Investigation and Analysis of the Development of Interactive Network System Teaching Based on the MOODLE Platform

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ABSTRACT

This article aims to investigate and analyze the development of an interactive English teaching system based on the MOODLE platform. Firstly, we will introduce the characteristics and advantages of the MOODLE platform and explain its role in teaching English interactive systems. Then, we will describe our survey methods, including survey subjects, questions, and data analysis methods. Next, we will present the survey results, including students' satisfaction with the MOODLE platform, frequency of use, and level of assistance to their English learning, as well as teachers' recognition and frequency of use of the MOODLE platform. Finally, we will analyze the impact and limitations of the MOODLE platform in English interactive system teaching based on the survey results and propose corresponding suggestions.

Keywords: MOODLE Platform, Interactive System, Network Education

1. Introduction

Under the background of economic globalization and knowledge globalization, the importance of English teaching is becoming more and more prominent. Compared with network education, traditional classroom teaching will be deficient in freedom, timeliness, efficiency and limitation of human quantity. Therefore, network teaching is necessary to develop English education [1]. For our current college education model, especially English education, English majors and non-English majors are different in teaching systems and teaching staff. Even for English majors, professional skills can't be fully guaranteed [2]. In addition, the examination-oriented education and the university classroom model have also led to the students' thinking mode being confined. Moreover, the structure of Chinese differs greatly from that of English, which requires a more comprehensive teaching system, so there are many difficulties in the process of English teaching [3]. Professional grammar teaching occupies a vital position in English teaching. Therefore, constructing an interactive teaching system for college English grammar teaching based on the MOODLE platform will solve this problem for educators.

The development of the MOODLE platform provides convenience for English teaching while reducing the education workforce and saving the opportunity cost for educators. This is a free code open source platform based on constructivism and is a system that can find a solution [4]. The MOODLE platform's multi-functionality, resource, and activity diversity can fully arouse students' interest and interaction in English grammar learning, which will play an important role in English teaching.

2. State of the Art

An important feature of MOODLE is that social constructivist pedagogy is regarded as the theoretical basis for design [5]. It allows teachers and students to think, participate in, and work together to solve problems, fully arousing their interest in learning, training their divergent thinking ability, achieving a more open teaching environment, and achieving collective wisdom in the communication process.

Creating a virtual learning environment has been the focus of distance education. How to set up a network education system with remarkable effect and extensive audience to solve the problems faced by teachers and students during teaching to the greatest extent has always been a problem that practitioners and administrators of distance education need to continue studying. The theoretical basis and the corresponding technical support are equally important [6]. At the same time, relevant research designers have noticed that in the educational curriculum reform at home and abroad, a relatively complete teaching system is urgently needed to provide specific teaching methods and strategies for educators to carry out daily teaching activities effectively. The interactive system under the MOODLE platform can precisely manage the students' learning environment and teachers' teaching environment, thus providing a perfect solution [7].

3. Methodology

3.1. Analysis of Design Factors

Although the research on computer-assisted English teaching has been paid attention to for many years, there is still a lack of it in our foreign language circles. In recent years, the devel-
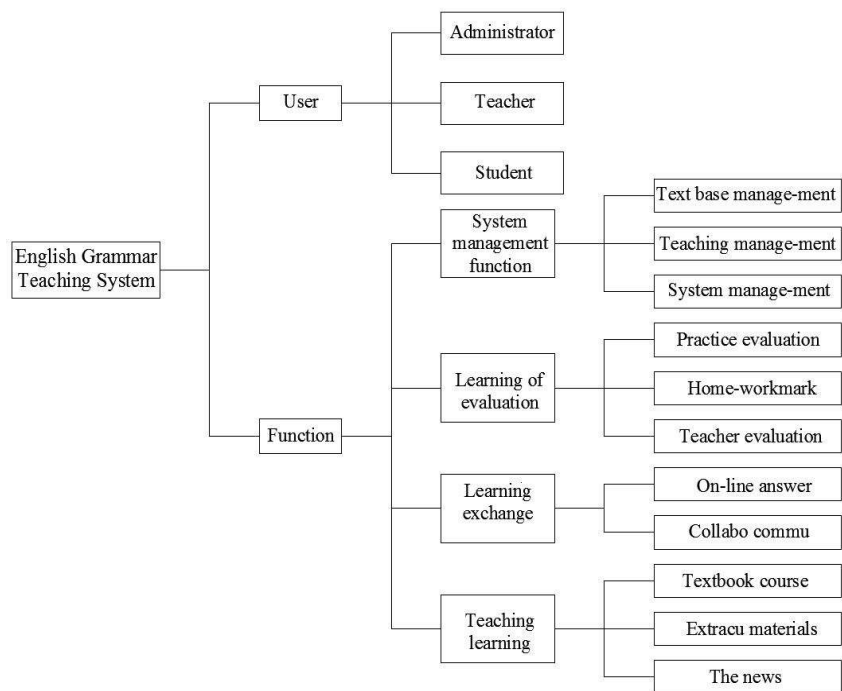

Figure 1. System hierarchy diagram

opment of computer English teaching has been greatly improved, but it is still in the stage of exploration and trial. Therefore, the successful cases that can be referenced are not enough, thus requiring designers to discover and create [8] constantly. The preliminary design concept is imperfect, and many problems will be encountered while applying the theory. It is a complex process to try to construct a relatively complete teaching system from a tentative idea [9]. In addition, under the influence of factors such as the geographical environment, the cultural environment, and the audience's acceptance, the system may produce different experiences. As a result, there may be unpredictable deficiencies in the application process or even some unnecessary impact [10]. Given this kind of question, it is necessary to construct a relatively perfect system model to form a connection between the student and the teacher. The whole English grammar teaching system includes two modules of function and user, as shown in Figure 1.

As shown in Figure 1, a complete English grammar network instruction system is divided into functional and user areas to achieve the effectiveness and relevance of data transmission in the user's use process. The functional area contains teaching and learning functions, learning and communication functions, learning evaluation functions, and system management functions, the advantage of which is that the two mechanisms of education and learning are closely integrated to fulfil the coherence and connection requirements of the system greatly [11]. In addition, the user area of the teaching system is made up of students, teachers and administrators. The data flow of the student function area includes user login, online learning, data query, job detection, examination evaluation, etc. [12]. Data flow in the teacher function area includes user login, teaching resource management, online answering, homework and exam review. The data flow of the administrator function area is divided into user login, system management, and so on. After analyzing the system's requirements, the whole teaching system was divided into layers. Thus, the main input and output of the system, functional requirements in the process of the system, and the logical performance requirements corresponding to the running environment were determined [13].

In addition, the main process of the English grammar teaching system was also analyzed and integrated. The basic process is shown in Figure 2:
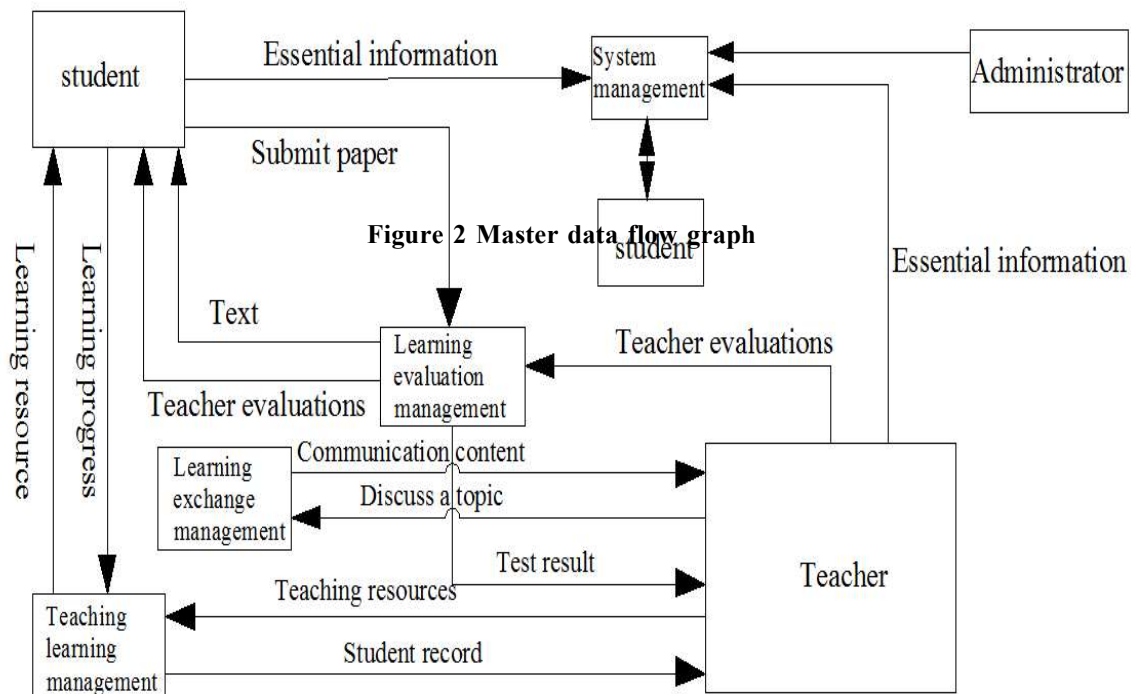

Figure 2. Master data flow graph

A good system operation must have a strong data stream as a support. Although there are only three main bodies of students, teachers and administrators in this system, the operating mechanism is far more complex than expected. Therefore, there are strict requirements for data flow [14]. As can be seen from Figure 2, the students and teachers can give the basic information to the system management after they log on to the system. Then, the administrator controls the system's subsequent running. Through the management of teaching and learning and the management of learning evaluation, both students and teachers are closely linked. The information transfer between students and teachers is based on the system management mechanism. It has been well implemented whether it is collaborative or normal [15]. All the factors in the data flow diagram form a complete teaching system and assume all the thinning processes of the system.

3.2. Construction of Interactive System for College English Grammar Teaching Based on MOODLE Platform

After analyzing and improving the preliminary design factors and determining how to extract feedback information, the teaching system was constructed. In the construction process, the construction principle should be paid attention to. The first is the practical principle: as a teaching system, the system aims to improve the efficiency and quality of education and teaching. The system's design should consider whether the R & D results meet the actual application requirements and the desired application effects. The second is the extension principle: the designed system must have the possibility of late development and certain flexibility to be updated or upgraded. The third is the principle of interactive participation: after a detailed understanding and use of the system, the user may better understand the system. By investigating and asking the old users how they feel about the system experience and even asking the user for suggestions about improving the system, users can be most involved in the system's R & D process to make the system meet user requirements. The fourth is the principle of easy maintenance: the regular operation of the system, as well as the ease of operation and simplicity in the maintenance of the system, must be guaranteed to cope with sudden failures encountered during use. The fifth is the confidentiality principle: after the user enters personal information and personal privacy into the system, the system is responsible for the confidentiality of the user's privacy in the management of information so as to avoid unnecessary losses and losses caused by the leakage of personal information of users.

Figure 3. Overall design of the system

An interactive system can be further constructed while considering the principles of system construction. MOODLE is a curriculum management system that has appeared recently and is now a part of new things. The MOODLE system is slightly different from the traditional model because of the abstract and complex management functions such as "activity" and "resource". In the new application system, it is necessary to account for the possible factors that affect the system fully. In the study of this paper, the construction process was divided into four stages. The first stage is the collection of data. The teaching system is mainly for the educational groups and educated groups rather than all groups. Therefore, it is necessary to carry out detailed and comprehensive collection and input of educational resource information to ensure normal operation and resource use in the process of system application. The second stage of system construction is online analysis processing. This phase aims to align the data and information gathered with the system users to make the last rendered effect close to the user. In addition, push reports can push the analysis data to the users and display the most suitable system for the users. The third stage of this system is to acquire professional analytical knowledge. The teaching management system should analyze and prove the information from the education angle. Moreover, the teaching management system should not only analyze the past but also need professional ability to predict future development situations. At this point, information mining is critical. Professional knowledge analysis is easy to obtain as long as one has the ability to dig through vast amounts of information. The fourth and final stage of the system construction is the output phase of the information integration. At this stage, the most specialised and applicable information obtained in the previous stages is systematically sorted out and presented best through the system feedback mechanism. Further, the information is transmitted to the user according to different requirements, so as to provide reference and use. The four stages operate in concert with each other and work together to build the system.

4. Result Analysis and Discussion

In the process of constructing an interactive teaching system of college English grammar based on the MOODLE platform, to save design time and improve research efficiency, in the initial construction, the maturity conditions and technologies of similar systems were absorbed as much as possible. Before the system design phase ends, researchers should perform extensive and rigorous system performance testing. In order to test the performance of the system, the corresponding login interface was set up after the teaching interaction system was set up. The user registers and logs on the system according to the user name and personal password, and at the same time, the system also saves and collates the user's information so as to make a thorough analysis and system evaluation of the usage experience. After successful login, users can manage, classify and induce personal information. After entering the system, there are three modules: the teacher module, the student module, and the administrator module, which will be classified and managed according to the users' different choices.
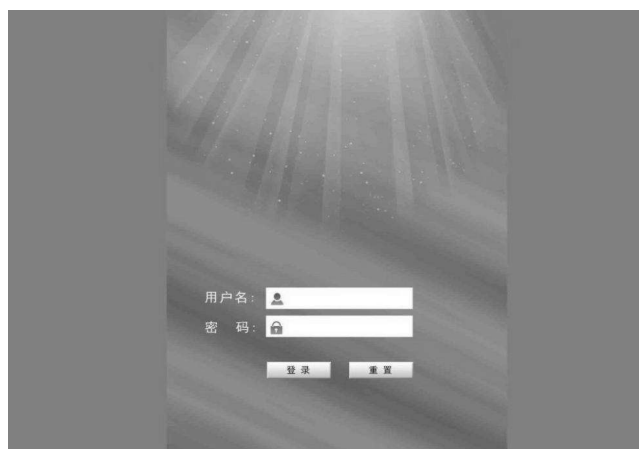

Figure 4. User login interface

In this paper, by rigorous scientific research design principles, the constructed teaching interaction system can avoid the adverse effects caused by technical defects or mistakes to the greatest extent to achieve a good use effect and allow users to get a satisfactory experience. In this paper, the Access database was adopted. Compared with other database development systems, Access has obvious advantages: users do not need to write a single line of code. They can develop a powerful and professional database application system quickly. The development process is fully visualised; developers can also write programs that work more complexly through the programming environment provided by the system, VBA. The main reason for choosing Access as a database is that it can be combined with ASP to perform dynamic data exchange on the network so that the system can better generate dynamic files and develop the network system. According to the analysis of users' needs, the database table mainly relates to the student information table, teacher information table, students practice table, learning exchange table, learning information table, job information table, examination management, examination table records, and database list. Taking Table 1 student information table as an example, there are mainly the number, student name, login password, student number, class and other personal information.

Field Name	Type of data	Description
ID	Auto numbering	
Name	Text	Name
Number	Text	Student ID
Class	Text	Class
Sex	Text	Gender
Password	Text	Password
Question	Text	Problem
Answer	Text	Answer

Table 1. Student information table

In addition, the system was tested in many aspects, including user program security test, system network security test and database security test. Firstly, the security of user programs should be tested, and the permissions of different users in the system should be clearly distinguished. Whether there are user conflicts in the system, whether the system can be logged in through absolute channels, and whether all authentication marks can be deleted after the user logs out of the system, all should be tested; the second aspect is to test whether the system network is secure. Whether the protective measures taken are tight and whether the patch on the system is installed should be tested. Different Trojan killing tools are used to detect the Trojan horse status of the system; the third aspect is to test whether the system's database is secure, including the integrity of data, confidentiality, independence, manageability, data backup and recovery capabilities.

The close and efficient cooperation between each component of the system can make a complete system usually run so that the operation of each component must be strictly required. In ensuring the speed of operation, the effects of use should also be taken into account, and at the same time, the confidentiality and security performance of the system should not be neglected. During the system's operation, continuous repair and improvement are carried out.

According to the data given by the feedback mechanism of the backstage operation of the system, the program or component that should be improved and strengthened can be analyzed. In addition, a user feedback platform can be added because, in some functions, users may have a more intuitive sense of how the system works than the developers. Through the feedback users give, the performance of each part of the system can be further improved and enhanced. In this paper, in the process of constructing the system, the opinions of the multiple groups were taken into consideration simultaneously. Different users will have different subjective feelings in the process of using. A small range of user groups was also considered when considering the main user groups. After the detailed analysis and design of the system function requirements, the function of each module of the system was designed. Then, the function of each module was defined, and a complete database table was established. Finally, ASP language was used to complete the system platform. After the system design was completed, based on the actual use of the students and teachers, the system was evaluated to determine whether it achieved the ideal standard in the user experience and met the design requirements. According to the survey results, the construction of an interactive system of college English grammar teaching based on the MOODLE platform can meet the basic standards of users both in function and demand. This result shows that the design is successful and highly feasible. Nevertheless, the system still has minor flaws, which will be improved in the latter stage of product improvement and development.

5. Conclusions

Network technology has been increasingly widely used in all walks of life, including the education industry. As English grammar teaching receives a warm welcome among the large group, the network teaching system of college English grammar is bound to be well received by users. In this paper, the structure, function and main advantages of the MOODLE learning platform were understood through specific research and analysis, and the operation flow of each module and the function analysis of the MOODLE teaching system were introduced. Then, the feasibility of the construction of an interactive system for college English grammar teaching based on the MOODLE platform was put forward. The security of user programs was tested, and the permissions of different users in the system were clearly distinguished. Then, whether there were user conflicts in the system, whether the system could be logged in through absolute channels, and whether all authentication marks could be deleted after the user logs out of the system were tested. Whether the protective measures taken were tight and whether the patch on the system was installed, all were tested. Different Trojan killing tools were used to detect the Trojan horse status of the system. The security of the system's database was also tested, including data integrity, confidentiality, independence, manageability, data backup and recovery capabilities. In the future, more professional research will be conducted to make the research conclusion more rigorous and instructive.

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