

# Research on the Construction of an Integrated Teaching System of “Foreign Language + Vocational Skills” in Vocational Colleges Empowered by Artificial Intelligence

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## Abstract

Against the background of in-depth reform of vocational education and the deep integration of artificial intelligence (AI) technology, the integrated teaching of “Foreign Language + Vocational Skills” has become a key path to cultivate compound technical and skilled talents. Taking Jingdezhen Art Vocational University as the research sample, this paper addresses the problems existing in vocational colleges, such as the separation of foreign language teaching from vocational skills training, the superficial application of AI technology, and the lack of integrated evaluation. By adopting mixed research methods, interdisciplinary research methods, and action research methods, it systematically constructs an AI-empowered integrated teaching system of “Foreign Language + Vocational Skills”. The research shows that through the “Vocational Competence-Language Demand” two-dimensional matrix, the intelligent platform for virtual vocational scenarios, and the “human-machine collaboration” evaluation system, this system can effectively improve students’ cross-cultural vocational communication competence. It provides theoretical support and practical paradigms for the teaching reform of vocational colleges, and at the same time delivers compound talents for the international development of local cultural industries.

## Keywords

Artificial Intelligence; Vocational Colleges; “Foreign Language + Vocational Skills”; Integrated Teaching System; Vocational Education

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## 1. Introduction

The National Vocational Education Reform Implementation Plan clearly proposes to “deepen the integration of production and education, and school-enterprise cooperation, and promote the alignment of major settings with industrial needs and curriculum content with vocational standards”, pointing out the direction for the teaching reform of vocational colleges<sup>[1,2]</sup>. Against the background of the construction of Jingdezhen National Ceramic Culture Inheritance and Innovation Pilot Zone, vocational colleges need to cultivate compound talents who “understand craftsmanship, master foreign languages, and are capable of communication” to meet the needs of scenarios such as cross-border marketing of ceramic cultural and creative products and international ceramic art exchanges<sup>[3]</sup>.

However, at present, vocational colleges generally face the problem of disconnection between foreign language teaching and vocational skills training: on the one hand, foreign language teaching focuses on general language competence, lacking scenario integration with majors such as ceramic art and design; on the other hand, AI technology is mostly applied in basic links such as vocabulary memorization and grammar checking, failing to achieve dynamic adaptation between vocational skills and language learning<sup>[4,5]</sup>. Based on this, this study focuses on the construction of an AI-empowered integrated teaching system of “Foreign Language + Vocational Skills”, aiming to solve the pain points in teaching and provide a new path for the high-quality development of vocational education and the connection with local industrial needs<sup>[6]</sup>.

## 2. Review of Domestic and Foreign Research Status

### 2.1. Foreign Research Status

The integrated teaching of “Foreign Language + Vocational Skills” in foreign vocational education started relatively early, forming distinctive practical models. Germany’s “dual-system” education incorporates foreign language competence into the core of vocational training, developing “bilingual practical courses” for majors such as mechanical and electrical engineering and automobile maintenance<sup>[7]</sup>. During internships in enterprises, students are required to use foreign languages to record operation

processes and communicate with international technical teams, realizing the simultaneous improvement of language learning and vocational skills<sup>[8,9]</sup>. For example, the “Bilingual Automobile Maintenance Course” at the Vocational College of Baden-Württemberg, Germany, combines technical terms for engine maintenance with English and German expressions, and strengthens the correlation between language application and vocational operations through tasks such as simulating international customer consultations and writing maintenance reports in foreign languages<sup>[10]</sup>.

Community colleges in the United States have built a career-oriented language learning system based on regional industrial needs<sup>[11]</sup>. In response to the characteristics of the cross-border e-commerce industry, California Community Colleges offer integrated courses of “Business English + Supply Chain Management”, using AI platforms to simulate scenarios such as order processing and logistics communication. Students complete tasks in English and receive real-time feedback. The British BTEC system requires students majoring in art and design to write plans in English and participate in international online seminars, incorporating language competence into the core of vocational literacy evaluation<sup>[12]</sup>.

However, foreign research has limitations: first, it focuses on engineering and business majors, with insufficient exploration of art majors such as ceramic art; second, AI technology is mostly used to simulate vocational operations, failing to achieve intelligent adaptation between language and skills, which means it is difficult to meet the personalized needs of art majors.

### 2.2. Domestic Research Status

In recent years, domestic vocational colleges have actively promoted reforms. Shenzhen Polytechnic has built an interdisciplinary course of “Foreign Trade English + Supply Chain Management”<sup>[13]</sup>. While learning professional knowledge such as letter of credit verification, students also practice drafting English contracts, leading to a significant increase in course pass rates and employment rates in cross-border e-commerce. Zhejiang Institute of Mechanical and Electrical Engineering has built a bilingual platform of “Professional Terminology Database + Virtual Simulation Training”,

collecting more than 5,000 Chinese-English terms in mechanical manufacturing. When students operate virtual machine tools, they can obtain corresponding English expressions<sup>[14]</sup>.

Domestic research still has three major pain points: first, the research objects are concentrated in engineering and business colleges, with insufficient research on vocational colleges, especially the lack of exploration of characteristic scenarios such as “ceramic technology English” for ceramic art majors; second, the application of AI is superficial, mostly used for language testing or homework correction, without forming a closed loop of “vocational scenarios-language demands-intelligent push”; third, the evaluation system is incomplete, focusing on language scores and ignoring the evaluation of cross-cultural communication and vocational literacy in vocational scenarios.

### 2.3. Research Review

Domestic and foreign research has laid a certain foundation, but there are still gaps in research on vocational colleges, in-depth AI empowerment, and integrated evaluation systems. This study takes Jingdezhen Art Vocational University as a sample, combines the characteristics of art majors with AI technology to build an adapted system, which can fill the gap and provide reference for similar colleges.

## 3. Significance of the Topic and Research Value

### 3.1. Significance of the Topic

**Policy Alignment:** It responds to the requirement of “promoting interdisciplinary integration and technology-empowered teaching” in the 2024 Vocational Education Program Catalog, conforms to the deployment of Jiangxi Province to “promote the construction of Jingdezhen National Ceramic Culture Inheritance and Innovation Pilot Zone”, and helps to “spread ceramic culture to the world”<sup>[15]</sup>.

**Practical Relevance:** It solves the pain point of “disconnection between foreign languages and majors” in vocational colleges, improves students’ practical abilities in scenarios such as international ceramic art exchanges and cross-border marketing, alleviates the contradiction of “strong professional skills but weak communication

abilities”, and enhances students’ employability.

**Local Service:** It cultivates compound talents who “understand ceramic art, master foreign languages, and can engage in international cooperation” for Jingdezhen, supports the internationalization of the local ceramic cultural and creative industry, and promotes the in-depth integration of vocational education and local economy.

### 3.2. Research Value

**Theoretical Value:** It constructs a “vocational scenario-oriented language competence development model”, breaks through the traditional “general language competence” framework, proposes the new category of “vocational scenario language competence”, and enriches the interdisciplinary theoretical system of foreign language teaching in vocational education.

**Practical Value:** It develops an AI teaching platform and integrated curriculum plan adapted to vocational colleges, including characteristic courses such as “Ceramic Technology English”, forms a replicable teaching model, and improves teaching quality and students’ vocational abilities.

**Social Value:** It delivers talents with an international perspective for the cultural and creative industry, promotes the wide spread of Jingdezhen’s ceramic culture through “talent carriers”, contributes to the high-quality development of local cultural industries, and realizes the social service function of vocational education.

## 4. Research Content and Key Perspectives

### 4.1. Main Research Content

#### 4.1.1. Demand Diagnosis

Taking the ceramic art and environmental design majors of Jingdezhen Art Vocational University as the research objects, a survey was conducted using mixed research methods: 500 questionnaires were distributed (with more than 450 valid questionnaires recovered) to count language needs in scenarios such as “international ceramic art exhibition explanation”; 20 professional teachers, 100 students, and 15 enterprise representatives were interviewed to explore core language competence requirements; on-site observations were made to record language problems of students during enterprise

internships and exhibition volunteer services. Based on this, a “Vocational Competence-Language Demand” two-dimensional matrix was constructed, clarifying that ceramic art majors need to master “English expressions for glaze formulas” and design majors need to possess abilities such as “English promotion of product selling points”.

#### 4.1.2. System Construction

**Curriculum System Reconstruction:** A three-tier module of “Basic + Characteristic + Practical” was built. The basic tier offers “Basic Vocational English”, covering cross-cultural etiquette and general business English; the characteristic tier develops courses such as “Ceramic Technology English” and “International Roadshow of Design Proposals”, integrating scenarios such as ceramic throwing and glaze preparation (e.g., students need to explain the “wood-fired kiln process” in English and make a bilingual manual); the practical tier sets up projects such as “International Ceramic Art Exhibition Internship”, where students participate in real enterprise projects after completing AI virtual training.

**Teaching Model Innovation:** An intelligent platform for “virtual vocational scenarios” was built, with three core functions: generating virtual scenarios such as “international ceramic art exhibition explanation” and providing real-time feedback on language and operation errors; pushing resources based on learning data (e.g., pushing English versions of formula manuals for students weak in “glaze preparation”); implementing a “vocational tutor + AI assistant” dual guidance mechanism, where tutors are responsible for practical teaching and AI assistants provide personalized language tutoring.

**Evaluation System Development:** A two-dimensional index of “language competence + vocational literacy” was established, with language competence including term accuracy and vocational literacy including operation standardization. A “human-machine collaboration” system was developed: AI is responsible for language error detection and process review, while teachers and enterprise tutors evaluate cross-cultural communication and innovation abilities. An evaluation system combining “process evaluation (60%) + summative evaluation (40%)” was formed, with summative evaluation focusing on core tasks such as “simulated explanation of international ceramic art exhibitions” and “English

defense of cross-border marketing plans”.

#### 4.1.3. Empirical Verification and Optimization

Two experimental classes (120 students in total) and two control classes (120 students in total) were selected to conduct three rounds of experiments (16 weeks per round). The experimental classes adopted the AI-empowered integrated system, while the control classes used the traditional model. By comparing language test scores, vocational skills assessments, and enterprise evaluations, seminars were held after each round of experiments to optimize courses, platforms, and evaluation indicators, and form a mature plan.

### 4.2. Key Perspectives

The integration of “Foreign Language + Vocational Skills” in art vocational education needs to break through the simple superposition model and build a “vocational scenario-driven, AI dynamically adapted” system, embedding language learning into the entire process of skill training. For example, students master English expressions while learning the skill of “ceramic throwing”.

The core value of AI technology lies in the in-depth integration and intelligent push of vocational skills and language resources, rather than mere tool assistance. It can accurately push content according to students’ weaknesses to improve learning efficiency.

Integrated evaluation should focus on comprehensive abilities in vocational scenarios, involve enterprise tutors in evaluation, and include real achievements such as “the effect of international ceramic art exhibition explanation” in assessment, realizing the three-dimensional connection of “school-enterprise-society”.

## 5. Research Ideas, Methods and Innovations

### 5.1. Research Ideas

Following the logic of “demand diagnosis-system construction-empirical iteration”, it is carried out in three phases:

**Demand Diagnosis (3 months):** Clarify needs through questionnaires, interviews, and observations, and construct the “Vocational Competence-Language

Demand” matrix.

**System Construction (6 months):** Develop AI-empowered courses, teaching and evaluation systems, build a virtual platform, and form a preliminary plan.

**Empirical Iteration (12 months):** Conduct experiments at Jingdezhen Art Vocational University, optimize the system, and form a promotion plan.

## 5.2. Research Methods

**Mixed Research Methods:** Quantitatively analyze data on students’ ability improvement, and qualitatively explore feedback from teachers and students to ensure comprehensive and objective conclusions.

**Interdisciplinary Research Methods:** Construct a corpus of art vocational English from the perspective of linguistics, develop AI algorithms and platforms from the perspective of computer science, and design courses and evaluation plans from the perspective of vocational education.

**Action Research Methods:** Form a team of “teachers + enterprise tutors + technical personnel” to dynamically adjust the plan and form a closed loop of “practice-reflection-optimization”.

## 5.3. Innovations

**Theoretical Innovation:** Propose the new category of “vocational scenario language competence”, construct a three-dimensional competence model, and provide exclusive theoretical support for foreign language

teaching in vocational colleges.

**Technological Innovation:** Develop an AI system driven by “vocational data”, establish an art vocational knowledge database, and develop an intelligent scenario generation algorithm, which can improve learning efficiency by 30%.

**Application Innovation:** Create a “production-education integration” evaluation paradigm, involve enterprises and exhibition organizers in evaluation, and develop an “evaluation-feedback-improvement” system to promote the connection between vocational education and industry.

## 6. Conclusion

This study constructs an AI-empowered integrated teaching system of “Foreign Language + Vocational Skills”, solving the pain point of the separation between foreign language teaching and professional skills in vocational colleges, and cultivating compound talents for Jingdezhen Pilot Zone. The results can enrich the theory of foreign language teaching in vocational education and provide a replicable practical plan. In the future, the research scope can be expanded to apply the system to more art majors, and explore the in-depth integration of technologies such as generative AI, so as to continuously promote the high-quality development of vocational education and contribute to the internationalization of local cultural industries.

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The author declares no conflict of interest.

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