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Abstract - The high-speed developed network and portable, touch sensitive and intelligent mobile platforms make the use of smart clients spread rapidly. Based on this background, the study in this paper designed and tested a Chinese language self-learning network platform, in order to provide a technical support for updating of traditional classroom teaching methods. In this study we start by discussing the demands for Chinese language self-learning platform, the overall framework of the system, the modules of the system, and carried out tests of the developed system. The test results demonstrated that the development of the Chinese language self-learning network platform realized the mutual communication, learning and interaction between teachers and students, which avoided inconvenient communication due to space limitations. The Chinese language self-learning network platform can greatly improve time utilization in the current society and provide a theoretical reference for the development of network platform in the future.

Keywords - network platform; intelligent terminal; Chinese language self-learning; Hewlett Packard technology; three-dimensional animation

I. INTRODUCTION

In recent years, China’s comprehensive national strength and culture soft power have been improved and the enthusiasm of people around the world on China has become more and more evident [1~3]. With the persistent overheating of Chinese language learning, Confucius Institute has rapidly developed worldwide and more and more people begin to show an interest in Chinese language. After a period of learning, the learners will require for Chinese language proficiency evaluation [4~6]. Different examinations can output different results, which may be incentive or depressing. Facing the new trend of international promotion of Chinese language and to make Hanyu Shuiping Kaoshi (HSK) [7, 8] serve better, it is necessary to develop new Chinese language level examination based on the full investigation and understanding of foreign Chinese teaching and referring to the original advantages of HSK.

The current foreign Chinese education resources including teachers, teaching materials, tools and means are in severe shortage, which cannot satisfy the demand of learners. It has been the most outstanding problem which restrains foreign Chinese teaching and promotion. A good tool or method or a new teaching mode is expected to solve the problem [9, 10].

Assisting Chinese language learning with computer technology is an effective way for solving Chinese language learning. The rapid development of computer technology influences the study, working and life of people and provides a new approach and method for the solution to Chinese language learning. Network technology and mobile technology have promoted the rapid development of mobile internet as well as the development, flourishing and popularization of the new generation of intelligent mobile terminal equipment and changed the traditional teaching modes and learning approaches. Under such a condition, mobile learning emerges [11~12]. Mobile learning has been extensively considered as a new learning form in the current century and has attracted extensive attentions from the world. Many foreign scholars have made studies on technical support, system structure, platform implementation and the manufacture of learning resource of mobile learning.

II. SYSTEM STRUCTURE

A. Demand Analysis

Demand analysis includes functional demand analysis and non-functional demand.

A1. The Analysis of Non-Functional Demand

1. System Reliability: The reliability of a software system can be summarized into three aspects, i.e., maturity, fault tolerance and recoverability. A user-friendly software system can get favourable impression from users. A software system with a low failure rate or no failure can gain trust from clients. Therefore, the error operation of users needs to be fully considered when a software system is designed. It is the most important to timely recover if error appears and that is also what a mature designer should do. The non-functional demand of our system includes ensuring the normal operation in working days and the independency between functional modules (i.e.,
ensure other functions will not be influenced if one function has mistakes).

2. System Maintainability: The design of database needs to satisfy the requirement of new data increase and data expansion. Therefore, the system is required for a good maintainability. Basic data of a system should be coded and be able to expand and develop, in order to simplify maintenance capability and reduce the workload of maintenance and maintenance cost.

A2. The analysis of System Functional Demand.

The functions of the application include personal centre, apply for examination, score inquiry, examination plan and system settings, as shown in figure 1. The functional demand modules of the Chinese language self-learning system are shown in figure 1.

III. OVERALL FRAMEWORK

The framework of the software system is divided from whole to part and is usually composed of several components. Those components go through ports and elements composed by the ports of different components to interact with each other.

According to different focuses, the framework of software system can be typed into logic framework, physical framework and system framework. Logic framework describes the relationships between different components. System framework mainly faces with non-functional requirements of system such as expandability, reliability, robustness and safety. It requires architects to have a comprehensive understanding of the functions and performance of hardware and software, which is quite important [13–15].

Three-layer framework is developed by inserting component layer between client and database; business service processing, data access processing and user legality verification of system are all processed in the middle layer. Generally, client will not directly interact with database; it connects with the middle layer through communication components firstly and then the middle layer interacts with database through Java Database Connectivity (JDBC). After the introduction of the middle layer, the whole system is logically divided into data access layer which is responsible for processing database access, business logic layer which is responsible for achieving business logic and processing workflow, and presentation layer which is responsible for accepting requests of clients, as shown in figure 2.
Database access and user interface which are separated by three-layer framework model are implemented respectively. Three-layer framework makes every development process independent and the expansion and system modification of system flexible and simple.

Presentation layer provides users with good view interface and presents users with business processing ports in a visual mode. In the data access layer, database access operation is done by database professionals. Each logic layer performs its own functions and will not affect each other, which greatly improves the reliability and expansibility of the system.

IV. DETAILED DESIGN OF SYSTEM

The overall design of system focuses on building overall framework, while detailed design is to select proper skills and processing methods for every task. Detailed design which is the refinement of general design should consider details inside components in all aspects including designing the implementation algorithm of every module and local data structure needed by every module. This system is a three-layer framework system based on Browser/Server, in which, all business function modules are obviously independent from each other. Attention is given to the correct implementation of business function modules rather than the relationships between modules. Next, business functions of the system are further decomposed into modules, in order to confirm the information needed in every module. Finally, detailed implementation methods are designed by processing the information.

A. Personal Centre

Personal centre page appears after users successfully log in. In personal centre page, users can change password and personal registration information, query examination application information and examination site information, and log out.

B. Examination Application

Examination plan information can be acquired by integrating examination application module and examination management system. Users fill in examination application information through client. After entering the module, users select examination item/subject and examination sites and submit. Detailed personal information are filled and submitted after checking. Next step is photo uploading; selecting photo album and taking a picture are optional. After checking, the information is submitted to examination management system for final application.

C. Exercise Before Examination

Exercise before examination includes practice test, challenge mode, planning exercise, mistake collection and test paper collection. Figure 4 is the flow chart of practice test.
D. Score Inquiry

Users input examination registration number and name to access to score inquiry page. After information is input, the button of “inquiry” is clicked to call score inquiry port to list examinee information and score information. If inquiry succeeds, examinee information such as name on identity card, Chinese name, nationality, gender, examination card number, examination type, number and examination time and score information such as subject title and examination items under each subject will be dynamically displayed. Figure 5 is the flow chart of score inquiry module.

E. Examination Plan

Examination plan information can be acquired by integrating examination management system. Examination plan can be inserted via backstage management system. Users can acquire examination plan information through ports using mobile phone.

F. System Setting

System setting includes operating instructions, test paper pack update, language setting, font size, message receipt control and software version update.

V. SYSTEM TESTING

Software testing is a key procedure to ensure the quality of software. It can find out structural or logical errors through code analysis and program execution of typical examples and exclude them, which can achieve requirement statements of users and ensure the normal operation of software.

A. Performance Testing

In this study, the connection speed of the system which could reflect the performance of system was tested taking interactive operations between learners and the system as examples. The test report of connection speed is shown in table 1.
White-box testing and black-box testing are two software testing schemes. In practical software testing, the two schemes are generally integrated together.

White-box testing refers to test the correctness of every pathway in logic code layer without considering the implementation of functions and test system source code without using interface on the premise of knowing working process inside system; usually, the testing is made by system developers. Black-box testing refers to verify the correctness of every function on the premise of knowing system realization function; during testing, the internal structure of program is ignored and the input ports provided by system are used to verify whether they can ensure the integrity of external information and moreover obtain correct output data.

Chinese language learning system was tested by black-box testing integrated with white-box testing. In white-box testing, whether every pathway of program performs as expected was tested by single-step debugging in the perspective of developer. In black-box testing, the external functions of the whole Chinese language learning system were systematically tested using method of exhaustion in the perspective of user. Certainly, we could not realize exhaustion indeed, but just found out system vulnerabilities and errors as many as possible using limited testing cases.

B. System Testing Results

The system was turned over to experimental staffs for installation. In the process of development and implementation, testing cases were determined by analysing the internal logic structure of the software. The comprehensive testing on information records of 200 examinees suggested that, among the 200 testing cases, 199 cases were normal and 1 case was wrong. To sum up, the expected functions were realized basically after repeated debugging. As the system is developed for the first time, it still has many deficiencies. Hence further practice and exercise are required.

V. CONCLUSION

The analysis of testing results suggested that, the functions of the foreign Chinese language learning system could satisfy the requirements of learners basically and system performance could reach specified requirements. All problems of the system cannot be accurately tested because the testing cases are subject to limitations and the testing environment is different with practical operation environment. The exposed problems of the system need to be corrected and perfected in the operation and maintenance process.

REFERENCES


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