



Design and Construction of Business English "Double-qualified" Smart Classroom Learning Platform Based on Web Technology

Xuelian Su*

Sichuan Vocational and Technical College, Suining, Sichuan, China

**39037940@qq.com*

Abstract

With the development of social economy, more and more foreign enterprises have entered the domestic market, and the demand for "applied" business English talents is increasing. In order to meet this demand, colleges and universities have set up business English majors. Due to the particularity of this course, a relatively complete teaching system has not yet been formed. At present, this course is faced with difficulties such as the lack of close combination of theoretical knowledge and practice, the lack of professional teachers, and the imperfect practice platform. In order to improve the difficulties in business English teaching, this paper designs and develops a business English smart learning platform based on Web technology, Java language and big data Hadoop cluster tools. This platform is based on the smart classroom, using the platform to manage and control the intelligent equipment in the classroom, so that excellent "double-qualified" teachers with rich business practice experience can operate the platform and provide students with learning and practice opportunities. It helps schools to improve the dilemma of business English teaching and establish a relatively perfect business English teaching system, so that the business English major can develop healthily and continuously.

Keywords: *Business English; web; Java; Smart Learning platform*

1 INTRODUCTION

Under the guidance of China's major development policy of reform and opening up and the initiative of the belt and road initiative's international cooperation, more and more foreign enterprises come to China to explore the market. The importance of "English+business" talents is becoming more and more obvious. Society and enterprises need a large number of business English talents who have mastered the knowledge of international business and trade culture and western culture, excellent cross-cultural communication and negotiation skills and broad vision. The demand of the society has promoted the cultivation of business English talents in our country, and the main position for the cultivation of business English talents is colleges and universities. Colleges and universities are faced with many difficulties in the practice of cultivating applied business English professionals who have international vision and can engage in international business and trade-related work. How to get out of the dilemma of running a school and cultivate business English professionals who meet the

needs of the society is a problem that many colleges and universities need to consider and measure. As a language with business purposes, business English should not only teach basic application skills, but also international business theory and even western working ideas. Therefore, the teachers of this major not only require excellent English proficiency, but also have certain knowledge of economic and trade theories and the ability of foreign exchange and negotiation. However, most of the teachers who teach business English are English majors in our school, and they have no working experience in foreign business. They have the problem that theory is more than practice in business English teaching, and there are obvious shortcomings in professional teaching level [6]. The actual application scenario of business English determines that students are required not only to learn better theoretical knowledge, but also to have the ability of business practice. The particularity of business English major determines that its class form and content should be combined with theory and practice. The teaching mode of business English major should introduce the advanced international

teaching thinking mode, and according to the present situation of business English teaching and the actual needs of the society, "double-qualified" teachers should be better put into the course teaching of business English, so as to improve the integration of business English theory and practice [10].

The author believes that under the background of the increasingly mature development of network and science and technology in China, the campus LAN can cover every corner of the school, and the classroom equipment is constantly being updated in the direction of intelligence. On this basis, a smart learning platform can be developed to control the equipment of smart classrooms. The platform is designed from two aspects: classroom environment and classroom teacher-student interaction. It integrates four functions: attendance check, smart teaching, practice simulation and monitoring students' state [5]. The platform uses big data technology to collect and analyze students' attendance and assessment data, and implements simulation practice and student assessment system to improve students' interest in learning and academic performance, so as to comprehensively solve the problems encountered in the teaching process of business English and improve the teaching status of business English, thus comprehensively improving the teaching quality of this major.

2 TECHNICAL OVERVIEW

2.1 Java language

As an object-oriented, distributed, portable and safe programming language, Java is designed with C/C++ as a reference, taking its essence and discarding its dross, and abandoning some rarely used and difficult-to-understand features of C++, such as operator overloading, multi-inheritance, automatic conversion of mandatory types. But there are essential differences between Java and C/C++. C/C++ uses pointers, while Java language uses references [2]. As Java is a purely object-oriented language, it contains a lot of classes, objects and interfaces. In order to make it easier to write code, classes can only have single inheritance, while interfaces support multiple inheritance. An object is a concrete instance that expresses the behavior and state of a class, and a class is a model used to describe an object. Each class has its corresponding constructor. If the corresponding constructor is not defined for the class in advance, the compiler will provide a default constructor for the class. When creating an object, at least one constructor must be created or called. The name of the constructor must be consistent with the name of the class, and a class can call multiple constructors. The object is created from the class. When writing a Java program, create a new object by calling the keyword "new". To create an object, you need to declare an object first, then instantiate it, and finally

call the corresponding construction method to initialize the object.

GUI (Graphical User Interface) is the design function in Java to provide users with graphical interfaces. There are many class libraries in GUI design, which are stored in Java.awt and javax.Swing packages. Because AWT has a limited number of components and can only support the most basic GUI design tools, it can't meet the needs of GUI design at all. In order to better realize the design functions required by GUI, the Swing component is created based on ATW. Its appearance not only makes up for the limitations of AWT, but also provides more abundant functions and components for GUI. The classes in AWT are inherited by Swing. Figure 1 shows the login interface of a platform written by Java.awt and Swing.

```
import javax.swing.*;
import java.awt.*; //Import the necessary packages.
public class denglu extends JFrame{
    JTextField jTextField; //Define text box components
    JPasswordField jPasswordField; //Define password box components
    JLabel jLabel1,jLabel2;
    JButton jb1,jb2; //Create button
    public denglu(){
        jTextField = new JTextField(12);
        jPasswordField = new JPasswordField(13);
        jLabel1 = new JLabel("User name");
        jLabel2 = new JLabel("Password");
        jb1 = new JButton("Confirm");
        jb2 = new JButton("Cancel");
        jp1 = new JPanel();
        jp2 = new JPanel();
        jp3 = new JPanel();
        //Set layout
        this.setLayout(new GridLayout(3,1));
        jp1.add(jLabel1);
        jp1.add(jTextField);//The first panel adds user name and text box
        jp2.add(jLabel2);
        jp2.add(jPasswordField);//The second panel adds password and password input box
        jp3.add(jb1);
        jp3.add(jb2);//The third panel adds confirmation and cancellation.
        this.add(jp1);
        this.add(jp2);
        this.add(jp3); //Add three panels to the login box
        //Setting display
        this.setSize(300, 200);
        //this.pack();
        this.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        this.setVisible(true);
        this.setTitle("Login");
    }
    public static void main(String[] args){
        new denglu();
    }
}
```

Figure 1: User login

2.2 SSM framework

SSM framework is the integration of spring MVC, spring and mybatis. It is designed according to the standard of MVC pattern. The whole system is divided into four layers, namely: presentation layer, controller layer, service layer and DAO layer. Spring MVC is responsible for forwarding user requests and managing views, spring is used to operate and manage business objects, and mybatis provides an engine for persistence of data objects. Figure 2 shows the workflow of springMVC. The client sends the request to the DispatcherServlet, and the DispatcherServlet Controller

accepts the request and finds the controller controller that handles the request by querying HandlerMapping. Then, the Controller calls the service to process the request. After the processing is completed, the Controller returns it to ModelAndView, and ModelAndView queries the result through view parser, finds the view specified by ModelAndView, and sends it to DispatcherServlet. DispatcherServlet forwards the final result to JSP, which

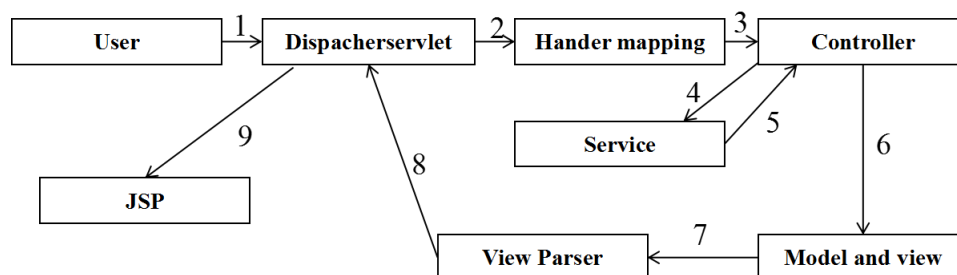


Figure 2: SpringMVC Workflow

2.3 Hadoop cluster

Hadoop cluster is a tool framework for distributed processing and storage of massive big data clusters. It is a software that can be deployed on multiple computers. It can run synchronously on thousands of cheap computers and organize them to form a large computer cluster. The fundamental principle of Hadoop framework is to use a large number of computers to operate at the same time so as to speed up the data processing and calculation. A Hadoop cluster can store, process and analyze massive data in a distributed way. Its advantage lies in that it can reduce the running cost and maintenance cost. If a computer fails, it will not affect the operation of the whole computer system. The cluster framework developed for the application layer will assume that the computer will fail. Hadoop cluster has many different components, including HDFS, MapReduce, Hbase, Hive, Sqoop and so on.

2.4 MySQL database

MySQL database is the most popular and the best relational database in Web application. It is a database based on relational model, and it processes data with the help of many mathematical concepts and methods. The data created by MySQL database is composed of several tables, and it can process thousands of data records. The reason why MySQL database is chosen in this paper is that it supports Java language, and the data set processed by big data technology is finally stored in MySQL through Sqoop component, which provides a solid database foundation for the development of the platform.

2.5 Development environment

Install and configure the development environment of this design according to the above-mentioned main technologies and frameworks. The development

displays the data and presents it to users. This platform design is developed on the basis of these four layers. The DAO layer is used to write the interface related to database operations, and the service writes the business logic service. Controller writes the corresponding feedback operation page according to the interaction between the user and the interface.

environment of this platform needs to be configured under Windows and Linux operating systems respectively, in which the development of Web application is completed under Windows, and Hadoop cluster needs to be installed under Linux.

First of all, to install and configure java development environment under Windows, you need to download the Java language development kit JDK, and choose the corresponding version to download according to your own system. This article chooses jdk1.8.0_91 version, and after downloading, install it according to the prompts. When installing JDK, you should install JRE, and choose the installation directory by yourself during the installation process. After installation, configure the environment variable: "Variable Name: JAVA_HOME Variable Value: C:\Program Files (x86)\Java\jdk1.8.0_91 (this is the installation path of JDK); Variable name: CLASSPATH variable value:.; %JAVA_HOME%\lib\dt.jar; %JAVA_HOME%\lib\tools.jar; ; The variable name: Path variable value: %JAVA_HOME%\bin; %JAVA_HOME%\jre\bin;". After the configuration test, whether the installation is successful or not, enter cmd, and enter java -version, java, and javac, respectively. As shown in Figure 3, the version information and creation information show that the configuration is successful. After configuration, start Eclipse to write code. Download mysql's installation package from official website. After downloading, unzip it, find the "mysql-5.7.19-win32.msi.exe" and double-click it to install it. After the installation is completed, configure the environment variables for it, and enter instructions in cmd to install, log in, open and set it.

Then configure the environment for hadoop distributed cluster in Linux operating system: upload and decompress hadoop installation package, and configure environment variables for Hadoop. Restart the system to test whether hadoop configuration takes effect. Set Hadoop license and add related configuration files for it.

Format namenode. Start each component service of Hadoop. Run MapReduce Job. The establishment of the above development environment ensures the feasibility

```
C:\Users\pardo> -version
Java version "1.8.0_91"
Java(TM) SE Runtime Environment (build 1.8.0_91-b14)
Java HotSpot(TM) 64-Bit Server VM(build 25.91-b14,mixed mode)
```

Figure 3: Test status

3 REQUIREMENT ANALYSIS

3.1 System requirements analysis

According to the needs of business English courses and the goal of using smart classrooms to improve classrooms, this paper analyzes the needs of teachers and students. Teachers can use the platform to control the smart devices in classrooms, so as to carry out smart teaching, processing attendance and assessment data, monitoring students' status and practicing simulation [3]. Intelligent teaching is mainly realized by the platform controlling multi-screen devices and the projector one-key projection system, which is convenient for teachers to give lectures and transmit data. And the examination and attendance function is supported by big data technology, so that the analyzed results are more scientific and effective, and at the same time, the time of teacher's class roll call and examination and review is saved. Because business English is a special major with strong application, the classroom practice simulation function is essential. Teachers publish practice simulation tasks in class based on their own business experience, and realize virtual scene communication practice between teachers and students and classmates through the platform. Control the camera to check the students' status and ask questions. Students can use the platform to carry out simulation practice and daily assessment. Simulation practice can help them better understand theoretical knowledge, and know and be familiar with the application direction and application environment of this major in advance. In the process of communication, there is no need to meet teachers face to face, which reduces their psychological burden and shows their abilities better. All the daily assessment contents are answered in the platform without written examination, which saves students time to think and answer the assessment contents better [4].

3.2 Global design

The smart learning platform of business English based on Web technology is developed with Java as the development language, SSM as the development framework and MVC design pattern. Therefore, the design is divided into four layers: presentation layer, controller layer, service layer and DAO layer. The presentation layer is used to present the relevant jsp pages

of the design of this intelligent learning platform for business English.

of the platform. The controller layer is equivalent to the media calling the other three layers. The controller layer not only interacts with js pages in the foreground, but also acts as the receiver of foreground data. The data processed in the background is also transmitted to the front end for display through the controller layer. Service layer is mainly responsible for the logic application design of business modules, first designing interfaces, and then designing specific classes to be implemented. For business logic implementation, the defined DAO layer interfaces should be invoked. DAO layer is responsible for data interaction and processing with MySQL database. For the data analysis and processing function, the component tools under Hadoop cluster are used to complete the analysis and processing. The process is embodied in: the data of students' clock-in records and examination results are stored on HDFS by Sqoop tool, then MapReduce component is called for offline calculation and cleaning, and the processed data is sent to Hive for statistical analysis. Finally, Sqoop is used for transmission to save the analysis results into MySQL database, and finally Java program accesses MySQL database to call data and generate visual page for teachers to view. The process of Java accessing database is shown in Figure 4.

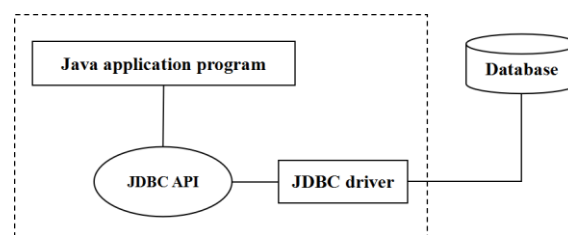


Figure 4: Java accessing MySQL

4 FUNCTION REALIZATION

As shown in Figure 5, the functional modules of business intelligence learning platform are divided into two modules: teacher module and student module.

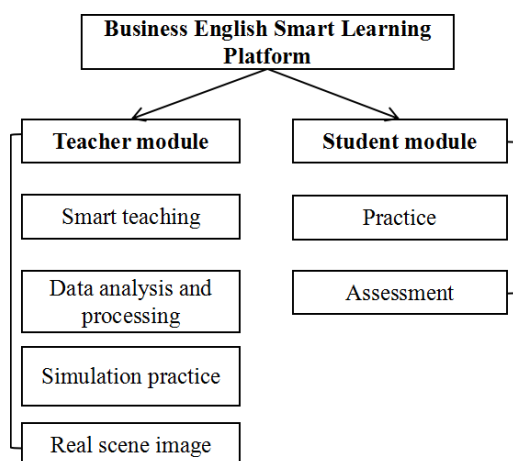


Figure 5: Functional module

4.1 Teacher module

Data analysis and processing: This function module is divided into two parts, one is the attendance data of students, the other is the assessment data of students.

Attendance: There is a fingerprint punch card machine in the classroom. The students' clock-in data will be analyzed by big data tools and stored in the database. Finally, it will be presented in the form of a chart on the teacher's client. The teacher can see the students' sign-in status with intuitive data results, and make relevant processing according to the results, so there is no need to worry about the bad situation of students signing in on behalf of each other (Yang, 2022).

Assessment: According to the knowledge learned in class and the content of practice simulation, students are assessed in all aspects, such as listening, speaking, reading and writing, etc., which are published on the platform and sent to students with one click. After the students have completed the submission, they will analyze and sort it out through the big data tool, and present the assessment report form and analysis chart to the teacher, who will give the grade according to the students.

Smart teaching: Teachers can easily operate and control all kinds of intelligent hardware devices in the classroom by opening the device control function of the platform. For example, multi-screen equipment control and projector one-button screen projection system, teachers can put courseware, videos and other content to be taught in class on the projector with one button. The multi-screen device control function is convenient for teachers to control students' computers, microphones, cameras and other devices, so as to push the materials that students need to view and the finished homework to each student with one click. Control the students' microphones to carry out question-and-answer interaction and group discussion between teachers and students [1].

Simulation Practice: Teachers can intercept the content that meets the needs of business English teaching and apply it to the actual classroom simulation practice according to their own follow-up or contact with international trade cases, so that students can collect information and answers after class. In class, students are asked to explain and answer in a targeted way, so that students can actively use English to express themselves in class. In this way, students can be exposed to more realistic business English application situations [7].

Real scene image: By turning on students' cameras, students' class status and behavior can be monitored in real time, and teachers can only see students in one direction, and criticize and correct their behaviors in time if they find any abnormal conditions, so as to maintain a good classroom environment and order. For example, the teacher can turn on a classmate's camera, ask him questions and check his behavior [8].

4.2 Student module

Practice: according to the practical tasks assigned by the teacher, students conduct situational dialogues with classmates, conduct business communication and negotiation with teachers on the platform. And there is no need for face-to-face communication with the teacher, and there is no psychological burden to play better. Instead of just learning boring theoretical knowledge, they apply what they have learned to practice.

Assessment: Students use what they have learned to answer the exam content on the platform. Listening questions and answering questions are completed on the platform through computers, and reading translation questions are also completed on this platform. There is no need to write answers by hand, which saves answering time and allows students more time to think. After answering, they can submit them (Yang, 2022). Students improve their professional ability in various assessments, instead of blindly receiving theoretical knowledge in the classroom, only waiting for the final exam assault [9].

5 CONCLUSIONS

The smart learning platform of business English designed and developed based on Web technology combines the campus LAN with big data tools, and integrates the existing smart classrooms and platforms to create an smart classroom environment for business English courses. Teachers manage the classroom hardware and students' class situation through the platform, and combine their rich practical experience and professional theoretical knowledge to simulate the practice and assessment of students, which improves students' learning consciousness and correct learning attitude, and improves the overall achievement and professional quality of business English majors. It meets

the needs of the current business English major for classroom mode and curriculum form, effectively changes the dilemma faced by the current business English, and cultivates a group of professional business English applied talents for the society.

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