



Design and Implementation of Japanese Online Learning System in Mixed Teaching Mode

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Abstract. This paper uses Web technology to build a Japanese online learning system in mixed mode. The system is student-oriented, student-centered, and improves the one-sided evaluation of learning effect and single teaching mode in the teaching process. Among them, the system effect evaluation function needs to be realized by using tools such as Flume, HDFS, MapReduce, Spark and Java programming language in big data technology. The design of the system is not only conducive to stimulating students' interest in learning, enhancing students' ability to apply knowledge and teamwork spirit, but also conducive to improving students' autonomous learning ability and creating a learning atmosphere, and ultimately improving students' learning quality and comprehensive quality level. At the same time, it can help teachers accurately grasp students' learning situation and help students to form objective learning evaluation.

Keywords: Mixed Teaching Mode · Japanese · Online Learning · Web Technology · Java Programming

1 Introduction

With the continuous development of economy, the economic exchanges and cooperation between China and Japan have become increasingly close, which has made great progress in Japanese education in China. At present, most undergraduate universities have added Japanese majors. According to the survey, the current Japanese major education mode in colleges and universities mostly adopts classroom teaching mode. Moreover, there are some dilemmas, such as outdated teaching materials, single teaching methods, emphasis on theory rather than practice, and lack of reasonable evaluation of teaching effect, which seriously affect the development of Japanese education and teaching activities in colleges and universities, resulting in the unhealthy trend of students' reduced interest in learning, lack of subjective initiative and poor learning effect. The emergence of mixed teaching mode has become the only way to solve the current Japanese teaching dilemma [5].

Mixed teaching is a teaching mode combining classroom teaching and network teaching. According to different places where learning activities take place and different teaching activities, mixed teaching modes can be divided into different forms of online and offline teaching modes, such as online learning-offline discussion, online learning-offline operation, offline discussion-online practice. Among them, offline refers to the

face-to-face teaching mode, and online refers to the use of Internet technology to achieve teaching. The mixed teaching mode is a learning mode that combines classroom teaching with network platform through offline and online teaching modes. This mode combines the advantages of the two teaching methods, which not only plays the leading role of teachers in guiding, inspiring, supervising and controlling the teaching process, but also fully embodies the initiative, enthusiasm and creativity of students as the main body of the learning process, and finally achieves the best teaching effect. The advantages of mixed teaching mode are: (1) Realize the sharing of teaching resources and enhance the convenience of resource utilization, such as issuing homework, examination and evaluation. (2) It is conducive to the interaction between teachers and students. Teachers can easily grasp students' learning trends and give timely and objective learning evaluation. (3) As long as there is a network, students can study anytime, anywhere. Therefore, this paper holds that building a Japanese online learning system with Web technology can improve the present situation of Japanese teaching. The combination of online learning and offline practice forms a mixed mode, which transforms the object of classroom teaching into students and fully embodies the concept of targeted teaching. The application of the mode not only improves students' scores and comprehensive quality, but also avoids the problems of single teaching mode and over-emphasis on teacher-led, which is conducive to enhancing the effective interaction between teachers and students, and at the same time, it pays attention to language practice activities and improves the language application ability [7].

2 Key Technology Introduction

2.1 Web Technology

B/S mode is a hierarchical definition. The first step is to divide the development of the whole software system into several small blocks, and then realize the functional design of the corresponding layers of the system in each layer. The interaction between layers is called by the corresponding functional modules of the adjacent layers, and the information is transmitted by the interface. Figure 1 shows the B/S three-tier architecture.

These three layers are presentation layer (UI), business logic layer (BLL) and data access layer (DAL). The presentation layer mainly uses JS and HTML as its design and development languages for receiving user requests and displaying data. The business logic layer is located between the data access layer and the presentation layer, and plays a connecting role in data exchange. The data access layer is used to query, add, update and delete the database. The relationship among these three layers: the user sends out a request in the presentation layer, the business logic layer receives the request, and sends the request to the data access layer by using SQL statements, the data access layer returns the processed information to the business logic layer, and the business logic layer feeds back the information to the user.

2.2 Spring Frame

Spring is a common framework for Java, because it can develop high-performance complex Web applications and solve the coupling problem between business logic layer

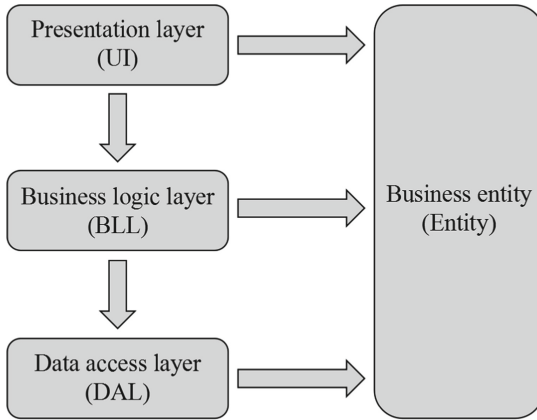


Fig. 1. B/S three-tier architecture

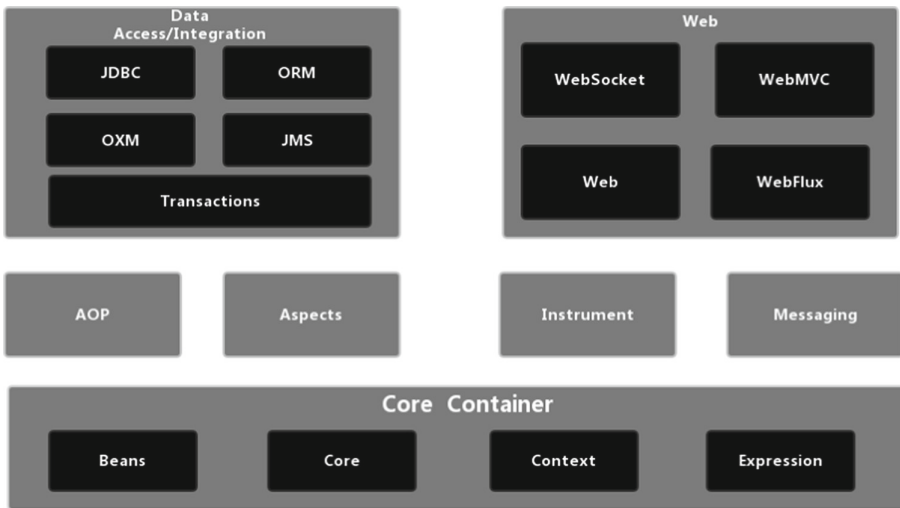


Fig. 2. Architecture of Spring

and other layers of enterprise application development. The advantage of this framework is that it provides a comprehensive configuration model to support traditional databases and modern databases, so Java developers only need to focus on the development of applications. It also provides functional modules, such as Spring MVC, Spring Core, Spring Boost and SpringTransaction. It is convenient for program testing, and almost all testing work can be carried out by means of non-container-dependent programming. Figure 2 shows the architecture of Spring, which includes Core Container, Data Access/Integration layer, Web layer, AOP (Aspect Oriented Programming) module, Instrumentation module, Messaging module and Test module.

2.3 Java

Java is a high-level programming language introduced by sun Company in 1995, and its core idea is object-oriented. With the continuous maturity of Java technology on the Web side, it has become the preferred language for Web personnel. The advantage of Java language is that it is easy to learn. The syntax of Java language is close to that of C language and C++ language, and there is no incomprehensible feature in C++. Object-oriented, Java language supports single inheritance between classes, multiple inheritance between interfaces, and implementation mechanism between classes and interfaces. With distributed characteristics, it supports the development of Internet applications. Among the basic application programming interfaces, Java net interface can be used as a class library for network application programming.

2.4 Development Process

According to the requirements of the above related technologies, we can complete the development and design of Japanese online learning system. The whole system environment is based on Web technology, with HTML and Javascript as the client development language, Java as the server development language and MySQL as the database. Java needs JDK version JDK1.8.0, MySQL needs version 8.0.26, and Linux is chosen as the operating system platform. Among them, the Spring framework installs Spring5.0 version, and the configuration steps of its development environment are as follows: the first step is to download and install JDK and Tomcat. The second step is to create the Spring project, first install and configure maven, then create maven project, then import the jar package of Spring, and finally use IDEA to develop the Spring program.

Through the brief introduction of the above key technology theories, we have determined the overall environment of system development and related software, and at the same time made clear the technical feasibility of the system.

3 Requirements Analysis

3.1 System Requirements Analysis

Analysis of system requirements from the teaching design can be divided into three aspects. The first is the teaching goal. Teaching objectives are the guide of teaching activities, and the application of mixed teaching mode is based on the realization of preset teaching objectives. Combined with the Japanese teaching goal in the classroom teaching mode, the systematic preset teaching goal is to improve the teaching quality by means of the evaluation of teaching effect, that is, on the one hand, to improve students' achievements and on the other hand, to improve students' comprehensive quality. The second is the teaching content. The application of mixed teaching mode needs to adopt different teaching modes according to different teaching contents. In this paper, massive open online course's teaching method can be used for basic Japanese teaching. The third is the teaching object. In the classroom teaching mode, the classroom is teacher-centered to carry out teaching activities. The mixed teaching mode will break this teaching state and change to student-centered teaching activities. Teachers can design teaching by combining students' learning styles and ways [1].

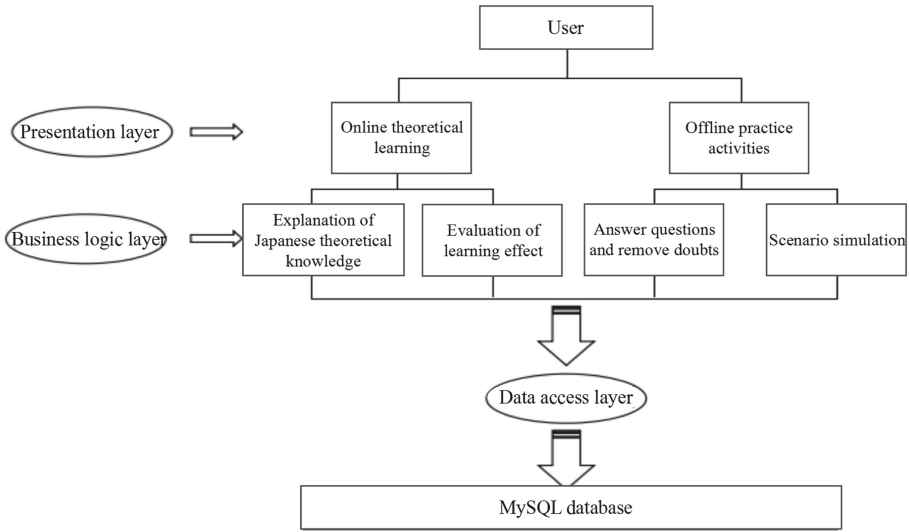


Fig. 3. Overall system design

3.2 Global Design

The overall design of Japanese online learning system in mixed teaching mode needs to be based on B/S architecture. Figure 3 shows the overall design of the system.

The overall design of the system can be grasped from two aspects, namely, horizontal and vertical. From the horizontal aspect, the presentation layer consists of two parts: online theoretical learning and offline practical activities. The online theoretical learning module in the performance layer mainly involves the Japanese theoretical part and other related contents, while the offline practical activities mainly focus on students’ language application ability. The business logic layer consists of four parts. The relationship between these four parts is that students learn Japanese theoretical knowledge first, and the parts that they don’t understand can be solved by means of the Q&A module. Then students can train their oral and listening skills through Japanese situational simulation. Finally, students and teachers can complete the learning effect evaluation module online. The data access layer mainly includes MySQL database, and its main function is to find data in MySQL database according to the request from the business logic layer [3].

From the vertical aspect, users log in to online Japanese online learning system by means of network, and carry out related operations in the system. The system consists of three layers: presentation layer, business logic layer and data access layer. The online Japanese online learning system is divided into two sections. The first is online learning, which includes two parts: the explanation of Japanese theoretical knowledge and the evaluation of learning effect. Users only need to log in to enter the online learning section, and then click on the module to study or evaluate according to their own needs. The second is offline learning, which is designed for Japanese practice. This module is initiated by teachers and students organize practical activities by themselves. Through the design of these two sections, not only the teaching quality is improved, but also the goal of student-centered and appropriate teaching methods is achieved [10].

4 Design Implementation

4.1 Online Theoretical Learning

Figure 4 is the functional module of online theoretical learning.

The relationship between the six sub-modules in Fig. 4: After completing the basic course, students need to consolidate the course knowledge through homework. After learning in stages, they will take part in the semester examination. After the end of the whole semester, the learning effect will be evaluated, which not only includes students' daily learning attitude, but also covers the evaluation indicators related to knowledge achievement. The following is a description of the functions of specific sub-modules.

Explanation of Japanese theoretical knowledge. The module of explaining Japanese theoretical knowledge includes three parts, namely basic courses, homework and exams.

The function of the basic course module is mainly led by students and assisted by teachers. This module includes four parts: online self-study, answering questions, course tasks and data download. Online self-study means that students complete self-study with the help of course materials and carry out related exercises, in which course materials mainly refer to video lessons, which are recorded and uploaded by teachers. Exercise is an assessment conducted by teachers to students by summarizing the key points of the course, and students submit it after completion, and it is also uploaded by teachers. Q&A means that students can consult teachers online when they encounter all kinds of knowledge that they don't understand or don't understand in the learning process, and teachers can give them targeted online counseling. Tasks, here refers to offline tasks, which are released by teachers. After the students finish the tasks, they need to upload the tasks to the system in the form of videos, pictures, words, etc., so as to facilitate other students to view them. Data download can enable students to view course materials anytime, anywhere. The materials here refer to video materials, text materials, audio materials, etc. Among them, video materials mainly rely on the form of massive open online course, text materials are made by teachers themselves, and audio materials include both the parts that teachers search by themselves and the parts that teachers record by themselves [4]. After-school homework is an exercise assigned by teachers to students according to the situation of middle school students' exercises in basic courses, and the exercises here are mainly used to train students' lack of knowledge. After the teacher uploads and publishes the homework, the students complete the homework online and submit it. The teacher corrects the homework submitted by the students and puts

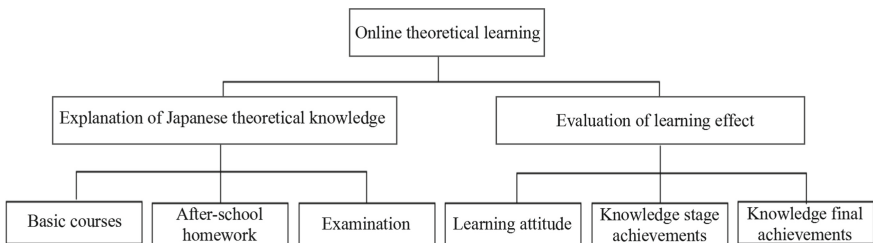


Fig. 4. Functional modules of online theoretical learning

forward suggestions for revision. Then the students check the corrected homework and suggestions [2].

Examination is a comprehensive assessment of basic theoretical knowledge. After the teacher uploads the test questions, the students answer the questions online. After the teacher reviews the test paper, the students check the test scores, and make targeted study on the sections where their knowledge is weak. Here, students can use the information uploaded by the teacher before class [6].

Evaluation of learning effect. Evaluation of learning effect needs teachers and students to work together. Teachers are mainly responsible for counting the indicators of learning effect evaluation, and students are mainly responsible for completing the evaluation index of student recognition, that is, completing the questionnaire task issued by teachers. Learning effect evaluation comprehensively evaluates learning attitude, knowledge stage achievement and knowledge final effect. Among them, learning attitude refers to the degree of investment in learning time, classroom interaction and cooperation, students' attendance and students' recognition (students' recognition of curriculum resources and ability training). Knowledge stage achievement refers to the task completion rate, achievement and submission rate (homework, unit test). Knowledge final effect refers to the final exam results. This part of the evaluation data source not only needs to count the use time of Japanese online learning system, online test scores and other data, but also needs to use questionnaires to count students' recognition of curriculum resources and ability training. Among them, statistical data need to use the log collection tool Flume in big data technology. Then use HDFS to store data, and use MapReduce and Spark to calculate and clean data. Finally, this part of data that needs to be counted is screened out. Questionnaire requires teachers to share a small program adjusted by the questionnaire for students, and students can enter the small program and complete the answers. Teachers can check the counted data in the application background. The design of the questionnaire needs to be based on the answering applet, make welcome words and brief introduction, do the function of jumping title page and authorization button on the answering entrance, and then set the title type, content, conditions and tips. The whole design process needs to use JS to write programs. For example, Fig. 5 is the code setting of the condition "Please answer all questions on this page".

Through this part of the evaluation, it is helpful for teachers to grasp the specific situation of students' learning Japanese knowledge in time, and then modify the teaching plan or carry out targeted teaching for students, and it is also helpful for teachers to formulate comprehensive quality training plans [8].

4.2 Offline Practice Activities

Offline practice activities are a supplement to online courses, which includes two parts: answering questions and answering questions and scenario simulation. This part is mainly aimed at the application of Japanese. Students can put forward their confusion in Japanese application and oral English to teachers, and teachers can answer them face to face. Then, the students conduct scenario simulation according to the tasks posted by the teacher online, and the students divide themselves into groups. The scenario content needs to be discussed by the students' groups. After the students have rehearsed, the teacher watches the scenario dialogue and comments on the aspects to be improved and

```
//----Conditional judgment
if (boo) {
  if (this.data.page < Math.ceil(arr.length / 2)) {
    this.data.page++;
    this.setData({
      page:this.data.page++,
      page_prev:true
    });
  } else {
    return;
  }
} else {
  this.modalShow({
    msg:"Please answer all questions on this page"
  });
}
```

Fig. 5. Code setting of the condition “Please answer all questions on this page”

excellent in the group simulation. Finally, the students upload the scenario simulation and evaluation to the system for other groups to view and learn. Offline practice is conducive to improving students’ ability to use Japanese, and improving students’ ability to adapt to Japanese context and innovation [9].

5 Conclusions

The construction of online Japanese teaching system based on mixed teaching mode creatively applies the mixed teaching mode to Japanese teaching, achieving the goal of fully integrating the advantages of classroom teaching and Internet platform, which is more in line with the development thought and trend of modern educational technology. The design of the system is based on the problems existing in Japanese teaching at present, such as students as the main body of the system and suitable teaching methods as teaching means. By using Web technology, big data technology, questionnaire and other technical means, the system is built and configured. The system not only intuitively shows the overall content of Japanese teaching, but also organically combines Japanese theoretical teaching, practical teaching and Japanese teaching effect evaluation, which makes Japanese teaching more complete. This is a new and efficient teaching mode, which can improve teaching quality and teaching effect, and has high practical significance and strong promotion value.

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