Exploration of Construction Paths for Virtual Simulation Training Bases under the Background of Digital Intelligence Economy

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Abstract: With the application of new-generation information technologies such as virtual reality, artificial intelligence, big data, cloud computing, and 5G, the construction of business training bases has transformed from physical to virtual. This paper analyzes the current construction status of business training bases in higher vocational colleges, identifies major issues such as lack of top-level design, unclear positioning, incomplete operational mechanisms, insufficient teaching content, and weak teaching staff. It proposes construction paths including scientific and reasonable planning, overcoming teaching difficulties with hybrid training, combining education and training, and strengthening the teaching staff, providing valuable references for the construction of new business virtual simulation training bases in higher vocational colleges.

Keywords: Digital Intelligence Economy; Virtual Simulation; Training Base; Construction Path

1. Construction Background

According to documents such as the "National Vocational Education Reform Implementation Plan," the "Action Plan for Improving Quality and Excellence in Vocational Education (2020-2023)," and the "Notice on the Construction of Demonstrative Virtual Simulation Training Bases in Vocational Education," the construction of virtual simulation training bases is designed to adapt to the national strategic layout and the new era of the digital economy. Utilizing digital economy as a key engine, it precisely aligns with modern industrial systems and modern service industry chains, reshaping the new business landscape in the accounting industry. By scientifically analyzing the relationships between industries, occupations, positions, and majors, and following the path of "new economy → new technology → new business form → new occupation → new capability → new major → new curriculum," the construction of virtual simulation practice bases is based on the requirements of professional full-element resources being scenario-based, digitized, and intelligent. Following the principles of "industry-education integration, school-enterprise cooperation, joint construction and management, and shared use," a comprehensive virtual simulation training base integrating "virtual business environment + augmented reality (AR) scenes + real business content + digital business panoramic typical intelligent application scenes" is established.

2. Problems in the Construction of Business Virtual Simulation Training Bases

The construction of virtual simulation training bases in higher vocational colleges aims to address the "three highs and three difficulties" in practical teaching: high investment, high risk, high consumables, difficult to observe, difficult to implement, and difficult to reproduce. Through the deep integration of various information technologies and practical teaching, virtual scenarios are established to enrich teaching modes, optimize teaching effects, and improve the quality of practical teaching and student satisfaction[1]. However, due to differences in the professional characteristics and investment foundations of practical teaching in various higher vocational colleges, the relevant practical software platforms and hardware equipment also differ. Virtual simulation training teaching software needs to be both universal

and distinctive. Therefore, the overall construction of the information platform for virtual simulation training bases faces several prominent issues in the construction of higher vocational virtual simulation training bases.

2.1 Incomplete Top-Level Design of Base Construction

In recent years, although the construction of virtual simulation training bases in higher vocational colleges has achieved certain results, there is a lack of unified technical construction standards and overall planning[2]. Each professional training room construction is limited to the related teaching needs of the profession and does not fully consider the compatibility of cross-professional or cross-college training. Moreover, the "virtual-real combination, virtual before real" model has not been fully realized, leading to a waste of resources in base construction.

2.2 Subject and Positioning of Base Construction

There is generally poor coordination between departments and professions in the construction of training bases in higher vocational colleges. The main reason is that some higher vocational colleges have construction plans that are overly broad, covering all departments and professional groups in the school, while the construction plans are limited to certain professional groups or even a few training rooms or courses[3]. Additionally, the needs of major administrative departments or the leadership of only one or two departments are driving the construction.

2.3 Incomplete Operational Mechanism of Base Construction

The construction of virtual simulation bases is a unified platform that integrates multiple functions such as teaching, training, scientific research, competitions, popular science, and social services. Its fundamental purpose is to achieve data integration and sharing by connecting online platforms[4], virtual simulation resources, and teacher courses. This creates a highly standardized experimental training environment that matches actual scenarios for students and enables teachers to effectively complete classroom practical teaching. Through VR resources, the "three highs and three difficulties" in practical teaching are genuinely addressed. However, there are many operational links in the training base, making management difficult. The management mode of open training bases is completely different from traditional training management modes. Training bases should maximize the application of digital technology and improve the operational mechanism of the base. In the construction of VR training teaching resources, most higher vocational colleges adopt cooperative development or purchase methods. However, the market lacks VR training teaching resources, and high-quality, high-standard VR training content is even rarer.

2.4 Incomplete Teaching Staff for Base Construction

Building a high-quality training teaching staff is an important prerequisite for the construction and implementation of virtual simulation training teaching systems. The teaching staff needs to have advanced teaching concepts and high-level teaching abilities, ensuring the effective use of virtual simulation training teaching systems. To better promote the construction of modern vocational education virtual simulation training bases and enhance the high-quality development of vocational education[5], it is urgent to cultivate a group of teachers who are familiar with virtual simulation training teaching, have strong professional abilities, and are proficient in digital technology. Therefore, higher vocational colleges need to strengthen deep cooperation with enterprises, jointly cultivate virtual simulation training teaching talent teams, improve the teaching design abilities and enterprise practical abilities of professional teachers, and jointly develop virtual simulation teaching software, thereby constructing a virtual simulation training teaching system.

3. Construction Paths and Strategies for Virtual Simulation Training Bases under the Background of Digital Intelligence Economy

To adapt to the national strategic layout and the new era of the digital economy, with the digital economy as an important engine, precise alignment with modern industrial systems and modern service industry chains is necessary. This involves reshaping new business formats, scientifically analyzing the relationships between industries, professions, positions, and majors, and revolving around the comprehensive practice teaching base's overall goal of "Digital Intelligence Business Virtual Simulation." Following the route of "new economy → new technology → new business form → new profession → new ability → new major → new curriculum," based on the construction requirements of scenario-based, digital, and intelligent virtual simulation practice bases with all-element resources of the profession, and combined with the core courses of relevant majors on the basis of the original comprehensive practice teaching base, the role of "cross-professional comprehensive training + AR-enhanced reality scenes" courses' virtual simulation should be strengthened, to build a comprehensive training base for digital intelligence business panoramic virtual simulation.

3.1 Construction of a Digital Intelligence Virtual Simulation Training Environment

By leveraging the advantages of industry resources, technological capabilities, and regional influence through the integration of industry and education, and combining the needs of school construction, schools and enterprises can jointly develop solutions for "Digital Intelligence Business Virtual Simulation Practice." The aim is to build a high-level virtual simulation base integrating "professional teaching, internship training, skills competitions, scientific research, and social services," as shown in Figure 1.
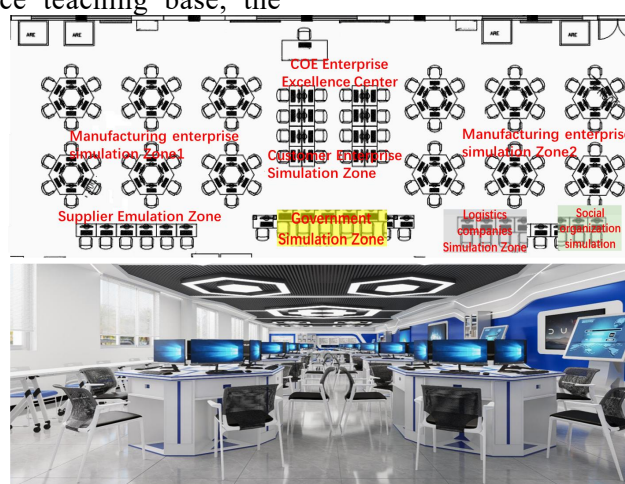
**Figure 1. Digital Intelligence Business Environment Virtual Simulation Training Environment**

3.2 Construction of Digital Intelligence Virtual Simulation Platforms and Course Resources

Focusing on the overall goal of the digital intelligence business panoramic virtual simulation comprehensive practice teaching base, aligning with the digital financial management job group of the full industry chain in the Guangdong-Hong Kong-Macao Greater Bay Area, and the collaborative innovation talent cultivation goal of "dual precision, dual integration" between schools and enterprises, we can develop a digital intelligence virtual teaching management platform, digital intelligence virtual simulation platform, and course resources by extracting the application of enterprise process automation in digital intelligence enterprise business scenarios combined with data modeling and visualization analysis tools.

3.2.1 Digital Intelligence Virtual Simulation Electronic Banking System

This includes electronic banking systems from the Bank of China, China Construction Bank, Agricultural Bank of China, and Postal Savings Bank of China, meeting students' needs for cash business processing functions, as shown in Figure 2.
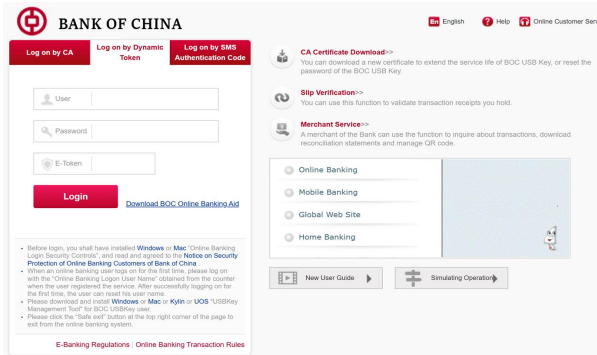
**Figure 2. Virtual Simulation Electronic Banking System**

3.2.2 Digital Intelligence Virtual Simulation Tax System

This includes the State Taxation Administration Guangdong Taxation Bureau and individual income tax declaration systems, meeting functions such as enterprise value-added tax declaration, enterprise additional tax declaration, enterprise income tax declaration, individual income tax declaration, and stamp tax declaration.

3.2.3 Digital Intelligence Virtual Simulation Invoice System

This meets the needs for invoice recognition, invoice issuance, invoice certification, invoice verification, official inspection, and verification code recognition, as shown in Figure 3.
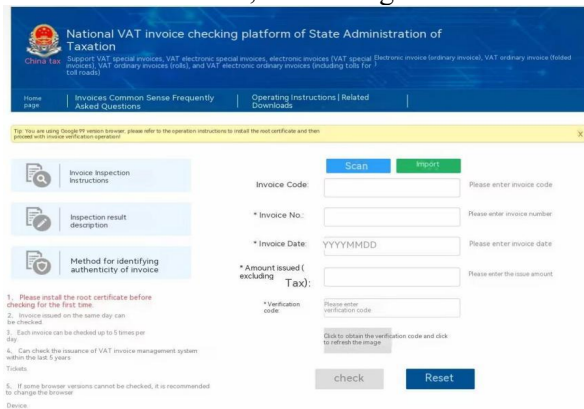
Figure 3. National Tax Administration National Value-Added Tax Invoice Inspection Virtual Simulation Platform

3.2.4 Digital Intelligence Virtual Simulation Recruitment and Enterprise Credit System

This virtual simulation system meets the needs for human resource recruitment, resume downloading, and enterprise credit inquiry, as shown in Figure 4.

Figure 4. Digital Intelligence Virtual Simulation Recruitment and Enterprise Credit Simulation Platform

3.3 Setting up Digital Intelligence Business Virtual Simulation Training Arrangements

Focusing on the overall goal of the "Digital Intelligence Business Environment" virtual simulation practice teaching base and aligning with the digital financial management job groups of the entire industry chain in the Guangdong-Hong Kong-Macao Greater Bay Area, virtual simulation training projects are set up based on typical work tasks combined with the digital intelligence virtual teaching management platform, digital intelligence virtual simulation platform, and course resources. The overall typical business, teaching content, knowledge skills, and teaching arrangements as shown in Table 1:

Table 1. Teaching Schedule of Virtual Simulation of Digital Intelligence Business

No.	Teaching Unit	Business Scenario	Training Task	Reference Hours
1	Course Introduction	Basic Knowledge	Cognition of Business Panorama	1
2	Course Introduction		Cognition of New Industry Technologies	1
3	Course Introduction		COE Excellence Talent Center Model	1
4	New Technology Cognition	Application of Process Automation Technology in Office Software	Process Automation Application	2
5	New Technology Cognition		Data Modeling	2
6	New Technology Cognition		PowerBI Data Visualization Application	2
7	New Technology Cognition		Introduction to Python Applications	2
8	Procurement	Background Analysis of Clients and Merchants	Supplier Credit Check	2
9	Procurement		Investigation of Cooperative Enterprise Information	2
10	Procurement	Procurement Management	Supplier Grading Management	2
11	Procurement		Automated Extraction of Contract Information	1
12	Procurement		Automatic Cost Reconciliation	2
13	Finance		Monthly Data Analysis of Procurement	2
14	Sales	Sales Management	From Data Analysis to Customer Profiling	2
15	Finance		Updating Accounts Receivable Information	1
16	Sales		Automated Notification Robot for Bank Receipts	1
17	Sales		Processing and Analysis of Project Payment Reports	1
18	Finance	Supply Chain Document Processing	Issuing of Output Invoices	1
19	Finance		Verification of Invoice Authenticity	2
20	Finance		Extraction and Certification of Invoice Information	1
21	Finance		Analysis of Accounts Receivable and Payable Data	1
22	Sales	Online Sales Data Analysis	Crawling E-commerce Website Data	1
23	Sales		Exploring Blue Ocean Categories	2
24	Sales		Investigation and Analysis of Consumer Habits	2
25	Finance	Daily Expense Reimbursement	Expense Reimbursement Review	1
26	Finance		Expense Reimbursement Payment	1
27	Finance	Intelligent Tax Declaration for Enterprises	Enterprise VAT Declaration	2
28	Human Resources	Human Resource Management	Collecting Data from Recruitment Websites	1
29	Human Resources		Downloading Recruitment Resumes	1
30	Human Resources		Intelligent Management of Personnel Information	1
31	Finance		Automatic Sending of Pay Slips	1
32	Public	End-of-Month Data Processing and Analysis	Profit and Cost Analysis	1
			Business Operation Analysis	1
			End-of-Month Data Processing and Analysis	1
Total Course Hours: 48 hours				

5. Effectiveness of Virtual Simulation Training Base Construction under the Digital Intelligence Economy

Through the construction of a comprehensive digital intelligence business panoramic virtual simulation training and course resources, the overall project content has been enriched. This provides strong support for building the "Digital Guangke" education ecosystem platform, accelerating the construction of a smart campus, and improving the level of informatization.

By integrating real business scenarios from enterprises, a high-level virtual simulation training base has been jointly built and awarded the title of "Digital Business Workshop." Taking this award as an opportunity, and following the principles of "technology-led, virtual-real complementarity, integration of education and training, and shared construction and sharing," further accelerating the construction of software and hardware for the demonstrative virtual simulation training base. This comprehensive base, which integrates student training, teacher training, vocational training, skills competitions, and technological research and development, gradually achieves the organic combination of virtual technology and real teaching, enhancing the practical teaching and talent training levels of related majors.

The comprehensive integration of the "big data visualization" + "Finance" system uses data thinking to define problems, stimulates student motivation, and guides students to see how accurate, efficient, and timely financial data can support cost reduction and efficiency improvement for enterprises.

It also achieves refined enterprise management by producing visual, multidimensional, and transparent management reports. Talent cultivation goals are constructed with a focus on thinking and ability, and the new technology-empowered talents trained can meet the latest requirements of enterprises and public institutions for digital management and application talents in today's society.

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