limitations through AI agents, virtual simulation, and related methods. Based on this, this study takes the teaching of interaction design courses as an example and explores the ideas and pathways for implementing smart teaching in design courses at application-oriented universities.

2. Theoretical foundations of smart teaching and industry-education integration in interaction design courses

2.1. Interdisciplinary attributes and practice orientation of interaction design courses

Interaction design is a design field in which art and science are deeply integrated. It is concerned with defining and designing the behavior of artificial systems, and its teaching and talent cultivation require equal emphasis on design and technology [1]. As a discipline focused on interactive experience, interaction design has continuously renewed its research priorities along with technological development. Its current focal areas include intelligent interaction, multimodal interaction, virtual interaction, and human-AI collaborative interaction, all of which are oriented toward human-centered human-computer interaction technologies. The course is widely offered within design disciplines, and in recent years, relevant talent cultivation has even been conducted under the program name of intelligent interaction design. As a bridging discipline connecting user needs and technological implementation, interaction design has three major disciplinary characteristics: the interdisciplinarity of its knowledge system, the contextuality of its practical process, and the iterativity of its design thinking. For course teaching, these characteristics require the intervention of authentic user scenarios, the support of actual work projects, and the clear presentation of the full design process. Design outcomes should be placed in real contexts to observe their actual effects, and interaction experience should be tested through scenarios and over time [2]. Interaction design courses emphasize following, and even leading, the frontier of science and technology. However, in traditional teaching, the model that relies on textbooks and courseware as major references or even as the basis of instruction has lagged far behind the pace of technological development. As a result, the course knowledge and skills taught in the classroom can only provide an understanding of relevant theories, while difficulties arise when connecting them with actual social production.

2.2. Theoretical basis for coupling industry-education integration with smart teaching

Smart teaching is a new teaching model supported by next-generation information technologies such as artificial intelligence, big data, and virtual reality. It is learner-centered and can realize the intelligentization of teaching scenarios, the personalization of learning pathways, and the datafication of evaluation processes. Its core feature lies in the deep embedding of technology throughout the entire teaching process and in data-driven precise intervention. Industry-education integration and smart teaching are not mutually opposed; rather, they have an inherent potential for integration. Professor Ji Qinghua deeply integrates ICAP theory with industry-education integration, dividing students' cognitive engagement in learning, from low to high, into four progressive levels: passive learning, active learning, constructive learning, and interactive learning. These levels correspond respectively to isolated storage, activated integration, reflective transfer, and collaborative creation in cognitive outcomes [3]. This framework explains, from the perspective of cognitive development, the relationship between student engagement and cognitive outcomes, indicating that deep engagement is beneficial to cognition and learning.

American educational psychologist Richard Mayer proposes that the coordinated design and application of multiple media forms, including text, images, audio, and video, can directly influence students' cognitive processes and learning achievement [4]. He also points out that emotion and motivation have a direct impact on students' learning. In industry-education integrated teaching, authentic working environments can stimulate students' willingness to understand future work. The application of virtual simulation, mixed reality, digital twins, and other technological approaches in smart teaching further narrows the distance between the classroom and the front line of design production. Through the cognitive principles of multimedia design, industrial scenarios can be pedagogically translated, thereby transforming abstract concepts and tedious knowledge points into learning content that students can perceive and operate.

According to the field theory proposed by the French sociologist Pierre Bourdieu, each field has its own specific rule system, forms of capital, and habitus internalized by actors [5]. Since universities and enterprises belong to different fields, the long-standing dilemma of "integration without true convergence" exists in the practice of industry-education integration. Smart teaching technologies such as virtual reality can simulate certain industrial scenarios within teaching spaces, allowing students to encounter enterprise task processes and work norms in advance and thereby reducing the spatial distance between university classrooms and industrial practice. Therefore, smart teaching is not merely an upgrading of teaching methods; it is also an auxiliary tool for reconstructing field rules and reshaping subject behavior in industry-education integration. The coupling of industry-education integration and smart teaching is not a simple addition of the two, but a deep interembedding and systematic symbiosis at the levels of cognitive development, knowledge organization, and institutional evolution.

2.3. Teaching logic of interaction design courses jointly driven by smart teaching and industry-education integration

The teaching reform of interaction design courses is not simply a matter of bringing enterprise projects into the classroom or deepening the application of digital tools. Rather, it takes the curriculum as the carrier, transforms authentic industrial needs into teachable knowledge modules, and uses smart teaching technologies to provide intelligent support for the learning process [6]. In lecture-based courses, the application of knowledge points is often explained through examples, such as illustrating how a target concept is applied in a particular project or design case. In contrast, in practice-oriented courses driven by industry-education integration, enterprise tasks with authentic industrial constraints, including cost, schedule, and technological limitations, are assigned to students. To complete these tasks, students need to actively explore knowledge rather than passively listen to teachers' explanations, thereby strengthening their understanding of the discipline and cultivating professional skills. This aligns with Rogers' humanistic educational theory, which emphasizes that learners' emotional experience and value identification are key prerequisites for deep learning [7], and it enables students to move from passive knowledge reception to active knowledge acquisition. Therefore, by integrating the concept of industry-education integration and the methods of smart teaching into the curriculum system, the study aims to achieve deep coordination among the three and to construct an interactive framework in which teaching serves industrial development, industry feeds back into teaching reform, and technology drives design innovation.

3. Construction of a smart teaching model for interaction design courses

3.1. Objective system: Cultivating comprehensive design competence for human-AI collaboration

The incorporation of smart teaching shifts the teaching of interaction design courses from the transmission of skills to the cultivation of scenario-based problem solvers capable of human-AI collaboration. The goal of talent cultivation is expanded from the single mastery of course knowledge to the development of comprehensive qualities that combine professional knowledge, innovative thinking, technological application ability, and industrial adaptability. This corresponds to the changing requirements of modern enterprises for technical personnel, which have gradually shifted from basic software tool operation to the ability to propose feasible design solutions under authentic constraints. Therefore, teaching objectives need to track real-time changes in industrial job competency requirements closely.

In the course, students should first be guided to establish an understanding of the use and importance of the course and to develop emotional and value identification with it. This helps motivate students to actively acquire relevant knowledge and improve corresponding abilities, forming a spiral improvement pathway of "emotional identification-active learning-competence enhancement-value reinforcement". Students' identification with the value of the course can stimulate intrinsic motivation for self-realization, thereby driving their active engagement in knowledge exploration and practical competence training. The positive feedback brought by competence enhancement further reinforces emotional identification, allowing students to enter a self-reinforcing upward spiral. This meets the requirement that interaction design talents cultivated by universities should not only be passive users of tools, but also intelligent designers who can skillfully use AI tools, understand users' deeper needs, and make appropriate design decisions in complex industrial scenarios.

3.2. Content framework: Integrated organization of disciplinary knowledge and authentic enterprise tasks

In designing the content framework of interaction design courses, it is necessary not only to follow disciplinary logic and organize knowledge modules in sequence, such as user research, information architecture, interaction prototyping, visual design, and usability testing, but also to guide students in completing interaction design project tasks. Authentic enterprise projects, technical problems, and job competency standards should be introduced into the organization of teaching content, and relevant teaching content should be added accordingly. A content structure based on "disciplinary logic + authentic enterprise tasks" can be established. For example, if contextual user research is a key teaching content and the enterprise task requires the development of an educational product for elderly users, the teaching content should be integrated with this task, and the project requirement assigned to students can be defined as "research on learning scenarios for elderly groups". Students are then guided to conduct investigations of the corresponding contexts of the target population through user research methods. In this process, knowledge points such as personas, scenario scripts, and user experience maps are no longer vague concepts detached from context, but methodological tools that students use in completing research tasks.

3.3. Learning process: Multi-terminal collaboration driven by authentic tasks

Smart teaching requires the abandonment of the traditional one-way transmission of knowledge in the teaching process. Enterprise mentors can deconstruct authentic design and development tasks and divide them into sub-tasks suitable for phased learning and exploration. Students learn, integrate, and construct knowledge systems while completing each sub-task and gradually acquire relevant knowledge through problem-solving. Smart teaching shifts the teaching process from a unified pace to an adaptive pathway. The system can assist in analyzing students' learning status based on learning behavior data and dynamically match learning resources, optimize learning modes, and adjust learning pace accordingly. Digital technology reconstructs the temporal and spatial scenarios of classroom teaching, satisfies students' personalized learning needs, and makes differentiated instruction technically possible [8], thereby enabling each student to master course knowledge in a way suited to their own learning conditions.

In teaching, students are not only guided to use AI tools to organize materials, edit explanatory documents, and generate images and videos, but AI agents are also used to analyze students' learning characteristics and construct dynamic learner profiles that run through the pre-class, in-class, and post-class stages.

3.4. Evaluation method: Multidimensional evaluation integrating process data and design outcomes

With the continuous advancement of teaching reform, the overall grades of current professional courses are often composed of regular performance and final assessment. However, the formation of design competence is a gradual and multidimensional process. In practice, regular performance is still easily confined to attendance, assignment submission, and classroom participation, making it difficult to fully reflect students' growth in key abilities such as user research, problem definition, and solution iteration. In teaching, a comprehensive assessment method combining phased small assignments with a final portfolio can be adopted. In the evaluation process, AI agents can assist teachers in conducting in-depth analysis of students' learning behavior data. AI can efficiently collect and quantify measurable behavioral data such as the rate of material consultation, participation in course activities, accuracy of exercises, and accuracy of virtual experiment operations, thereby providing teachers with multidimensional references regarding the learning process. Finally, teachers can combine these references with students' practical works to make a relatively balanced evaluation of learning outcomes.

4. Coordination among intelligence, industry, and education in interaction design education

4.1. Matching industrial needs with curriculum knowledge

In the field of interaction design, knowledge is updated rapidly, and technological iteration cycles are short. The mismatch between talent cultivation and industrial demand has long existed. The key to overcoming this dilemma lies in keeping teaching content synchronized with industrial development and constructing a dynamic mechanism for transforming industrial needs into teaching content. Through semantic analysis and knowledge element extraction of enterprise project tasks and design requirements, the extracted demand elements can be matched and mapped with the curriculum knowledge graph, thereby clarifying changes in actual social production needs and their corresponding positions in knowledge objectives, competence objectives, and quality objectives. Industrial needs are then transformed into classroom knowledge points and evaluable learning objectives, which are jointly incorporated into teaching content by university and enterprise teaching teams in the form of knowledge points or project-based teaching cases.

The advantage of knowledge renewal in smart teaching is beyond what conventional teaching content coordination can achieve. It can collect and introduce frontier content from similar universities and enterprises as supplementary teaching resources, thereby breaking the bottleneck caused by poor dissemination of frontier knowledge in the industry. Curriculum knowledge is no longer limited to the textbook system, but is expanded to the diversified knowledge of enterprise practice. Work-practice knowledge in the industrial field and disciplinary theoretical knowledge in the academic field are pedagogically integrated. As a result, curriculum knowledge is no longer a static list, but a living knowledge network that evolves with industrial technology. Students no longer face isolated knowledge points, but a knowledge system that can be explored, collected, and generated.

4.2. Virtual reconstruction of industrial practice spaces

Common learning scenarios in industry-education integrated teaching for design majors generally take three forms. The first is taking students to enterprise design and R&D front lines for visits, where designers, product managers, user researchers, and engineering technicians explain project processes. The second is sending students to enterprises for internships and practical activities, allowing them to participate in the actual design and production process. The third is building engineering training centers within universities to imitate enterprise design and production environments and realize simulation-based teaching. These forms have positive effects on industry-education integrated teaching, but they also have certain limitations. For example, if students rely only on one or two visits to enterprises, it is difficult for them to develop an in-depth understanding of actual enterprise design and production. Their understanding often remains at the level of superficial visual and auditory impressions, and their cognition of learning practice stays at a relatively shallow subjective level. Moreover, enterprises have limited available positions and can accommodate only a limited number of interns and trainees; therefore, not all students in a class can obtain enterprise internship opportunities. This leads to the situation in which some students cannot acquire a more profound and solid understanding of social production practice through this approach. In addition, reproducing enterprise work environments and production process facilities on campus faces considerable difficulties in management, maintenance, use, and updating. The rapid iteration of the industry also places great pressure on the renewal of equipment in on-campus training centers.

Smart teaching can overcome the limitations of school-enterprise distance and space by constructing mixed virtual-reality classrooms and creating digital learning spaces in which students can participate in an embodied manner. First, existing experimental and training classrooms can be renovated by introducing lightweight VR, AR, or XR equipment, thereby creating a physical field for virtual teaching spaces while meeting the needs of class-scale instruction. Second, universities and enterprises can jointly build virtual training classrooms, construct highly simulated industrial practice environments through virtual scene modeling, and develop intelligent operation guidance systems. Third, small-scale production or simulation equipment synchronized with enterprise practice can be introduced for teaching and learning operations by teachers and students. Through the construction of smart teaching spaces, the shortage of practice teaching venues in enterprises can be alleviated. Technological means can be used to reconstruct the working environment of the design and production front line, enabling students to become immersed in understanding production, learning about processes, and becoming familiar with workflows. Virtual simulation spaces can guide students' cognition while cultivating and strengthening their comprehensive analysis and expression abilities, thereby facilitating better alignment when they enter enterprise workplaces.

4.3. Optimization of university-enterprise dual-subject evaluation

It is necessary to move beyond the common form in which designers only enter the classroom as guest lecturers. Enterprise mentors should be involved throughout student cultivation and deeply participate in the course. University and enterprise instructors should conduct collaborative teaching research, jointly prepare lessons, teach, and evaluate, and use integrated standards from both universities and enterprises to assess students' learning outcomes. Smart teaching can more effectively improve the consistency and multidimensionality of learning evaluation. To a certain extent, it can avoid the tendency in university teaching to evaluate art and design courses mainly according to intuitive indicators such as completion, innovation, and presentation effect, while neglecting comprehensive dimensions such as user value, technical feasibility, and commercial viability.

University teachers and enterprise mentors should jointly conduct teaching discussions and formulate evaluation indicators that conform to both university educational standards and actual social production requirements. They should then jointly evaluate students' learning outcomes and reach objective and balanced evaluation results. On the one hand, this enables a comprehensive assessment of students' learning outcomes based on multiple practical indicators. On the other hand, it helps enterprises identify students with development potential in advance, thereby providing talent reserves for subsequent internships, employment, and project collaboration. Evaluation coordination has positive effects for teachers, students, and enterprises and produces a win-win outcome in the process of industry-education integration.

5. Conclusion

The key to integrating smart teaching methods into interaction design courses and realizing industry-education integration lies in using digital-intelligent technologies to promote the effective connection among industrial needs, curriculum knowledge, and learning processes. Industry-education integration provides the course with authentic projects, clear job standards, and standardized practice contexts. In teaching, AI agents, virtual simulation, and other tools optimize teaching support and evaluation feedback. However, AI cannot fully replace authentic user research, teacher guidance, or feedback from enterprise practice. The effective implementation of smart teaching in design courses still requires the improvement of curriculum resources, the enhancement of teachers' digital literacy, and the refinement of school-enterprise collaborative mechanisms.

Funding

Teaching Reform Research Project of Shandong Youth University of Political Science (Project No. : JGYB202239)

Disclosure statement

The author declares no conflict of interest.

References

[1] Xian F, 2017, Construction of the Interaction Technology Course System: A Case Study of the Academy of Arts & Design, Tsinghua University. Zhuangshi, (3): 90–92.

[2] Xiao Y, Chen Y, Zhu H, 2024, Exploration of Teaching Reform in Interaction Courses from the Perspective of Design Studies. Design Research, 14(2): 123–129.

[3] Liu Y, 2026, Teaching Reform and Practice of Industry-Education Integration in the Product System Design Course Based on Deep Learning ICAP Theory—Packaging Engineering, 47(S1): 578–582, 600.

[4] Deng Y, Shi Z, 2024, Research on Model Construction of AIGC-Empowered Smart Teaching Design. Design Research, 14(3): 51–56.

[5] Zhu H, Ji H, 2026, How Digital Empowerment Breaks the Field Barriers of Industry-Education Integrated Teaching. Jiangsu Higher Education, (3): 64–70.

[6] Yu M, Zheng X, Shi L, et al., 2026, Reform and Exploration of the PBL+CBL+TBL Three-Track Integrated Teaching Model in the Interaction Interface Design Course under the Background of AIGC. Packaging Engineering, 47(S1): 623–628.

[7] Zhao B, 2025, Reshaping the Classroom: From Blended Teaching to AI-Assisted Smart Teaching. China University Teaching, (11): 69–75.

[8] Lv X, Feng C, 2026, The Underlying Logic and Practical Pathways of Digital Empowerment for Large-Scale Personalized Instruction. Curriculum, Teaching Material and Method, 46(4): 67–73.