

# Practice and Effectiveness of AI-Enabled Higher Vocational Classrooms from the Perspective of Cultural Integration

-- A Case Study of the Packaging Planning and Design Major in the Sino-Italian Cooperative Education Program

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**Abstract:** Against the backdrop of the internationalization and digitalization of vocational education, the Sino-Italian cooperative education program provides an important platform for cross-cultural talent cultivation in the packaging planning and design major of higher vocational colleges. Taking the Sino-foreign cooperative education program of this major at Zhejiang DongFang Polytechnic as a research sample, this paper focuses on the perspective of cultural integration and explores the feasible practical paths of artificial intelligence (AI) technology empowering higher vocational classrooms. By constructing an innovative teaching model integrating cultural immersion and AI empowerment, a three-stage practical exploration is carried out from curriculum restructuring, teaching implementation, and evaluation feedback, and the application effectiveness is deeply analyzed combined with teaching data and typical cases. The research results show that the introduction of AI technology has broken through the problems of low teaching efficiency and limited teaching resources in cross-cultural classrooms. The survey data after the teaching reform shows that students' course satisfaction has increased to 90%, and the excellent and good rate of cross-cultural projects has reached 92%. This practice provides replicable and promotable experience for the classroom teaching reform of Sino-foreign cooperative education majors in higher vocational colleges.

**Keywords:** Cultural Integration; AI Empowerment; Higher Vocational Classrooms; Sino-Italian Cooperative Education; Packaging Planning and Design.

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## 1. Introduction

With the deepening of the "Belt and Road" Initiative, the internationalization of vocational education has become a key direction to enhance the core competitiveness of China's vocational education. As an important field for the internationalization of higher vocational education, the Sino-Italian cooperative education program not only provides students with a high-quality platform for cross-cultural learning but also poses new challenges to the traditional classroom teaching model. The packaging planning and design major has both technical and cultural attributes. Its teaching process must not only strengthen students' professional skills but also focus on cultivating their cross-cultural design thinking to meet the needs of the international development of the industry [1].

At present, the rapid development of AI technology has injected strong momentum into the reform of classroom teaching in higher vocational colleges. Its unique advantages in personalized teaching push, high-quality resource integration, and immersive interactive experience provide feasible solutions to solve the pain points in cross-cultural teaching. For example, Shanghai Institute of Visual Arts has formed curriculum content and resource organization based on knowledge graphs through AI technology, realizing the immersive teaching innovation of cultural application scenarios [2]; Guangzhou Panyu Polytechnic has used AI technology to assist the intangible cultural heritage of paper-cutting, demonstrating how to use AI to break through the bottleneck of traditional cultural innovation [3]. However, existing studies mostly focus on the teaching application of

AI technology in a single cultural context or the theoretical discussion of multicultural integration, and there is a relative lack of practical research on the in-depth combination of the two in the classrooms of Sino-foreign cooperative education majors in higher vocational colleges. Based on this, this paper takes the packaging planning and design major of the Sino-Italian cooperative education program at Zhejiang DongFang Polytechnic as a case to systematically analyze the practical paths and application effects of AI-enabled higher vocational classrooms from the perspective of cultural integration, in order to provide useful reference for the classroom teaching reform of similar colleges and universities.

## 2. Core Connotations of Cultural Integration and AI-Enabled Higher Vocational Classroom Teaching

### 2.1. Perspective of Cultural Integration

Cultural integration is a dynamic process in which different cultures, through equal communication, collision, mutual absorption and learning, ultimately form mutual tolerance and coordinated development. In the Sino-Italian cooperative education program, cultural integration is specifically manifested as the organic integration of traditional Chinese culture and modern Italian design concepts [4]. It not only emphasizes inheriting the excellent culture and technological wisdom in traditional Chinese packaging but also focuses on absorbing the innovative thinking and concepts of Italy in the field of design, ultimately cultivating students with both cross-cultural design capabilities and international

perspectives. Just like the Sino-German College of Tongji University, which has built a platform for Sino-foreign cultural exchange and cooperation through various ways such as Confucius Institutes and overseas training bases, realizing the in-depth mutual learning and coordinated development of Chinese and foreign cultures in the field of education [5].

## **2.2. Theoretical and Practical Value of AI-Enabled Teaching**

Expand the application scenarios of design majors and the integration method of classroom project-based teaching models through AI technology to ensure the timeliness and accuracy of teaching content. At the same time, AI technology also supports real-time interaction between teachers and students during the teaching process. The teaching evaluation under this model is more scientific and quantitative. In the current classroom teaching of the packaging planning and design major, AI technology has shown advantages different from other new media technologies. It can effectively break the limitations of time and space, integrate high-quality teaching resources from China and Italy to the greatest extent, and create a unique cross-cultural learning experience for students. These measures have significantly improved the pertinence and effectiveness of bilingual and dual-teacher teaching under the Sino-Italian program. The teaching practice of the Sino-Italian cooperative education institution of Chengdu Polytechnic in Sichuan provides strong evidence. The research results displayed by the institution at the Sino-Italian program teaching seminar show that the combination of AI technology and international education has effectively promoted the cultivation of compound technical and skilled talents.

## **3. Practical Paths of AI-Enabled Higher Vocational Classrooms from the Perspective of Cultural Integration**

Since the launch of the packaging planning and design major in the Sino-Italian cooperative education program at Zhejiang DongFang Polytechnic in 2023, it has always taken cultural exchange as the core orientation and AI technology as an important support. It has actively learned from the resource integration experience of Sino-German cooperation at Tongji University, the comprehensive AI exploration of the Academy of Arts & Design, Tsinghua University, and the cross-cultural teaching cases of Guangzhou Panyu Polytechnic. It has systematically carried out classroom teaching reform practices from three dimensions: curriculum restructuring, teaching implementation, and evaluation feedback, and constructed a new teaching system with professional characteristics.

### **3.1. Curriculum Restructuring: Constructing a Progressive Curriculum System Oriented by "Culture + AI + Profession" Three-Dimensional Competencies**

#### **3.1.1. Cultural Competence Module**

Integrate Chinese and Italian cultural elements into the curriculum content, and specially add characteristic modules such as "Traditional Chinese Culture" and "Modern Italian Design Trends". Through AI technology, comprehensively integrate typical cases, research literature, documentary

images and other resources of packaging design from China and Italy, and build a digital Chinese-Italian cultural resource library containing more than 1,200 resources, including 240 Italian design cases and 460 traditional Chinese cultural clips. For example, in the classroom teaching of the core professional course "Packaging Design", a comparative analysis teaching method based on Prompt Engineering is adopted. Students are required to select one traditional Chinese packaging example and one modern Italian packaging example. Students attach image data of Chinese and Italian packaging examples in DeepSeek and send a clear prompt: "Compare and analyze the differences between these two types of packaging in terms of material, structure, color matching, etc.", guiding students to intuitively and in-depth understand the differences in design concepts and aesthetic logic under different cultural backgrounds, and improving the depth and pertinence of teaching.

#### **3.1.2. AI Competence Module**

Strengthen the cultivation of technical application capabilities by adding cutting-edge courses such as "Artificial Intelligence and Art Design" and integrating AI technology practical projects into multiple core packaging professional courses such as "Packaging Design" and "Brand Packaging Planning". Systematically teach students to use AI multimodal toolchains such as Jimeng AI and Wujie AI to complete packaging design for different actual needs in the packaging industry, break through the design limitations dominated by empiricism, generate multiple design inspiration schemes, and improve design efficiency. Introduce an AI virtual simulation teaching system to highly simulate packaging models and cross-cultural scenarios, and build an instruction library containing 8 progressive teaching activities, covering core competence training links such as case analysis, cultural comparative research, and creative generation practice, helping students improve their technical application capabilities.

#### **3.1.3. Professional Competence Module**

Deepen core skill training, closely align with the talent training program of the Sino-Italian project, combine the actual needs of enterprise positions, restructure the core curriculum content introduced by foreign parties, and integrate Italian design methods and traditional Chinese cultural concepts into the pre-class, in-class, and after-class teaching processes. Realize the dynamic update of teaching content through AI technology, with an annual dynamic iteration of more than 31.5% of industry cases, ensuring that the teaching content keeps pace with the development of the industry and improving students' job adaptability.

## **3.2. Teaching Implementation: Adopting "Immersion + Interaction" Teaching Methods**

### **3.2.1. AI Immersive Teaching to Break Cross-Cultural Communication Barriers**

Introduce the AI virtual foreign teacher "Xiao Zhong" to create an immersive English teaching environment, ensuring that students have an average of 45 minutes of daily English listening and speaking practice outside English course teaching; use Augmented Reality (AR) technology to build highly simulated immersive virtual environments such as the Italian Design Week and traditional Chinese workshops, and organize 5 virtual research activities, covering more than 140 students in the Sino-Italian project. Students can "enter" top

Italian design studios and conduct real-time interactive exchanges with virtual designers, intuitively feeling the real design cultural atmosphere, thereby effectively breaking the time and space limitations of cross-cultural communication.

**3.2.2. AI Interactive Teaching to Improve Classroom Participation**

Realize real-time interaction in the teaching process relying on an intelligent teaching platform, comprehensively grasp students' learning progress and weak knowledge links through AI technology analyzing students' questionnaire data, and then carry out targeted teaching. Generate teaching intervention plans based on AI analysis reports, classify students into "basic consolidation groups" and "ability enhancement groups", and push personalized supplementary learning resources to students in different groups. For example, for students with weak color control ability, push color masterclasses taught by Italian designers. In project-based teaching, AI dynamically adjusts the difficulty of tasks based on the practical teaching exercises provided by teachers combined with real-time learning situation analysis, realizing stepped ability cultivation.

**3.3. Evaluation and Feedback: Establishing a "Diversification + Intelligence" Evaluation System**

**3.3.1. Diversification of Evaluation Subjects**

The classroom teaching evaluation method of the Sino-Italian project includes teacher evaluation, student self-evaluation, group mutual evaluation, enterprise evaluation,

and cultural inheritor evaluation, forming a multi-evaluation subject system. Among them, the enterprise evaluation is composed of a professional review team of 8 Chinese and foreign industry experts to conduct comprehensive professional comments on students' final design works, with an evaluation weight of 30%, ensuring the industry adaptability and objectivity of the evaluation results.

**3.3.2. Intelligence of Evaluation Methods**

Use an AI evaluation system to conduct comprehensive and accurate evaluations of students' learning processes and outcomes, conduct quantitative scoring from multiple dimensions such as creativity, cultural integration, and technical application capabilities, and generate personalized evaluation reports. For example, in the course "Model Making and Craftsmanship", AI identifies the integration of cultural elements in design works according to prompts with an effective recognition rate of 87%, and provides students with targeted improvement suggestions to help them improve their professional employment capabilities.

**3.4. Data Support for Teaching Implementation**

In order to carry out teaching well and achieve good teaching results, evaluations and tracking were conducted before and after the teaching reform. The tracking indicators mainly include: the number of digital teaching resources, student classroom participation rate, number of cross-cultural projects, number of virtual research activities, and English listening and speaking qualification rate.

Table 1. Comparison of Key Indicators of Teaching Implementation (Before and After Reform)

| Indicators                                        | Before Reform (2023) | After Reform (2025) | Absolute Increase | Growth Rate |
|---------------------------------------------------|----------------------|---------------------|-------------------|-------------|
| Number of digital teaching resources              | 350 items            | 1200 items          | +850 items        | 242.9%      |
| Student classroom participation rate              | 65%                  | 91%                 | +26%              | 40.0%       |
| Number of cross-cultural projects                 | 5                    | 23                  | +18               | 360%        |
| Number of virtual research activities             | 0                    | 5                   | +5                | -           |
| English listening and speaking qualification rate | 42%                  | 95%                 | +53%              | 126.2%      |

**4. Practical Effects of AI-Enabled Higher Vocational Classrooms**

**4.1. Significant Improvement in Students' Professional Competence and Cross-Cultural Literacy**

After five years of teaching practice, students' professional skill levels have been significantly improved. They have won a total of 46 awards in various competitions such as the Future Designer Competition and the International Youth Design Competition, an increase of 254% compared with 13 awards before the reform, including 28 awards in international competitions, fully demonstrating students' international competitiveness. The utilization rate of AI design tools among

students has reached 100%, 92% of students can independently complete high-quality cross-cultural packaging design projects, and 85% of students have received high praise from Chinese and foreign enterprise mentors during project evaluation, an increase of 30 percentage points compared with before the reform.

**4.2. Effective Integration and Optimization of Teaching Resources**

The Chinese-Italian digital cultural resource library built with the help of AI technology and digital teaching platforms has achieved a total of 50,000 visits. It not only provides strong support for the teaching of this major but also realizes the sharing and win-win of high-quality teaching resources. The application of the AI virtual simulation teaching system has effectively reduced the training material cost by 40%, and

the utilization rate of training class hours has increased to 95%, successfully solving the problems of insufficient training equipment and limited training venues in traditional teaching, and improving the utilization efficiency of teaching resources.

#### **4.3. Continuous Improvement of Teaching Quality and School-Running Influence**

The teaching reform practice of this major has been widely recognized by education authorities and industry enterprises. It has signed school-enterprise cooperation agreements with many enterprises to jointly discuss and promote the formulation of talent training programs and curriculum standards for the Sino-Italian cooperative project. The reform experience has been promoted through various forms such as the National Vocational Education Teaching Seminar on the Packaging Industry and academic papers. A total of 5 related research papers have been published, including 1 core journal paper, providing useful reference for the classroom teaching reform of Sino-foreign cooperative education majors in higher vocational colleges across the country, and the school-running influence has continued to expand.

### **5. Conclusion**

The practice of AI-enabled higher vocational classrooms from the perspective of cultural integration provides new ideas and effective methods for the teaching reform of the packaging planning and design major in the Sino-Italian cooperative education program. By constructing a progressive curriculum system oriented by "Culture + AI + Profession" three-dimensional competencies, adopting "immersion + interaction" teaching methods, and establishing a "diversification + intelligence" evaluation system, the classroom teaching quality and students' comprehensive literacy have been effectively improved. Relevant data show that after the reform, the number of students' professional competition awards, the qualification rate of cross-cultural communication capabilities, and enterprise satisfaction have all achieved significant improvements, the integration efficiency of teaching resources is remarkable, and the quality of talent training has been strongly guaranteed.

### **Author Introductions**

Xu Xiaolei (1997—), female, from Wenzhou, Zhejiang, master's degree, mainly engaged in packaging design research; Erica Brucoli (1990—), female, Italian, master's degree, mainly engaged in packaging illustration design research; Zhang Yue (2004—), from Jinhua, Zhejiang, mainly engaged in packaging design research; Wen Lumin (2007—), female, from Wenzhou, Zhejiang, mainly engaged in packaging design research.

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Supply-Demand Matching Employment and Talent Cultivation Project of the Ministry of Education: Research on Competence Improvement of Creative Designers for Electrical Product Packaging (2025021944793).

### **References**

- [1] Zhang Yuanyuan, Tang Shubo, Gan Luying. Research on the Improvement Path of Higher Vocational Classrooms Empowered by Digital Intelligence [J]. Journal of Yuxi Normal University, 2025, 41(05): 127-132.
- [2] Ma Yuanfei. The Application and Challenges of Artificial Intelligence Technology in Contemporary Art Creation: Reflection from Tool Attribute to Creative Subjectivity [J]. Literature and Art Weekly, 2025, (16): 74-78.
- [3] Xiao Jie. Innovation Research on the Training Model of High-Skilled Talents in Product Design under the Background of Artificial Intelligence [J]. China Packaging, 2022, 42(07): 89-92.
- [4] Gu Qiang. Research on the Digital Restructuring of Design Professional Courses Driven by "Integration of Competition and Teaching"--A Case Study of the Sino-Italian Cooperative Project of Yantai University [J]. Art Education Research, 2025, (17): 118-120.
- [5] Huang Xiao. International Seminar on "China Competence in Germany and Germany Competence in China" Held at Tongji University [J]. German Studies, 2017, 32(04): 129.