International Journal of Social Science and Education Research

Yang Lei
School of Foreign Languages and Business, Shenzhen Polytechnic University, Shenzhen 518055, China

Exploration of the construction of training rooms for foreign language majors in higher vocational education under the background of artificial intelligence

Yang Lei

DOI: https://www.doi.org/10.33545/26649845.2025.v7.i2b.332

Abstract
In recent years, the country has attached great importance to the impact of information technology on education, actively promoting the deep integration of artificial intelligence and education. The application of artificial intelligence and digital transformation have become an inevitable trend in the construction of training rooms. This article aims to build a three dimensional, digital and comprehensive vocational foreign language intelligent training room through the construction of digital computer rooms, virtual simulation training rooms, and online platforms. The smart training room is based on a digital computer room, supplemented by virtual simulation, and combines reality and virtuality to overcome the limitations of time and space and utilize big data platforms to integrate data feedback for teaching and practical training, realizing the application of artificial intelligence and digital transformation.

Keywords: Artificial intelligence, digitalization, vocational foreign language training room

1. Introduction

The country vigorously advocates the full utilization of technologies such as artificial intelligence and big data to build a digital, networked, personalized, and lifelong education system, in order to cultivate high-quality talents with innovative ability, communication and collaboration ability, complex problem solving ability, and human-machine collaboration ability. For foreign language majors in vocational colleges, the training room serves as the main venue for practical teaching, skill training, and vocational skill assessment. Building a smart training room is the basic guarantee for achieving these goals.

Vocational foreign language majors generally have their own training rooms, mainly consisting of ordinary language labs and business (simulation) centers. How to apply artificial intelligence and digital transformation to these traditional training rooms to adapt to the development of information technology, promote educational reform and innovation, is a difficult problem in the construction of vocational foreign language majors.

Artificial intelligence and digitization are the development trends of smart training rooms, which can be constructed from three aspects: the application of artificial intelligence, software and platform construction, and the construction of digital training rooms.

2. Artificial intelligence promotes foreign language teaching in higher vocational education

The development of artificial intelligence and digitization has brought great changes and impetus to foreign language teaching in vocational colleges in the following five aspects:

- **Knowledge system:** The knowledge system of foreign language teaching in vocational colleges is no longer arranged and constructed in a complete and orderly hierarchy, but teachers and students can freely choose different levels and contents according to their personal needs for teaching and learning; Skills such as listening, speaking, reading, writing, and translation in foreign languages can be switched and trained at any time;

- **Learning Time and Space:** The time and space of foreign language teaching in vocational colleges have been broken, and teachers and students can communicate, teach, and learn anytime, anywhere, online and offline, in and out of class, and on and off campus, without geographical, time, and spatial limitations.

Corresponding Author:
Yang Lei
School of Foreign Languages and Business, Shenzhen Polytechnic University, Shenzhen 518055, China

- **Learning methods:** Artificial intelligence and digitization have brought about changes in students' learning styles, alternating between virtual and real learning, and combining formal and informal learning. Students can learn foreign languages from teachers or online platforms, and personalized learning is greatly supported. Meanwhile, vocational college students can also conduct practical training on online platforms at any time.
- **Teacher student interaction:** The traditional teacher teaching students to learn has evolved into an interactive form that integrates human, computer (mobile phone and computer), and internet, continuously acquiring and optimizing knowledge. The interaction between teachers and students has shifted from teacher centered to multilateral interaction;
- **Learning management:** Artificial intelligence technology tracks the behavior of teachers and students by analyzing data from terminals such as web, app, and VR glasses, and conducts multidimensional and multi angle analysis of behavior in specific scenarios to obtain special needs for specific objects. Then, with the help of learning support systems, matching learning resources are pushed to teachers and students to provide appropriate teaching services.

3. The application of artificial intelligence in foreign language teaching in vocational colleges

With the continuous development and breakthroughs of digital technologies such as artificial intelligence, big data, and the Internet of Things, the construction of vocational foreign language training rooms is gradually transitioning from informatization to digitalization and intelligence. Technological empowerment and digital integration are inevitable development trends and paths.

3.1 Computer graphics and simulation technology in foreign language teaching

Traditional foreign language information technology teaching mainly relies on forms such as text, images, animations, audio, and video to assist teaching. The development of computer graphics and simulation technology has brought about changes in foreign language teaching, involving changes in teaching methods, teaching venues, perception methods, and thinking modes. Among them, technologies such as Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), and Extended Reality (XR) have brought new experiential forms to foreign language teaching by integrating digital information with the real environment to varying degrees. Extended Reality (XR) is a collective term for VR, AR, and MR technologies, all of which integrate physical and virtual environments or provide fully immersive virtual experiences.

The virtual simulation training room applies MR technology to foreign language teaching, especially in specific scenario teaching, which requires strict requirements for teaching venues, environments, scenarios, etc., making it difficult to achieve in reality. At this point, MR can utilize its technological features to present both real and virtual situations to teachers and students. At the same time, MR technology enables teachers and students to maintain synchronous connection with the real world and virtual

world, and adjust their operations according to their own needs and situations. Simply put, MR technology is the perfect integration and sublimation of AR technology and VR technology, which more comprehensively meets teaching needs.

3.2 AI foreign language teaching software and platform

AI foreign language teaching software and platform are new systems that utilize artificial intelligence technology to assist the entire process of foreign language teaching. Many platforms and software empower foreign language learning from six dimensions: listening, speaking, reading, writing, translation, and testing, comprehensively assisting teachers and students in teaching. The application of AI foreign language teaching software and platforms is a crucial step in the digital transformation of training rooms, greatly enriching training teaching resources and fully meeting the teaching and learning needs of foreign language teachers and students. It provides a basic guarantee for exploring and summarizing talent training models in universities.

In terms of listening, AI converts foreign language speech into textual form, enabling learners to understand listening materials through reading and improve their listening skills; AI provides personalized listening training content based on learners' levels and needs, adjusting difficulty and content according to learners' performance and feedback to achieve optimal learning outcomes. AI accurately evaluates learners' listening abilities and provides targeted feedback and suggestions. Commonly used English software platforms such as Utalk, Duolingo, Rosetta stone, FluentU, BBC Learning English, TED Talks, etc.

In terms of speaking, AI converts learners' oral expressions into textual form and provides real-time correction and feedback. This can help learners improve their pronunciation, intonation, and grammar, and enhance their oral expression ability; AI engages in dialogue with learners, providing real-time voice communication and interaction. Learners can practice oral expression and listening comprehension through conversations with voice assistants; AI accurately evaluates learners' oral expression and provides targeted feedback and suggestions, enabling learners to gradually improve their oral expression ability. Commonly used English software platforms such as FIF, HelloTalk, iTalki, Pimsleur, etc.

In terms of writing, AI can analyze learners' foreign language writing and provide suggestions for correcting grammar and spelling errors. This can help learners improve the accuracy and fluency of their English writing. AI can provide writing assistance tools such as vocabulary expansion, synonym replacement, writing templates, etc. These tools can help learners improve their writing skills and enrich their vocabulary expression. AI can evaluate learners' writing and provide targeted feedback and suggestions. This can help learners identify problems in writing and improve their expression and argumentation skills. Common English software platforms include iWrite, Grammarly, Google Docs, Hemingway Editor, Scrivener, etc. In terms of reading, AI can convert text into speech and provide voice reading function. Readers can improve their listening and comprehension abilities through listening and reading. AI can also provide auxiliary reading functions, such as marking and highlighting text, providing semantic explanations, etc., to help readers better understand and digest the content. AI analyzes readers' reading history and

behavior to provide personalized recommendations and customized reading experiences. Common English software platforms include Kindle, Pocket, Scribb, Readability, and Google News.

In terms of translation, AI can use machine translation technology to automatically translate foreign language texts into other languages, or translate other languages into English. This automatic translation technology can provide fast and real-time translation services, helping people overcome language barriers and engage in cross language communication. AI voice translation technology can assist people in cross lingual communication during voice conversations or phone conversations, providing real-time voice translation services. Commonly used English software platforms such as Google Translate, Microsoft Translator, DeepL Translator, iTranslate, etc.

In terms of assessment, AI can use natural language processing technology and machine learning algorithms to automatically score writing and reading comprehension. It can quickly and accurately analyze students' language use, grammar correctness, discourse structure, and reading comprehension ability, providing objective and consistent scoring results. AI can collect and analyze a large amount of language assessment data, generate data reports and personalized feedback, and provide corresponding learning advice and guidance to help students improve their language skills in a targeted manner. Commonly used English assessment software platforms such as iTEST, Duolingo, Cambridge English Assessment, etc.

4. Construction of digital foreign language training room in higher vocational education

With the continuous development of artificial intelligence and digitization, how to build a smart vocational foreign language training room to meet the requirements of the Ministry of Education's "promoting the integration of online and offline education through new educational infrastructure, promoting digital transformation, intelligent upgrading, and integrated innovation of education, and supporting high-quality development of education" has become an urgent task.

The construction of smart vocational foreign language training rooms includes digital training rooms, virtual training rooms, and online platform construction, in order to build a three-dimensional, digital, and all-round smart training room.

4.1 Construction of digital training room

The vocational foreign language training room has been upgraded from a traditional self-owned computer room to a digital intelligent training room. The servers and workstations have been locally deployed, and a large number of teaching software and hardware equipment have been installed in the self-owned computer room, achieving comprehensive and autonomous control of the equipment. To prevent resource waste, servers have undergone virtualization operations, placing devices that do not require long-term operation on virtual servers, appropriately releasing computing resources, and reducing the pressure on data center operations and maintenance. There is no need to worry about network lag or lack of interoperability in the training room, as the network within the campus LAN is interconnected in real-time and has fast transmission speeds. Students provide class information through the terminal

APP, arrive at the designated training classroom, and clock in through the facial recognition device on the terminal to enter the classroom for class; Teachers transmit teaching content to the cloud backend through a web-based system, download the teaching content from the classroom terminal, and collect and correct the assigned homework through the cloud backend. Through a combination of online and offline methods, closed-loop management of teaching is achieved, making it convenient for teachers and students. The localization of IT construction in training rooms is a relatively traditional approach, which has the advantage of providing all visible equipment and physical platforms, gathering manpower and material resources for traditional IT service management. However, the disadvantage is that user participation is not flexible and convenient, and learning and teaching can only be carried out on-site.

4.2 Construction of virtual venues

Based on existing virtual reality technology, build virtual training rooms to allow teachers and students to participate in teaching and learning anytime and anywhere. Virtual reality technology can provide a broad and three-dimensional teaching environment for practical training, and restore real teaching scenes through 3D modeling technology. By wearing VR and AR teaching devices, teachers and students can interact throughout the entire teaching process, as if they were in a real learning scene, intuitive, three-dimensional, and vivid. At the same time, the internal systems of VR and AR devices provide different learning environments and resources for different subjects, allowing learners to have a completely immersive feeling. Through comprehensive creation of visual, auditory, tactile, and other aspects, teachers and students can feel a sense of immersion, increase their focus, enhance their learning interest, and improve teaching effectiveness. The advantage of virtual venue construction is that it has no venue restrictions, and teachers and students only need to operate the equipment for teaching, which can make them feel no difference from the real venue. But the disadvantage is that the development of any teaching scenario relies on manufacturers, and teachers and students cannot develop the scenarios they want according to their own needs.

4.3 Construction of online integration platform

The vocational foreign language training room empowers teaching with artificial intelligence equipment and digital platforms. However, currently, most of the artificial intelligence equipment in the training room is closed, which cannot achieve data sharing between devices and limits the improvement of teaching effectiveness. The construction of foreign language training rooms requires breaking the closed boundaries of equipment, building a data lake, and achieving data sharing between different devices to achieve comprehensive and sufficient teaching improvement.

4.3.1 Localized data on cloud

As the number of foreign language training room equipment and students increases, it is considered to migrate some or all of the equipment to cloud servers to save resources and manpower. The elastic service function of cloud servers can flexibly expand storage resources and rely on the manufacturer's operation and maintenance capabilities to ensure security and performance. The architecture diagram of the migrated cloud service is shown in Figure 1.

The school's IT infrastructure adopts high-end and low-end cloud service cluster nodes to meet the computing requirements of different teaching software. The basic principle is: real-time strong computing software is deployed on high-end nodes, general management software is deployed on low-end nodes, and ordinary software is deployed on localized servers for easy operation and maintenance management. The cloud server is equipped with a management platform to monitor its operational status for easy management. A dedicated network improves network speed, bandwidth, and enhances security. Users can operate training room software at any time and place, which has significant advantages. The localization of data to the cloud lays the foundation for the construction of subsequent data integration platforms.
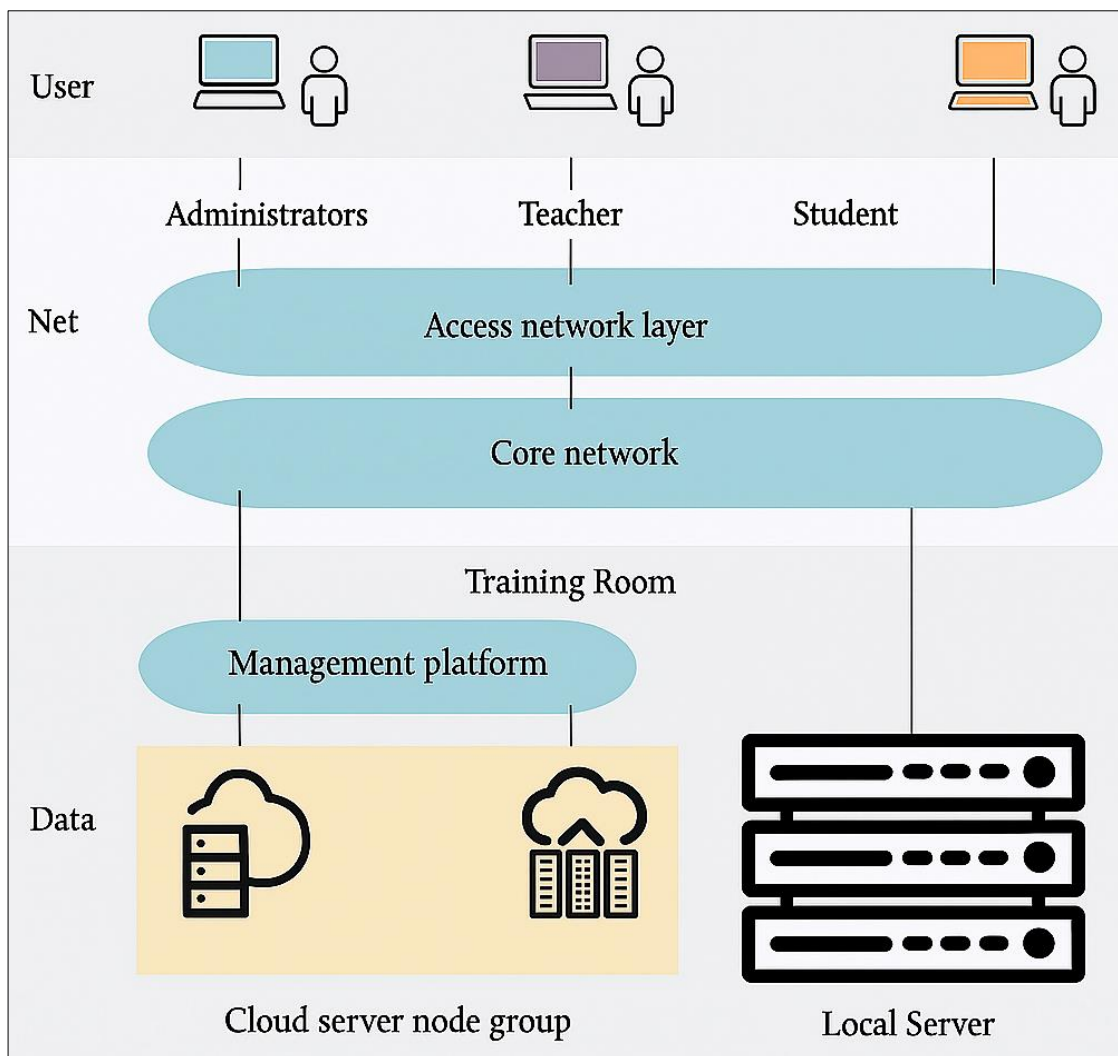

Fig 1: Cloud service architecture diagram

4.3.2 Building a data integration platform

During the construction of the training room, a large number of artificial intelligence devices and other training systems need to be deployed and installed. However, the devices and systems are isolated from each other, and data cannot be exchanged, making it difficult to achieve multi-dimensional data assisted teaching. Therefore, building a unified data integration platform to interconnect isolated data islands, achieve high data integration, and apply more dimensions and larger amounts of data to teaching and serve teaching. The architecture diagram of the data integration platform is shown in Figure 2.

The underlying data sources can be divided into four aspects: teaching documents uploaded by teachers and students, data from existing big data platforms in schools, localized database data, and other teaching related data such as attendance and course selection data. The main principle is to transmit data that is beneficial for teaching and security to the integrated platform.

The data integration side is responsible for managing, storing, scheduling, and processing data. Firstly, it is necessary to establish data interfaces, standardize data fields, and manage data elements, secondly, handling correlations, processing data and mining valuable information, finally, handle t-level data scheduling, monitoring, and log management. The data integration side is the core of the platform, truly empowering teaching and practical training.

On the data analysis side, it is more about interacting with users, who extract data from the platform based on their own needs. At the same time, the platform will also establish report display and query functions, and build a dashboard with a large screen display to showcase some commonly used indicators, with the aim of serving teaching. By showcasing, more people can participate in platform construction and data management.
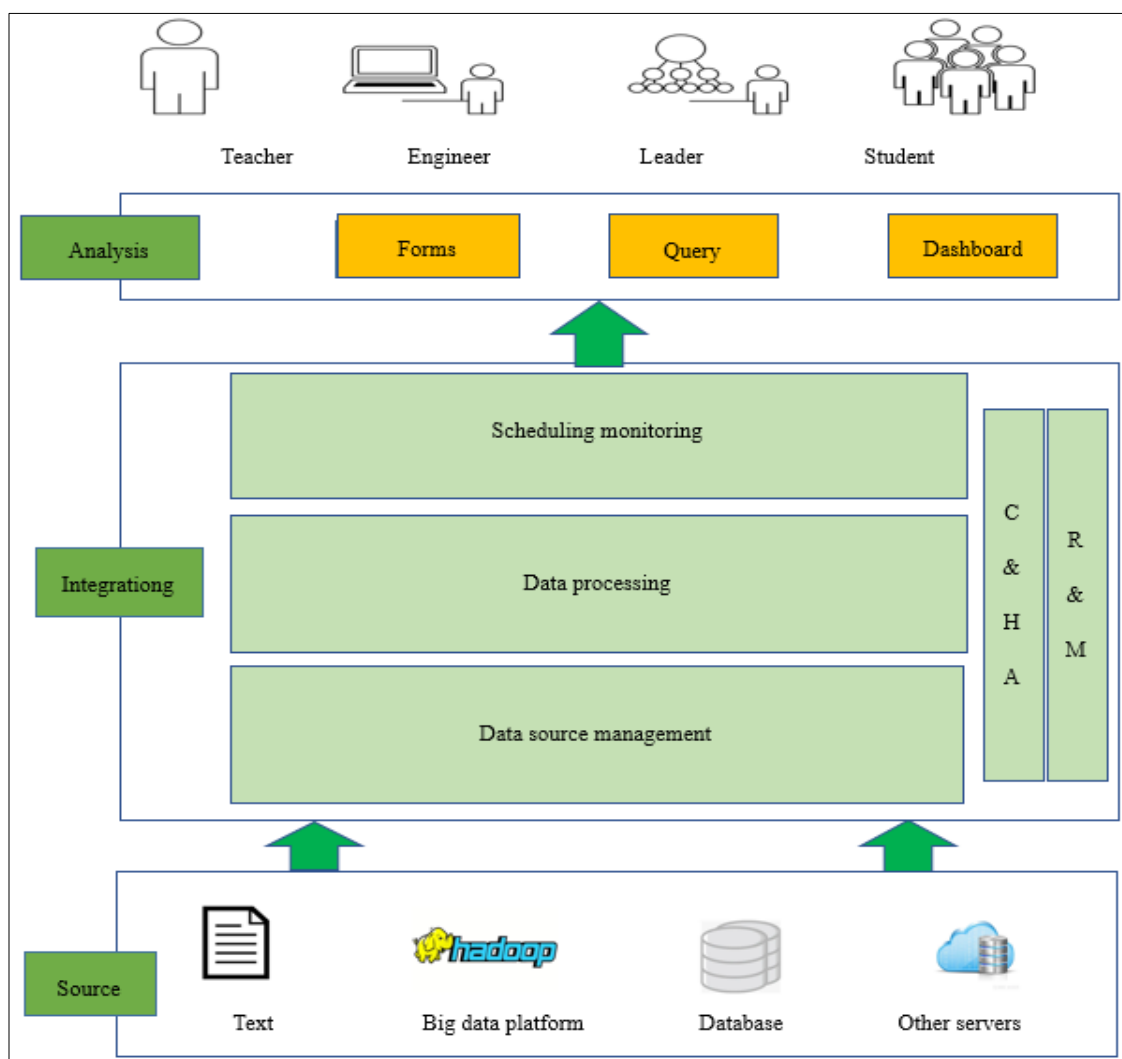
Fig 2: Architecture diagram of data integration platform

5. Conclusion

Under the digital transformation, the construction of vocational foreign language training rooms cannot be separated from AI technology and big data platform technology. By introducing cloud computing, the training room can quickly deploy various AI software and hardware devices, making it easy for teachers and students to use. Building a platform that can integrate, share, and develop data, address the issue of device data silos, and improve teaching and management efficiency. The ultimate goal of building a smart training room is to create data application scenarios with foreign language teaching characteristics, which can be applied to teaching management, decision support, and teaching evaluation, while developing more unknown application scenarios. In short, the construction of vocational foreign language training rooms should closely follow the trend of technological development, take into account the overall development of the discipline, and empower teaching and practical training.

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