# Design and Implementation of an OBE-Oriented, AI-Enabled Teaching Model for the Intellectual Property (IP) Character Design Course

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**Abstract:** The rapid development of the cultural and creative industries has driven the continuous expansion of IP design positions, yet talent cultivation exhibits abundant quantity but structural imbalance, with increasing issues of creative homogenization and job-skill mismatches. In response to this challenge, universities urgently need to construct teaching systems better aligned with industry demands through intelligent reforms and industry–education integration mechanisms. Guided by the Outcome-Based Education (OBE) concept, this study integrates artificial intelligence technology into the teaching of the "IP Character Design" course, designing and implementing a closed-loop teaching model of "Objectives–Content–Implementation–Evaluation–Improvement" to address the disconnect between teaching goals and job skill development, enhance students' innovation capacity and job adaptability, and provide a reference paradigm for the intelligent and industry–education integrated reform of art and design courses.
***Keywords*:** Outcome-Based Education; artificial intelligence; IP character design; teaching model; curriculum reform

## 1. Introduction

With the rapid development of the cultural and creative industries, the IP economy has become an important driving force for cultural innovation. IP character design is widely applied in cultural tourism branding, digital art, virtual idols, and other fields, resulting in an increasing demand for talents who integrate creativity and technology. Currently, university courses on "IP Character Design" generally suffer from severe homogenization and a disconnect between theory and practice. To meet the needs of industrial upgrading, universities urgently need to optimize course systems through intelligent teaching reforms and industry–education integration mechanisms. Based on the Outcome-Based Education (OBE) concept, this study introduces artificial intelligence technology to construct a closed-loop teaching model aimed at improving teaching effectiveness and alignment with job skills.

## 2. Analysis of Pain Points in the Traditional "IP Character Design" Teaching Model

### 2.1 Ambiguous Teaching Objectives and Disconnection from Industry Needs

Traditional course objectives mostly focus on generalized descriptions such as mastering basic methods of IP character design and completing aesthetically acceptable design works, without clearly aligning with the specific skill requirements of industry positions [2]. For example, core industry requirements for IP designers—such as user demand analysis, IP commercialization and extension capabilities, and cross-software collaboration skills—are not incorporated into course objectives. As a result, students need additional corporate training after graduation to qualify for positions like IP designer or cultural and creative product designer.

### 2.2 Rigid Teaching Content Lacking Technological Integration

Course content still mainly follows traditional workflows of hand-drawn sketches, software coloring, and static effect presentation, without integrating the application of artificial intelligence in IP design. On one hand, students are not exposed to mainstream AI tools in the industry, such as generative AI-assisted sketch creation or big data analysis for user preference insights, resulting in technical literacy lagging behind industry practice. On the other hand, course content updates slowly, with an excessive proportion of classic IP cases, lacking teaching in emerging fields such as metaverse IP and virtual idol IP. This causes a misalignment between students' creative directions and market trends.

### 2.3 Single Teaching Implementation and Insufficient Personalized Training

During teaching implementation, instructors largely adopt a "one-size-fits-all" approach. In the theoretical teaching phase, all students learn the same design principles. In the practical creation phase, students complete works around a unified theme, such as brand mascot design, leaving little room for independent topic selection and personalized exploration. With class sizes of 30–40 students, teachers find it difficult to provide targeted guidance for each student's creative style. Styles

such as chibi, traditional Chinese, or cyberpunk all require adaptation, and some students' creative potential is suppressed due to the lack of precise guidance.

### 2.4 One-Dimensional Evaluation Ignoring Process Growth

Evaluation methods mainly rely on "summative assessment," i.e., grading IP design works submitted at the end of the course, accounting for 70%–80% of the total score. This method has two main shortcomings. First, it overlooks the skill development during the design process, such as students' efforts in sketch iteration, user feedback adjustment, and commercialization extension, which are not considered in the assessment. Second, the evaluation subjects are relatively singular, with grading conducted only by teachers, without involving industry experts, corporate mentors, or users, resulting in assessment outcomes that may deviate from actual market demands.

## 3. Theoretical Basis of OBE Orientation and AI Empowerment

### 3.1 Core Elements and Application Logic of OBE

Outcome-Based Education (OBE), first developed by American scholar Spady, is guided by three core principles: student-centeredness, outcome orientation, and continuous improvement. Its implementation pathway involves determining expected learning outcomes based on industry job requirements, backward designing teaching content and methods according to these outcomes, and achieving a closed-loop optimization through evaluation feedback [3]. In applying the OBE model to the "IP Character Design" course, the approach follows industry demands, expected outcomes, and backward instructional design thinking—for example, setting metaverse IP design capability as a training objective and then planning corresponding teaching modules and practical tasks.

### 3.2 Technical Support of Artificial Intelligence in IP Character Design

Artificial intelligence can provide dual support in efficiency and personalization for IP character design courses, encompassing three core technologies. Generative AI can assist in idea and sketch generation, rapidly producing multiple versions based on textual descriptions and supporting iterative optimization. Big data analysis can accurately capture user needs, such as using children's preference data to guide IP form design. Virtual simulation can construct immersive practical environments to verify IP dynamic effects and scene adaptability, compensating for the limitations of traditional static teaching displays.

## 4. Overall Design of the OBE-Oriented and AI-Enabled "IP Character Design" Course Teaching Model

### 4.1 Objective Layer: Clarifying Expected Learning Outcomes Based on Industry Needs

Following the OBE "backward design" logic and supported by AI technology, this study constructs a five-dimensional closed-loop teaching model of "Objectives–Content–Implementation–Evaluation–Improvement" for the "IP Character Design" course, with its overall structure shown in Figure 1. This model places "industry demand-driven expected learning outcomes" at its core, leverages AI technology to empower course content, implementation, and evaluation, and ultimately relies on a continuous improvement mechanism to optimize teaching effectiveness, ensuring that student capabilities align precisely with job requirements.

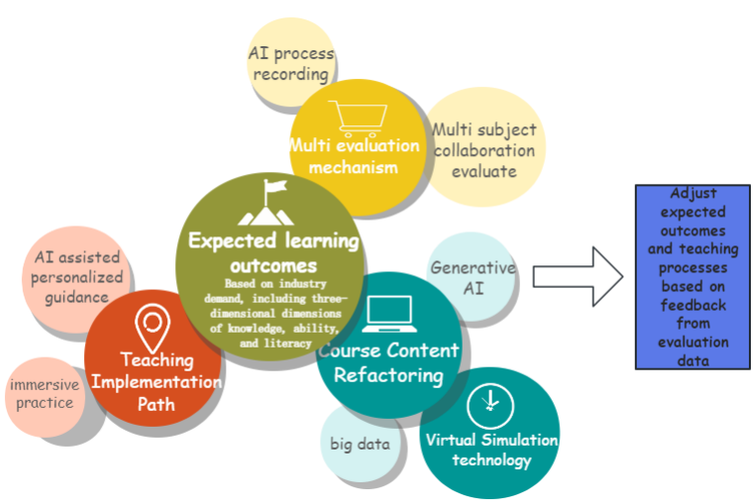


**Figure 1. Structural Diagram of the OBE-Oriented and AI-Enabled "IP Character Design" Course Teaching Model**

Based on surveys of 10 cultural and creative enterprises and 15 senior IP designers, and combined with the OBE dimensions of “knowledge, ability, and literacy,” the expected learning outcomes of the "IP Character Design" course are established. In the knowledge dimension, students are required to master the principles of modeling, color, and symbolic design, as well as understand AI tool application logic and commercial industry standards. In the ability dimension, students should be able to independently use AI tools to complete multi-version sketch iterations, analyze user preferences through big data, and verify adaptability on virtual platforms to complete full-process design. In the literacy dimension, the course cultivates innovative thinking, strengthens teamwork, and fosters awareness of copyright norms.

## 4.2 Content Layer: Restructuring the Course Content System with AI Integration

According to the expected learning outcomes, the course content is reconstructed into three progressive modules: foundational, core, and practical, with AI technology integrated into each module. The specific content is shown in Table 1. The total course duration is 64 hours, including 24 hours of theory and 40 hours of practice, ensuring a deep integration of “theory + AI tools + practice.”

**Table 1. Course Content System of the OBE-Oriented and AI-Enabled "IP Character Design" Course**

| Module Name | Hours (Theory/ Practice) | Core Teaching Content | Alignment with OBE Objectives | AI Empowerment Methods |
|---|---|---|---|---|
| Foundational Module | 8/8 | 1. Principles of IP design, including modeling, color, and symbolism; 2. Basic operation of AI tools, including LIblibAI and Baidu Index; 3. IP copyright regulations | Mastery of IP design knowledge and AI tool logic | 1. Decompose design elements of classic IPs using AI, with Lingna Bell as the case study; 2. Practice generating basic sketches using keywords |
| Core Module | 8/16 | 1. IP creative design, including style positioning and user demand analysis; 2. AI-assisted sketch iteration and optimization; 3. IP dynamic effect design, including virtual simulation | Enhance AI-assisted design and scenario-based capabilities | 1. Analyze target user preferences with big data to determine design direction; 2. Verify IP dynamic effects using virtual simulation |
| Practical Module | 8/16 | 1. Integration with real enterprise IP projects, focusing on local cultural tourism IPs and brand mascots; 2. IP commercialization and extension, including derivative products and scene embedding; 3. Project reporting and optimization | Possess commercial IP design and team collaboration capabilities | 1. Use generative AI to complete derivative product design sketches; 2. Use AI to document project iteration processes |

## 4.3 Implementation Layer: Designing a Phased AI-Enabled Teaching Path

Based on students’ cognitive development, the teaching implementation is divided into three stages: “Perception–Practice–Innovation,” with each stage supported by AI tools and driven by project tasks. The specific implementation path is shown in Figure 2.

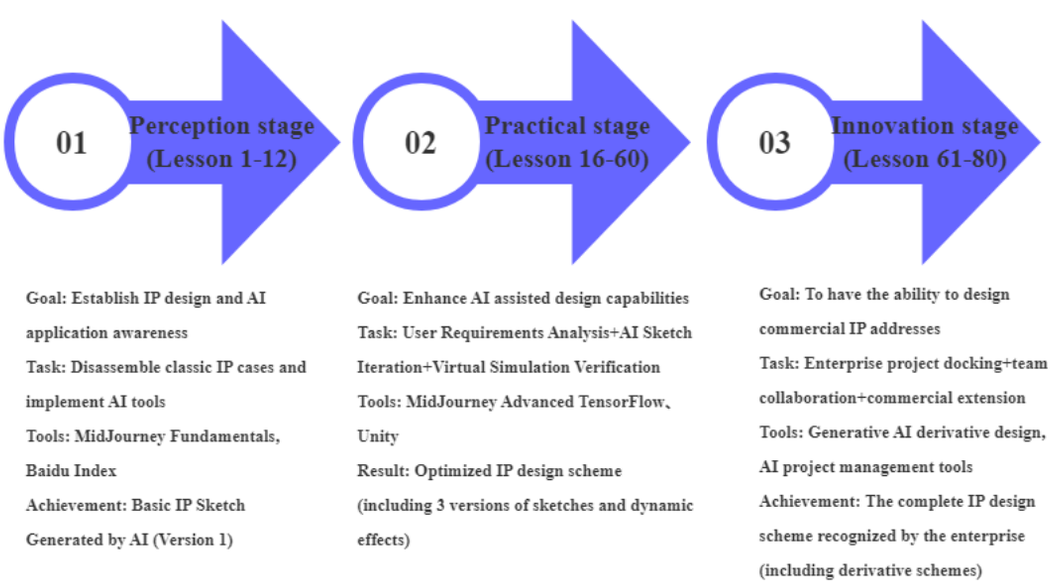


**Figure 2. Teaching Implementation Path of the OBE-Oriented and AI-Enabled "IP Character Design" Course**

Perception Stage (Lessons 1–15) aims to stimulate interest and lay the foundation, using case analysis and AI hands-on practice to help students establish a cognitive connection between IP design and AI technology. In practice, instructors first use virtual simulation platforms to demonstrate the full design process of classic IPs such as Lingna Bell and Bing Dwen Dwen, while employing LIblibAI to decompose their modeling and color elements, allowing students to visually understand the core logic of IP design. Two AI tool practice sessions are then arranged, guiding students to learn keyword input techniques in LIblibAI, using expressions such as Q-version IP, roundface, brightcolors, minimalism, etc. Students also learn user preference analysis via Baidu Index and complete AI-generated tasks for personal-style IP sketches. Finally, an AI sketch critique session is held, where instructors analyze the match between students' generated sketches and keywords, guiding students to optimize keyword descriptions and improve the accuracy of AI tool usage [4].

Practice Stage (Lessons 16–60) focuses on skill enhancement and proficiency, adopting task-driven and AI-personalized guidance approaches to enable students to master the full AI-assisted IP design process. IP design tasks such as campus cultural and creative IP projects are assigned. Students analyze the aesthetic preferences of 18–22-year-old college students using Baidu Index and determine IP style directions, such as traditional Chinese or cyberpunk. Using LIblibAI, students generate three versions of sketches in different styles and upload them to the course AI platform, where image recognition technology evaluates sketch modeling integrity and color harmony, generating preliminary evaluation reports. Instructors then provide personalized guidance based on these reports—for example, advising students with overly complex modeling to adjust keywords, simplify lines, and highlight core symbols, and guiding students with color choices inconsistent with user preferences to adjust palettes based on big data analysis. Finally, students import the optimized IP designs into the Unity platform to construct campus scene simulations, verifying dynamic effects such as walking and interaction, and adjust IP proportions and details based on the simulation results.

Innovation Stage (Lessons 61–80) aims at practical verification and result implementation, enabling students to apply AI technology in real scenarios through "enterprise project collaboration + team cooperation." Collaborating with local cultural tourism departments, projects such as "Ancient Town Cultural Tourism IP Design" are assigned. Students form teams of 4–5 members, with clearly defined roles in user analysis, creative design, AI operation, and commercialization extension. Teams analyze cultural features such as ancient town architecture and folk activities, as well as tourist preferences, to determine core IP symbols like the town gate shapes and folk character images. Generative AI is then used to create IP sketches and key derivative products such as keychains and dolls.Enterprise mentors are invited to the classroom to review team proposals using AI-generated "IP Commercialization Feasibility Reports," which include derivative costs and market demand forecasts, guiding students to optimize commercialization extension plans. Each team presents the project to enterprises and instructors, submitting a complete "IP Design Proposal" containing sketches, dynamic effects, derivative product plans, and user analysis reports. Enterprises evaluate the proposals, and outstanding IP design plans may enter actual development processes.

## 4.4 Evaluation Layer: Establishing a Multi-Dimensional Collaborative Teaching Evaluation Mechanism

Combining the OBE concept with the advantages of outcome orientation and AI-enabled process recording, a multi-dimensional collaborative evaluation mechanism is constructed, encompassing "formative assessment + summative assessment" and "teacher evaluation + student self-assessment + enterprise evaluation." The specific evaluation content and weightings are shown in Table 2. AI technology is mainly applied to data recording and preliminary analysis in the formative assessment, ensuring that the evaluation is both objective and comprehensive.

**Table 2. Multi-Dimensional Evaluation System of the OBE-Oriented and AI-Enabled "IP Character Design" Course**

| Evaluation Type | Evaluators | Evaluation Content | Weight | AI Empowerment Methods |
|---|---|---|---|---|
| Formative Assessment | Teacher + AI | 1. Proficiency in AI tool usage, including number of sketch iterations and keyword optimization effectiveness; 2. Quality of practical tasks, including user analysis reports and sketch optimization plans; 3. Team collaboration contribution, including task completion rate and peer evaluation | 60% | 1. AI records students' sketch iteration processes and tool usage data; 2. AI analyzes team collaboration task progress |
| Formative Assessment | Student Self-Assessment | 1. Improvement in personal creativity, compared with initial sketches; 2. Gains from learning AI tools; 3. Shortcomings and improvements in team collaboration | 10% | Students upload self-assessment reports to the AI platform, which generates a "comparison analysis between self-assessment and teacher evaluation" |

| Evaluation Type | Evaluators | Evaluation Content | Weight | AI Empowerment Methods |
|---|---|---|---|---|
| Summative Assessment | Enterprise Mentors + Teachers | 1. Quality of the complete IP design proposal, including creativity, user adaptability, and commercialization feasibility; 2. Project presentation performance, including proposal explanation and problem-solving | 30% | AI generates a "reference scoring for IP design proposals," including quantitative analysis of modeling, color, commercialization, and other dimensions |

### 4.5 Improvement Layer: Constructing a Data-Feedback-Based Continuous Improvement Mechanism

The continuous improvement mechanism is a core requirement of OBE, requiring the collection of data from the multi-dimensional evaluation system and regular "Teaching Improvement Workshops," where teachers, enterprise mentors, and AI technicians jointly analyze existing problems in teaching and adjust instructional processes. At the end of each semester, the AI platform generates a teaching effectiveness data analysis report, covering student performance across stages, difficulties in AI tool usage, and frequent issues in enterprise evaluations, such as "commercialization extension plans are not specific" or "user analysis is insufficient."Teachers and enterprise mentors analyze the root causes based on the report—for example, "commercialization extension plans are not specific" may result from "insufficient commercialization content in the course," indicating the need to add practical sessions on "IP derivative product design." Teaching processes are then adjusted according to identified root causes, such as optimizing course content, increasing hours for commercialization modules, improving teaching implementation, inviting enterprise mentors to provide earlier project guidance, updating AI tools, and introducing more precise AI tools for commercialization forecasting. In the following semester, the adjusted instructional processes are piloted, and the effectiveness of improvements is verified by comparing evaluation data between pilot classes and original classes, forming a continuous improvement closed loop of "data feedback → problem analysis → process adjustment → effectiveness verification."

## 5. Conclusion

The OBE-oriented and AI-enabled teaching model for the "IP Character Design" course aligns expected learning outcomes with actual industry demands through backward design and leverages AI technology to address efficiency and personalization challenges in traditional teaching, constructing a closed-loop teaching system of "Objectives–Content–Implementation–Evaluation–Improvement." The implementation of this model not only enhances students' IP design innovation ability and job adaptability but also provides a replicable development path for the intelligent reform of art and design courses. In the future, with the continuous development of AI technology, it will be necessary to further optimize AI tool applications in the course and incorporate emerging teaching content such as virtual idol IP design and AI-driven IP dynamic interactive design.

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