Optimizing Data Intelligence Empowerment and Industry-Education Integration in University Foreign Language Teaching

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Abstract. In response to the challenges encountered in college English education, a novel approach to curriculum development and teaching has been proposed and implemented. This approach, emphasizing "ability prioritization, personalized instruction, data intelligence empowerment, and industry-education integration," aims to enhance students' foreign language application skills. By focusing on student-centered development, a personalized College English teaching method has been adopted, highlighting "practice-oriented learning, student-centered teaching, competency-driven instruction and production-oriented approaches." This strategy seeks to optimize course quality through collaborative resource development, individualized instruction, and industry-education partnerships, ultimately benefiting the reform and innovation of university foreign language education in the modern era.

Keywords: College English; Teaching Reform; Data Intelligence Empowerment; Industry-Education Integration.

1 Introduction

The 20th National Congress of the Communist Party of China advocated for the integration of vocational education with general education, industry-education collaboration, and the convergence of science and education, while also emphasizing the promotion of educational digitization. Empowerment involves leveraging technology to provide individuals with the information, resources, and capabilities necessary for development. While "digitization" is a technological concept, "data intelligence" pertains to the practical application of digital technology. Achieving "data intelligence" needs the utilization of digital technology to establish a new ecosystem of intelligent digitization. Today, cutting-edge technologies like artificial intelligence, big data, and cloud computing play pivotal roles in reshaping educational models and enhancing educational quality. Industry-education integration is crucial for the high-quality advancement of vocational education, serving as a key indicator of vocational education reform effectiveness and a means to connect the education chain, industry chain, supply chain, talent chain, and value chain seamlessly.

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2 The Significance of Data Intelligence Empowerment and Industry-Education Collaboration

The digital empowerment of industry-education integration enriches educational modes, management and evaluation, significantly promotes the high-quality development of education. This integration serves dual functions: educational and technological.

Educational function: Leveraging digital technology, internet services, cloud platforms and other tools to facilitate collaborative resource construction and sharing among industry-education integration participants. This promotes the provision of high-quality educational resources, offering students efficient, flexible, convenient and diverse learning environments to meet modern societal demands for talent cultivation.

Technological function: Within industry-education integration processes, digitalization and intelligence are harnessed to optimize communication and interaction among participants, refine educational practices and establish a more diverse and flexible industry-education integration community. Advanced technologies such as big data and artificial intelligence are extensively applied in education, expanding spatial-temporal boundaries and improving educational quality and efficiency.

Presently, the practical teaching system in university English encounters challenges. Professional English, as an elective course for non-English majors, often lacks the necessary attention from both students and institutions. Consequently, there is a deficiency in research on digitally empowering industry-education integration in the realm of English education in China. The foreign scholars focus on the study that Advanced AI technologies have been identified as potential ways for learners and teachers to apply generative AI (GAI) (Hong 2023[1]; Kohnke et al. 2023[2]). In China's foreign language education field, discussions on generative AI are also increasing, involving the impact of ChatGPT on foreign language teaching practices, teaching models and teaching methods (Hu Zhuanglin 2023[3]; Qin Ying 2023[4]; Yang Gang & Gu Shimin 2023[5]), but fewer research on the application of AI in the industry-education integration in foreign language teaching (Li Qiong & Song Xiaolin, 2023[6]; Deng Hongwei, 2023[7]). This paper aims to introduce an innovative curriculum development and teaching approach focusing on "practice-oriented learning, student-centered teaching, competency-driven instruction, and production-oriented education."

3 Methods of Data Intelligence Empowerment and Industry-Education Integration in Enhancing Foreign Language Teaching Reform

In addressing the challenges within foreign language education, we adopt industry demand as a guiding principle and constructivist educational theories as a foundation. Through comprehensive design encompassing teaching concepts, methods, modes, and resource co-construction, we introduce an innovative teaching model grounded in in-

dustry-education integration, digital empowerment and personalized instruction. Transitioning from general foreign languages to specialized purposes, from language to practice, we redefine the capability development model of university foreign language courses.

3.1 Personalized Teaching through Practical Learning Integration

We establish a personalized teaching system rooted in "practice-oriented learning, student-centered teaching, competency-driven instruction, and production-oriented approaches." This system interconnects customized teaching materials, virtual simulations, competition training and project practical training to facilitate incremental capability enhancement. The curriculum comprises general English courses, specialized English courses, business English courses, competition training and practical courses, ensuring continuous capability refinement through elementary course consolidation, advanced course deepening, competition course excellence cultivation, and practice course professional integration and application. Employing a blended teaching model incorporating MOOCs, SPOCs, and offline classes, we differentiate instruction in offline classrooms to cater to diverse student proficiency levels. In addition, competitions serve as vital platforms for promoting learning and education within universities. Hosting a national professional English competition not only allows students to showcase their abilities but also facilitates talent recruitment for various industries. Additionally, within the context of the 1+X certificate system, obtaining English-related certificates opens up additional opportunities for college students. By integrating classroom instruction with enterprise practices, practical professional skills are honed through hands-on activities. Implementing project-based teaching methods within the specialized English practical teaching system, under the industry-education integration framework, enhances students' practical professional skills and systematic abilities.

3.2 Online Resource Support, Digitally Empowered Technologies and Transformation of Personalized Teaching Methods

Teaching content serves as the primary way for students to acquire knowledge, skills and abilities. Initiatives include the publication of innovative textbooks, digital courses, and the creation of online open courses spanning general English, specialized English and business English. These resources support students' personalized autonomous learning and teachers blended online and offline instruction. While each English teaching course may appear distinct, integrating acquired knowledge is essential for achieving educational objectives. Digitally empowered technologies fundamentally reshape teaching modes. For instance, in comprehensive practical teaching, specific content often spans multiple disciplines and requires knowledge from various subjects. Traditional practical teaching relies on practice guides, limiting students' understanding of the underlying knowledge. Digital technologies can leverage computers to present information through images, graphics, audio, video and animations, aiding students in problem analysis. The teaching system structure mirrors the professional English knowledge structure, illustrating logical relationships between foundational knowledge

and serving as an intellectual knowledge source. Virtual reality (VR) technology integrates teaching methods based on human cognitive characteristics, displaying teaching content in diverse formats and fostering a dynamic learning environment. VR not only presents fundamental knowledge but also displays relationships between different knowledge domains, encouraging students to pursue new insights.

Simultaneously, the establishment of a diverse training platform for textbook development, virtual simulation practices and competition training supports students' personalized online practice. Developing a smart teaching platform for College English courses based on artificial intelligence and big data technologies enables AI assistant robots for intelligent Q&A, culminating in a "Digitally empowered personalized teaching system (as shown in Figure 1)." This model explores a novel approach to teaching guidance and assistance, featuring online and offline dual-teacher collaboration, peer tutoring, AI assistant teachers, and a blend of virtual and real personalized guidance. By leveraging big data analysis and machine learning algorithms to gather students' learning behavior data, an evaluation system integrating multiple information sources is constructed, enabling intelligent performance prediction and early warnings. Through the analysis of extensive learning data, student learning behavior models are established, offering comprehensive insights into students' learning process. Supported by an intelligent grading system, formative assessments are facilitated, verifying stage objective achievements. The combination of online classroom assessments and midterm anonymous questionnaires aids in identifying students' weaknesses promptly, helping teachers to enhance instruction effectively. Dynamic testing and cheating detection technologies, coupled with a self-service practice teaching platform, enable students to select knowledge points and difficulty levels independently, correcting learning behaviors based on differential analysis feedback. Teachers can identify procrastination tendencies and provide timely supervision and reminders by monitoring individual learning curves.

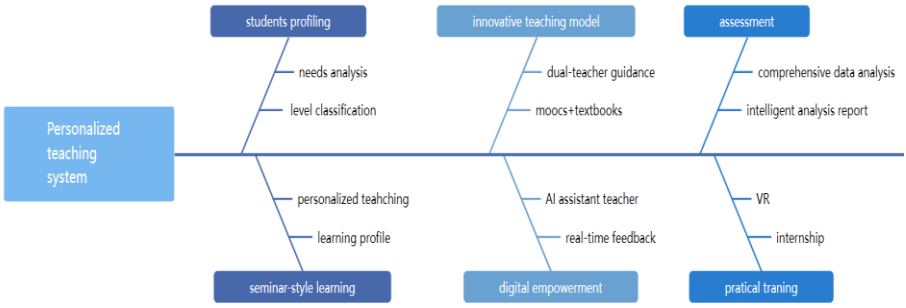

Fig. 1. Digitally empowered personalized teaching system of College English

3.3 Collaboration Between Renowned Enterprises and Renowned Universities, Cross-Boundary and Cross-School Cooperation, Facilitating Industry-Education Integration and Resource Sharing

To foster effective industry-education integration and resource sharing, we have explored collaborative methods involving renowned enterprises, renowned universities, cross-boundary cooperation and cross-discipline exchanges (as shown in Figure 2). Leveraging collaborative education bases and industry-academic cooperation projects, we engage engineers from companies like CRRC, driving excellent teachers from universities to explore industry-education integration teaching reforms. This initiative involves integrating industry standards and high-speed rail-related indicators into MOOCs, textbooks, or experiments, bridging the gap between foreign language proficiency development and industrial practice. This alignment enhances university foreign language teaching by incorporating cutting-edge technologies from the railway transportation industry, allowing students to grasp enterprise needs and technological advancements, fostering a spirit of innovation and patriotism. Furthermore, we leverage the exemplary roles of leading teachers and courses, utilizing cross-school and cross-discipline exchange mechanisms in virtual research rooms. The practical experiences pioneered by leading teachers and the MOOC resources co-created by schools and enterprises are distributed to other institutions, expanding the reach of industry-education integration initiatives.

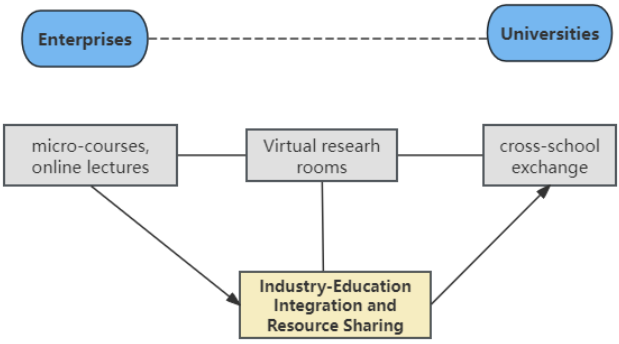

Fig. 2. The path of Integration of Industry and Education and Resource Sharing

4 Conclusion

In response to the evolving landscape of new engineering disciplines, educational digitization and industry demands, we have introduced an innovative curriculum development and teaching approach focusing on "practice-oriented learning, student-centered teaching, competency-driven instruction, and production-oriented education." Leveraging new technologies such as artificial intelligence and big data, we have established a personalized guidance system, enabling "intelligent grading, problem-solving Q&A, student profiling, performance prediction, comprehensive learning data analysis, multi-

channel feedback, and collaborative teacher assistance." Our efforts in resource co-construction, sharing, and collaborative teaching have yielded positive outcomes in educational practice, paving the way for innovative reforms in college English education in the contemporary era.

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