

Reform and Innovation of Prefabricated Building Courses in Higher Vocational Education Guided by Personalized Learning

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Abstract: With the advancement of information technology, "personalized learning" has garnered increasing attention. Taking personalized learning as the entry point, this paper clarifies its conceptual framework and reviews current research progress. Using a prefabricated building course in higher vocational education as a case study, a personalized learning platform was designed to shift pedagogical focus toward learner-centered education. This platform accommodates diverse learning styles, stimulates students' motivation, and fosters individualized development. The implementation of personalized learning partially addresses the limitations of traditional "classroom-based instruction" and "standardized teaching." This study explores methodologies to expand personalized learning opportunities for students in higher vocational education, aiming to enhance learning efficiency, cultivate self-directed learning abilities, optimize resource allocation, and ultimately realize "individualized instruction" through adaptive mechanisms aligned with learners' specific needs.

Keywords: Personalized Learning; Higher Vocational Education; Prefabricated Building; Smart Education

1. Introduction

The rapid development of the economy and the evolving cognitive levels of students have positioned personalized learning as a critical component of higher education. The integration of information technology and educational reform has reinvented personalized learning[1-4], transforming traditional teaching models, updating educational philosophies, and creating new learning environments. In smart education ecosystems, online resources better adapt to personalized learning needs, resolving related challenges and advancing the

principle of "individualized instruction."

Prefabricated buildings, characterized by functional diversity, personalized design, standardized production, modular construction, and intelligent management, offer significant advantages over traditional methods. They enhance project quality, drive the construction industry toward intelligent and modular transformation, and align with sustainable development goals. However, the promotion of prefabricated technologies faces a bottleneck: a shortage of skilled professionals, particularly technicians and industrial workers with adaptability and self-learning capabilities.

As a primary source of high-quality industrial talent, higher vocational institutions must cultivate knowledgeable, technically proficient, and innovative professionals to support the transition from traditional cast-in-situ construction to prefabricated systems. This underscores the urgency of optimizing prefabricated building courses.

Guided by the "personalized learning" philosophy, this study proposes reforms in curriculum design, teaching quality enhancement, and resource development to promote sustainable development in higher vocational education.

2. Current Challenges in Prefabricated Building Courses

2.1 Lack of Targeted Teaching

While more institutions now offer prefabricated building courses, their curricula often lack focus. Overloading syllabi with exhaustive content leads to fragmented teaching and disoriented learning.

2.2 Insufficient Teaching Resources

Despite growing course offerings, supporting resources remain scarce. Key topics such as assembly line workflows in prefabrication workshops and sleeve grouting lack visual aids, hindering student comprehension.

2.3 Limited Project-Based and Case-Driven Content

The absence of enterprise-aligned case studies in critical areas like component production, hoisting, and grouting reduces students' practical engagement and sense of achievement.

2.4 Inadequate Multimedia Integration

Overreliance on text-heavy PPTs persists, with limited use of videos, simulations, or interactive tools. Online resources remain predominantly text-based, failing to deliver personalized support.

2.5 Low Student Engagement

Despite interactive platforms, many students lack self-discipline, prioritizing entertainment over structured learning.

3. Reform Strategies for Prefabricated Building Courses

3.1 Personalized and Lifelong Learning Support Platforms

Develop adaptive learning systems that integrate social and individual needs. Key features include:

- (1) Navigation tools for course structures, learning histories, and resource retrieval.
- (2) AI-enhanced simulations and virtual labs to boost critical thinking and hands-on skills.
- (3) Real-time tutoring via audio-visual interfaces and collaborative online discussions.

3.2 "Micro-Learning Classroom" Model

Leverage 5G and multimedia technologies to transition from passive "lecture-based" teaching to interactive, immersive learning. Strategies include[5,6]:

- (1) Modular content delivery via short videos, quizzes, and gamified tasks.
- (2) AR/VR integration to replicate real-world construction scenarios.
- (3) Embedded interactive elements (e.g., quizzes, progress tracking) in video materials.

3.3 Knowledge Graph-Based Resource Repository

Construct a visualized knowledge graph for prefabricated building courses, integrating AI and manual curation to map interdisciplinary connections. Implementation steps[7-10]:

(1) Organize teaching resources and establish data standards.

(2) Phase-wise development and validation of the knowledge graph.

(3) Pilot testing with comparative analysis across cohorts and institutions. (e.g., Figure 1. Reform roadmap for prefabricated building courses under personalized learning orientation)

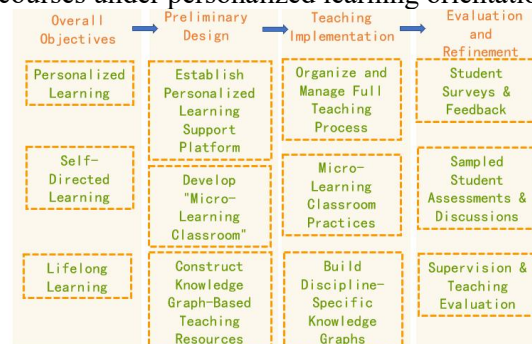


Figure 1. Reform Roadmap for Prefabricated Building Courses under Personalized Learning Orientation

4. Reform Objectives

4.1 Fostering Lifelong Learning

Networked education's flexibility and accessibility enhance vocational education's appeal, offering tailored resources and transcending spatiotemporal limits interactions.

4.2 Optimizing Teaching Effectiveness

Develop tiered "micro-courses" and shared resources to elevate teaching quality and institutional recognition.

4.3 Promoting Resource Sharing

Build comprehensive digital repositories (e-books, multimedia kits, video libraries) to support learners, educators, and professionals.

5. Conclusion

Information technology has revolutionized vocational education by digitizing resources, modernizing pedagogies, and cultivating students' digital literacy. Smart education reforms, emphasizing personalization and interactivity, empower learners to achieve lifelong development.

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