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The Mobile Education Model Based on the WeChat Public Platform

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***Abstract*—Under the rapid development of educational informatization and mobile learning, this paper utilizes the WeChat public platform to design a radiation network teaching platform in order to expand the teaching function of practical courses. The platform can effectively realize the real-time sharing of teaching resources and dynamic interaction between teachers and students, and enhance the ability of cooperative development in practice.**

***Keywords*—network teaching platform; practical course; WeChat; radiation network teaching platform**

I. INTRODUCTION

With the rapid development of the information age, knowledge presents an explosive growth and renewal. In the background of the requirements of the new curriculum reform and the rapid development of network information, the network teaching platform has been proposed[1]. At present, most web teaching platforms have abundant content. They integrate video conference module, virtual classroom module, interactive chat module, forum discussion module, E-mail module and so on. It provides students with more vivid and effective education mode. About the use of network platform, people prefer the way of Web which does not need to install any software. But it inevitably leads to the problem of data transmission security and communication congestion. At the same time, most of the network teaching platforms still have the problem of insufficient dynamic interaction and function generalization[2].

With the fast development of telecommunication, more and more people become mobile phone users. It accelerated the create of mobile terminal learning platform. The WeChat public platform is a kind of mobile service that provides rich content and comprehensive functions. It has wide coverage and convenient way of transmission. The mobile learning model based on the WeChat platform has been gradually accepted by the public[3].

In order to improve the integrity and logic of the knowledge system and curriculum system. In this paper, we utilizes the WeChat public platform's convenient operation, efficient interpersonal communication, accurate sending of messages and other advantages to design a practical course radiation network teaching platform.

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II. SYSTEM OVERALL DESIGN

The users of the whole platform are mainly divided into three categories: the learners, the administrators and the developers. The learners can freely view the open teaching resources on the platform, download data, discuss questions, leave messages, upload experimental equipment and make appointment applications. The administrators mainly release professional information on the platform and share teaching resources, experimental equipment and operational skills, and answer questions and approve experimental applications. The developers manage and maintain the entire platform, mainly including register user's applications, update database, answer messages, optimize platform design, etc.

The WeChat interface of this platform contains 3 first level menus. These are user centers, common services, and feature functions. Each first level menu has some second level menus, including user registration, user login, personal information, equipment appointment, equipment upload, news, video, file download, question forum and remote desktop.

The functional modules of this platform are mainly divided into information management module, main business module and maintenance module.

A. Information Management Module

This module is to plan the form content submitted by each interactive page to facilitate the administrator to manage all the information of the platform.

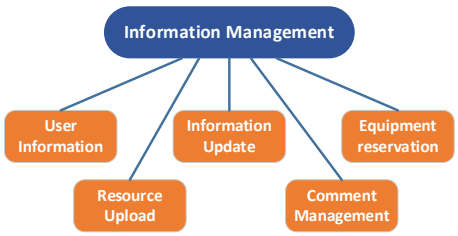

Fig. 1. The structure of information management module

- User Information: The registration page refreshes to submit the user's information. The administrator updates the database regularly.
- Resource Upload: Submit the data uploaded by users to administrators to check and return in the form of web

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pages, which can effectively avoid the existence of spam.

- Information Update: Regularly refresh platform information. The administrators have the right to delete expired information and issue new information, so as to ensure the effectiveness of the platform.
- Equipment Reservation: The administrators write the information submitted by the user to the database. And match with the audit to give the user an appointment reply when meeting the requirement.
- Comment Management: The users can offer suggestions to the platform. The messages must be audited by administrators before be posted online, so that uncivilized speech can be prevented from appearing on the platform.

B. Main Business Module

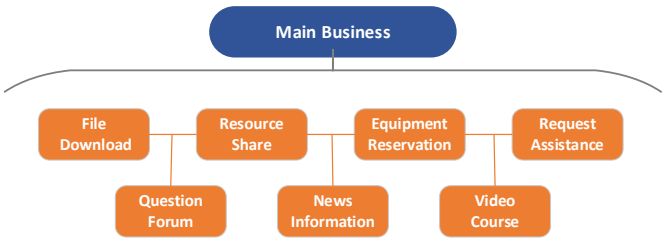

Fig. 2. The structure of main business module

- Resource Share: The users can use this function to register all hardware devices, as well as related product manuals, functional instructions, example programs, and so on.
- Equipment Reservation: When the users need to use certain device, they can submit applications through the platform. The background programme will filter the database based on the submitted device name and type, and help users to make an appointment directly.
- Request Assistance: When the users need to operate on the experimental equipment remotely, the background programme helps to connect the messages.
- Question Forum: The users can display their questions on the platform. The other users can communicate and reply online.
- Video Course: The platform provides a video list. In view of the problems that often happen in the practical process, the video explanation is carried out, and the user can watch it online.
- News Information: The platform can send news to users and it usually about professional development information and competition information.
- File Download: The platform provides a keyword response function, for example, the user sends "data" to the platform, it can directly return the data download link.

C. Maintenance Module

- Platform Optimization: The developers need to optimize browser interface, repair vulnerabilities and improve the operation performance.
- Browser Adaptation: when WeChat software version is updated, the developers need to test and adjust the rendering results of browser kernels in time, so as not to affect interface layout.

III. DEVELOPMENT ENVIRONMENT & TECHNOLOGY

A. WeChat Public Platform

The WeChat public platform is an integrated functional module that can be developed by other personnel. Except simple communication between users, WeChat public platform is a kind of service platform[4]. It offers rich interface permissions to the developer. WeChat has designed the mechanism of 'Access_token'. The developer has to send a 'request' to the WeChat server if he wants to get 'Access_token'. The 'request' has two key parameters — AppID & AppSecret[5]. In order to ensure the security of platform, only the users in IP white list are allowed to call the interface. Therefore, the developers need to add the server IP address into the IP white list. Otherwise, it will not be able to call successfully. And the HTTPS protocol is used in calling the interface.

B. Sina App Engine Server

The Sina App Engine (SAE) is the first public cloud computing platform in China. It provides more than 10 computing and storage services. The web developers can use Sublime, SDK, or web online code editors to develop and test programmes on operating system such as Linux, Mac and Windows. Meanwhile, Sina cloud server also supports team development. When developing a SAE project, the administrators can assign different permissions to the members of the project so that the members can be collaborated and developed through this platform everywhere.

C. MySQL Database

MySQL is a database server that provides powerful services for developers. As a database service, the main goal of designing MySQL is quick query, simple operation and strong storage. When problems arise in the process of debugging, the server will also provide a variety of false information for developers to facilitate the debug.

D. Web Development Environment

With the popularity of the Internet, there are many webpage editors created for design webpages efficiently. The Editplus, Adobe Dreamweaver, Sublime Text, VS Code are commonly used. Among them, the Adobe Dreamweaver integrates designers. And it supports real-time page view and visual compilation of CSS stylesheet and JavaScript. It has well production efficiency, unparalleled control ability and website management ability. Therefore, this paper uses Adobe Dreamweaver to design front pages.

IV. Platform Design & Creation

According to the function demands of the practical teaching course of radiation network platform, this paper designs a radiation network teaching platform based on the framework of WeChat public platform[6,7]. It is combined with the characteristics of mobile terminal equipment, the use of sina SAE cloud server, application of PHP, MySQL, HTML and other related technologies. The creation process is as follows. Firstly, we apply to WeChat for a WeChat public platform ID. If the application is approved, the developer mode is enabled. Then, bind the SAE server IP address to WeChat public platform. After verifying access_token, AppID and AppSecret are obtained. Finally, we can make use of WeChat's rich interfaces to develop platform. As shown in Fig.3, the system uses the three layer C/S network architecture in the developer mode. The message transmission objects are the mobile client, the WeChat server and the Sina cloud server. The user requests to the WeChat server through mobile phone. The Sina cloud server obtains the message sent from the user through the interfaces provided by WeChat platform. And then, the server transfers the message to the WeChat server after processing. Last, the WeChat platform sends the message to the user. It is the whole process of message processing.

Fig. 3. The message transmission process

The design content includes front pages and background programmes. The front page design mainly refers to the application of HTML, CSS, JavaScript. It needs to make the WeChat platform jump to actual pages. In order to improve the efficiency of background programme developing, we also make the list page template, the debug version of WeChat compatibility and template split. The background programme developing mainly realizes logic function and returns the URL response to user. As shown in Fig.4, we use SQL database to register the information of users and the records of the resource sharing for real-time management. And we use PHP to achieve the message exchange between users in the web framework.

- Custom Menue: The custom menu can help public platform have more abundant interfaces. The main interface of this platform has designed three first level menus. These are user center, common services and request assistance. We use these modules to realize user management and services.
- Keyword Reply: The keyword reply function is a passive message reply mode. It is designed to provide users with services without harassment to users by sending messages voluntarily. And keyword replay function is easy to expand; we can easily develop in the later period. The platform has set up the data download, competition information, course information and other query aspects.
- User Registration: The user registration menu is mainly used to register the user information into the database. We click the user registration menu, and then jump to a registration page. In this page, the users need to fill in their basic information, including the individual name, the student ID and the telephone number. About the background programme of user registration, it is more important to insert the personal information into database.
- User Login: Every user has his own openID of public account, which is unique to the WeChat public platform. After the user inputs necessary information and clicks the login button, the system will connect to the database firstly. And the programme will search the information in the database and check whether the username and password match. If match successfully, the system will get the openID of the curent user. If not, the system will return the error information and jump back to the login page and ask user to login again. When the user ask for other special services, the system will check if the openID of the current user is in the database and confirm whether the user is in the login state.
- Equipment Reservation: All the users registered on the platform have the authority to apply the equipment. They should fill in the information of the equipment that you want to borrow from the platform. After the reservation information is submitted, the system will catch the user's openID firstly to confirm the login state. Then the system will connect to the database for querying whether the corresponding openID exists. It means that the corresponding user has logined before. Otherwise, the interface will skip to the login page. If it is confirmed that the user has logged in, the system will get the form information, then query the database whether there is a device which the user wants to reserve. If there is equipment that can be reserved, the system will add the relevant information of the entire appointment to data table. It allows querying the reservation information according to the openID. After this process, the available equipment will be fed back to the applicant.
- Device Uploading: The user also needs to be in the login state when upload device. After clicking the device upload menu, the interface will jump to the page in which the user should fill the equipment information. It mainly includes the device name, the device type, the relevant documents and the student ID of the device owner. We can query the contact in the data table of the user's information by the student ID without any other connections. Clicking upload, we can successfully submit the information to the database. Then the interface will prompt you with a success message. Otherwise, it will return relevant information and jump to the device upload interface and ask to upload the device again.
- Information Push: When the user clicks the information push button, the platform will push some news to the user such as development cases, technology news

science articles and so on. The messages are stored in the server side. The permanent message interfaces provided by WeChat are used to invoke the text messages that have been edited. The system will push them to the users. This process is initiated by the users.

+ 选项

	equipname	equiptype	ownerID	file
	交流毫伏表	UT621	201303020123	0
	信号发生器		201203020204	0

全选 / 全不选 选中项：

+ 选项

	openid	device	model	time	period	place	ownerID
	oKLIQ1BqwuMwokSh1IGZJrlZmvyM	交流毫伏表	UT621	1231	两天	21312	201303020123
	oKLIQ1KKBsoYeD-l4uUJjxfIE_XQ	交流毫伏表	UT621	2017-1-3	半天	教12b305	201203020204

全选 / 全不选 选中项：

+ 选项

	name	studentID	class	phonenumber	QQ	password	openid
	[illegible]	201203020204	电子1202	[illegible]	[illegible]	124312	oKLIQ1KKBsoYeD-l4uUJjxfIE_XQ
	[illegible]	201303020123	电子1301	[illegible]	[illegible]	123456	oKLIQ1BqwuMwokSh1IGZJrlZmvyM
	[illegible]	201303020218	电子1302	[illegible]	[illegible]	123870	oKLIQ1C3HLzklv4afj0zkbdNeclo

全选 / 全不选 选中项：

Fig. 4. The database display

After the users click the menu, the system will trigger a media_id event. Then the WeChat server will search for materials in the permanent materials base and push the permanent materials to the users corresponding to OpenID. The administrator can edit and sort the materials, and upload them to the database. At present, almost all kinds of material messages are supported, which can be pictures, videos, graphic messages, etc.

V. Conclusion

In order to expand the teaching function of practical courses and provide skill training for the compound creative talents with non-professional system training characteristics, this paper utilizes the convenient operation of WeChat public platform-- high-timeliness of interpersonal communication, accurate message sending and other advantages to design a practical course radiation network teaching platform. This radiation teaching network platform can support mobile terminal equipment. And it is different from the traditional network teaching platform which uses the B/S framework and just can be accessed through the PC browser. The users can easily visit WeChat platform to obtain their desired services through the mobile phone.

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