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Design and Implementation of Web-based Autonomous Learning Support Platform for Forestry College English

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Abstract:

The implementation of forestry English teaching needs to optimize the integration of network technology resources and corpus resources, and fully tap the potential resources of mutual support between teachers and students. Web technology based on association analysis can help to mine potential network technology resources. Based on this, this paper proposes a web College English Resource Integration System Based on constrained clustering algorithm. In order to realize the system, the use cases of the system are analyzed. Based on the relevant learning theories and the principles of design and development, combined with the characteristics and actual needs of College English, this paper puts forward the overall framework of Web-based College English autonomous learning platform, and designs and develops the function and database in detail. In order to improve the accuracy of recommendation, this paper uses constrained clustering algorithm to complete the integration of English multimedia teaching resources. The experimental results show that the system can improve the accuracy of recommendation matching and the integration efficiency of English multimedia teaching resources.

Keywords*: Forestry College English, network technology, corpus resources, Web English resource analysis, constrained clustering algorithm*

I. INTRODUCTION

With the rapid development of information technology, online learning has become another way to acquire knowledge. The network can provide learners with large-scale, individualized and highly involved teaching content; through the network, learners can transcend the limitation of time and space, learn anytime and anywhere; they can get feedback and help in time, participate in communication; they can quickly collect information [1]. This interactive learning environment is conducive to stimulate learners' interest in learning, so as to improve the

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learning effect. With the development of constructivist learning theory, various forms of learning methods have been concerned. More and more scholars have realized that autonomous learning conforms to the law of language learning and can help learners improve their learning effect. Moreover, autonomous learning can also help learners improve their independent learning ability, which is the requirement of the information age and the basis of lifelong education.

With China's opening to the outside world, international exchanges and cooperation are increasingly strengthened, and people pay more and more attention to English. The level of English directly affects a person's development, and even relates to the overall competitiveness of our talent team in international exchanges, international cooperation, international affairs and national development [2-3]. Therefore, whether children or adults, more and more people join the ranks of learning English; school education and class teaching can not meet the needs of learners at all levels of English knowledge, people expect more flexible and personalized learning methods.

Constructivist learning theory provides a theoretical basis for Online Autonomous Learning and promotes the development of learning based instructional design. Constructivist learning theory emphasizes student-centered, and requires students to change from passive recipients of external stimulation and objects of knowledge infusion to active constructors of information processing and knowledge meaning [4]. Constructivism believes that learning is always connected with a certain social and cultural background, namely "situation". The interaction between learners and the surrounding environment plays a key role in the understanding of learning content [5-7]. Learning environment is a place where learners can explore freely and learn autonomously. In this environment, students can use a variety of tools and information resources (such as text materials, books, audio-visual materials, multimedia courseware and information on Internet) to achieve learning goals. In this process, students can not only get help and support from teachers, but also cooperate and support each other. In order to support learners' active exploration and complete meaning construction, various information resources should be provided for learners in the learning process, which are used to support students' autonomous learning and collaborative exploration.

II. THE OVERALL DESIGN OF THE PLATFORM AND THE DESIGN OF THE DATABASE

The intelligent recommendation English teaching resource system constructed in this paper is mainly for the majority of English learners [8-10]. Through the resource recommendation system, English learners can not only learn English resources, but also download them.

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According to the user's attributes, the system recommends different English learning resources to the user, and manages the system, including the user's basic information, user permissions, logs, etc.; the resource uploader uploads relevant English teaching resources through the system, including English courseware, English video, images, English songs, etc. Therefore, according to the different roles mentioned above, the overall use case diagram as shown in Figure 1 can be drawn.

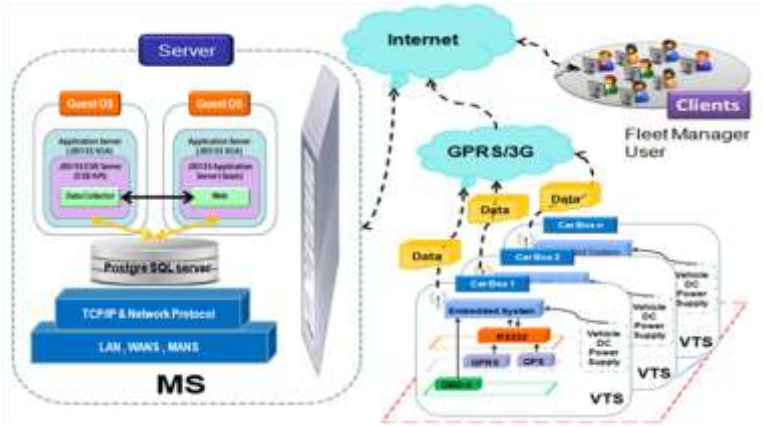

Fig 1: System use case analysis

According to the above use case analysis, the function of the system is designed into four modules: personal space management, resource management, system management, recommendation module. The details are shown in Figure 2.

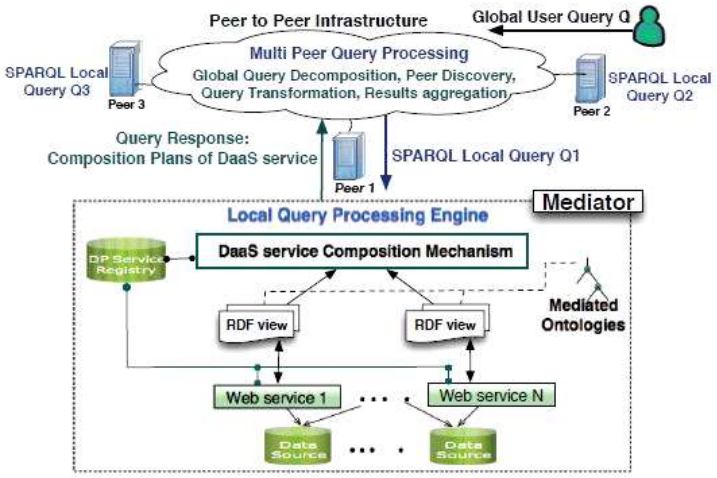

Fig 2: System function module

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1) Personal space management

Personal space management module includes space content management and space resource management. This module mainly provides an independent learning space for different English learners, so as to meet the needs of different English learners for different resources.

2) Resource Management

Resource management is mainly for English Resource up-loaders (English teachers), including resource upload and resource deletion. Teachers can upload relevant teaching resources to the system to share with other users. At the same time, teachers can also delete some outdated teaching resources to achieve the purpose of resource update.

3) English Resource Recommendation

Recommendation module is mainly combined with the user's attribute characteristics, and combined with the user's browsing score, so as to complete the purpose of recommendation to users. In this module, different recommendation models are used to recommend teaching resources for new users and old users.

4) System management

System management is mainly responsible for system user management, as well as basic data maintenance. The user of this module is the system administrator. In addition, in addition to the above permissions, the system administrator also needs to divide the permissions of different roles and manage the system log.

III. WEB MINING TECHNOLOGY

Although Web Mining and data mining are related, they belong to different concepts. Data mining was formally proposed at the 11th International Conference on artificial intelligence in 1989, which refers to the process of discovering useful knowledge and rules from a large number of incomplete, noisy, fuzzy and random data and information. It is a process of establishing models and discovering the relationship between data in large-scale massive data by using various analysis methods and tools. These models and relationships can be used to make decisions and forecasts. In recent years, data mining has been widely used in government decision-making, enterprise operation, marketing, medical and health financial services,

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university management and other fields at home and abroad. Web mining is a technology that applies data mining technology to the use of Web site resources and automatically finds and extracts information and knowledge from web documents and services. It uses data mining algorithms such as qualitative induction, classification learning, association rule mining and clustering analysis to extract interesting and useful patterns from related resources and users' browsing behavior. According to the different mining objects, web data mining is divided into three types: Web content mining, web structure mining, and Web Usage Mining.

3.1Design principles of the platform

Web based College English autonomous learning support platform is designed and developed based on constructivist learning theory, humanistic learning theory and multiple intelligence theory. At the same time, in the network education environment, learners are more autonomous learning through the network, rather than just passive receivers of knowledge. Therefore, in the process of development, generally speaking, it should be guided by constructivist learning theory, humanistic learning theory and multiple intelligence theory. At the same time, it should also grasp the principle of learner centered, and design diversified and personalized learning content and learning methods. To create a learning situation for learners in line with constructivist learning theory, humanistic learning theory and multiple intelligences theory, and help learners realize the construction of knowledge in their own way. To design an e-learning platform satisfying both teachers and students, we should at least follow the following principles:

(1) Educational principle

The function design and presentation design of teaching support environment should be based on the teaching and learning needs of network education, and provide strong functional support for learning support and teaching resource management.

(2) Supporting a variety of learning models

It can support individual learning mode, cooperative learning mode and discussion learning mode, so as to strengthen the flexibility and adaptability of network education, and it is also an important guarantee for cultivating innovative talents.

(3) Extensibility principle

The principle of extensibility means that the platform construction should consider not only

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the requirements of the current network education practice on the supporting environment, but also the needs of future development. Therefore, the software function should have further development plan, and the selection of hardware environment should consider the cost of expansion scheme.

(4) Principle of interactivity

The interactivity of e-learning generally includes four aspects: first, learners can interact with the e-learning platform anytime and anywhere; second, it refers to the interaction between learners; third, it refers to the interaction between learners and teachers; fourth, it refers to the interaction between teachers and teachers. This platform provides blog, BBS, Net-meeting and other activity modules, which can well reflect its interactive principle.

(5) Friendly interface principle

The interface is beautiful and generous, which can be seen at a glance; the operation should be simple, which does not require a lot of preparatory skills; the prompt information is detailed, accurate and appropriate.

(6) Maintainability principle

When there are small changes in the teaching content and new needs, it is necessary to be able to easily and quickly maintain.

3.2Design process and overall framework of the platform

The main idea of platform development is shown in Figure 3. Based on the analysis of the advantages and disadvantages of the existing college English online learning platform and the needs of non English majors, this paper designs the functional modules of the College English online autonomous learning platform. After determining the technology and tools used by the platform, the specific development is carried out, and the design and development results are revised after debugging and running. Finally, the results are released and run. The structure diagram of the platform is shown in Figure 3.

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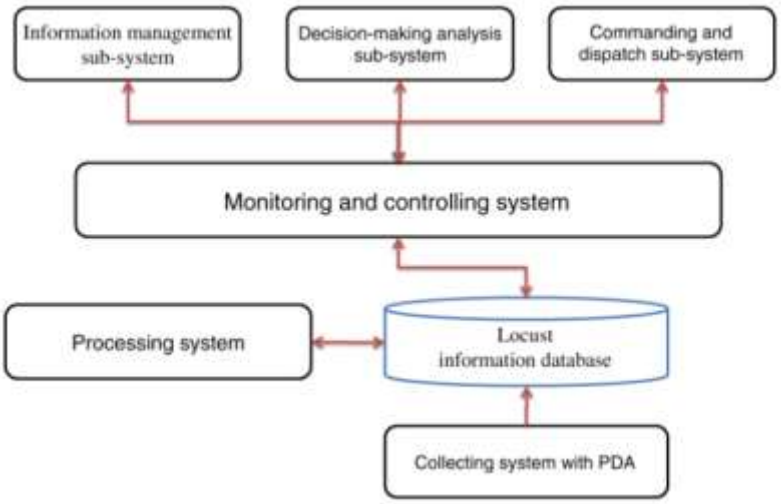

Fig 3: Logical structure diagram of the platform

3.3The function design of the platform

In the traditional classroom teaching, the teacher's teaching style has a great impact on students. Online courses can provide an open interface for different teachers to mine, add and modify the learning content, beyond the limitations of teachers. It integrates the wisdom of many people to present to students, and provides a discussion area for different teachers to communicate on the content and knowledge presentation means. This module uses the combination of file platform and multimedia attribute database to realize the management of teachers' upload data. Multimedia data is stored in the file platform and connected with the corresponding records of multimedia attribute database through location information. Through the study of English learning, the learning materials may contain sound, picture, animation and video, so we must summarize and refine the attributes of various multimedia data to form a description of multimedia attributes.

After the English teacher publishes the learning materials, the platform dynamically generates a learner page for students and teachers to view. In the query list of learning module, students can query the textbooks, volumes, units and lessons to be learned by selecting the conditions, and click "enter learning" to enter learning. According to the navigation menu, select the corresponding content for learning. This part of knowledge is presented in pages, which is divided into pre reading tasks, text content, new word learning, knowledge point learning, text translation, after class exercises, text multimedia materials, etc. Each specific task is subdivided into several problems, so that learners can learn in an orderly, planned and step-by-step way. At the same time, according to constructivism, we use various media to present the

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teaching content, so as to achieve the effect of picture, text, student and image, and mobilize learners' learning motivation. If the students don't understand the content of the text, the corresponding explanation will be displayed in the knowledge presentation area.

Net-meeting synchronous discussion answering and BBS asynchronous discussion answering are mainly used. Net-meeting realizes real-time discussion among learners, students, teachers and teachers. BBS asynchronous discussion Q & A provides a platform for the communication between teachers, students and teachers, students and students. The discussion area is divided into different topics according to the different communication objects, which is convenient for the search of the same topic content. Even if you don't participate in the discussion, you can get help from other people's discussion. Blog is also used to record learners' learning log, learning plan and learning experience. Teachers can also write teaching log and assign homework in blog. Learners can evaluate each other on the blog, learn from each other and exchange learning experience. Teachers can understand students' learning situation and learning attitude by browsing the blog.

IV. THE REALIZATION OF THE PLATFORM

4.1Realization of data access layer and connection of database

The data access layer is responsible for providing data operation to the business layer, that is, it is responsible for dealing with the underlying database. All objects in the business layer access the database through the objects in the data access layer. The classes in the data access layer are organized according to the business objects. The data contained in each business object may exist in several different data tables. It is uniformly organized into a conceptual object by the data access class. It is equivalent to an object-oriented database layer, which is responsible for mapping the relationship between object-oriented and relational databases.

All operations of the data access layer to the database are completed by stored procedures, and the data layer only calls the stored procedures in the foreground. A stored procedure is a set of T-SQL statements that are pre programmed and stored in the database as an independent code unit. The run-time information can be transmitted to it through input parameters, and the returned data can be obtained through result set or output parameters. The use of stored procedures can reduce the amount of network data transmission to improve performance, provide a convenient point of maintenance, extract transaction rules to improve consistency and security, reduce attacks through input forms to improve security, and enhance the re-usability of execution sequences.

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4.2Implementation of platform module

The users of the platform are divided into learners (general users), teachers (managing learning resources) and managers (managing users and BBS).

Besides learning the text, learners can also browse learning resources, use the tools provided by the platform, write logs on their blogs, learn experiences and learning plans, etc. You can speak in BBS, reply and modify your own speech, select the test questions from the question bank according to your own needs, and you can view your own learning records to understand the activity records in the learning support platform, and make an evaluation of your own learning.

In addition to the function of publishing texts, teachers can also add content and modify their own added content in the learning resource database and test question database. In addition to an independent book or extracurricular, the added content can also enrich a certain knowledge point added by others, or supplement multi-media materials.

Managers manage BBS categories, moderator authorization, teacher identity confirmation, user permissions, teacher upload content audit.

No matter what kind of users, they will first enter the landing interface of the platform. After landing, they can browse the course content. After students log in, the platform will automatically record their relevant information, such as landing time, landing times, browsing page times, etc., but learners can't publish courses and test questions. Only teachers can publish and manage courses and test questions. New users can register in the login interface by clicking the "new user registration" link button. The logic structure of login and registration function of the platform is shown in Figure 4 below:

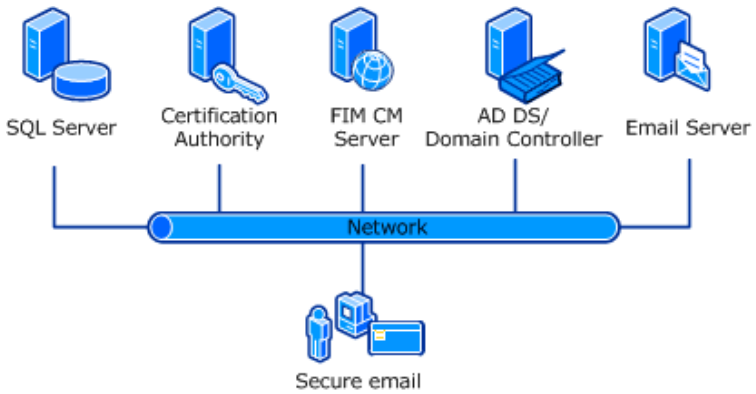

Fig 4: Logical structure diagram of user login and registration

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V. CONCLUSION

This paper investigates and analyzes the current application situation of College English learning platform at home and abroad, analyzes and summarizes the existing problems, discusses the guiding theories needed in the design and implementation of Web-based College English autonomous learning platform, and applies these theories to the whole process of the design and implementation of this platform. This paper summarizes the design principles of English learning platform, based on the relevant learning theory and design and development principles, combined with the characteristics and actual needs of College English, puts forward the overall design idea of Web-based College English autonomous learning platform, and on this basis, designs the overall architecture, functions and database of the platform in detail. Guided by constructivist learning theory, humanistic learning theory and multiple intelligences theory, according to the principles of design and development, this paper completes the design of the client and server of Web-based College English autonomous learning platform. This paper expounds the development and implementation process of Web-based College English autonomous learning platform, which has a certain reference for the development of web-based autonomous learning platform.

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