Research and application of mobile teaching platform

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Abstract. The application of mobile technology in university digital campus is ripe. This article mainly introduced the necessity of teaching platform based on mobile Internet in the teaching of higher vocational education, and the key to the construction of the feasibility of mobile learning platform, which is a feasible and effective teaching model under the new situation, worthy of promotion. The design and application of teaching platform based on mobile Internet is the change of educational ideas and working methods, and is the new starting point of Higher Vocational education.

1. Background
As mobile applications flourish, mobile devices such as smartphones and tablet PC are gaining popularity, and the wireless bandwidth increases lead to the costs continue to decline. In this case, the application of mobile technology in university digital campus is ripe [1].

Mobile digital campus based on the application of digital campus, the school teachers and students daily work, study and life, using the latest achievements in the development of mobile applications, resource sharing, information exchange, remote education, information technology, mobile terminal show in the unified guidance of the school teaching idea and information development thought. Further promote the teaching, research, management and other work of the school, and form a diversified, humanistic and intelligent information service environment. Effectively support the cause of the school, develop well and quickly, and improve the quality of teaching and work efficiency.

Mobile teaching platform is a new model of mobile learning experience, which can improve the quality and efficiency of school teaching. It is a useful and active attempt to develop high-quality resources, develop teaching methods and open learning environment. The latest achievements in the development of mobile applications using mobile teaching platform, resource sharing, information exchange, remote education, information technology, mobile terminal display in the unified guidance of development of teaching concepts and information school idea, promote the school teaching, scientific research, management and other work further, the formation of diversity, culture and intelligent teaching environment. The application of mobile teaching platform is not only the new direction of technological research and development, but also the change of educational idea and working mode.

2. Design of Teaching Platform Based on Mobile Internet
With the acceleration of the urbanization process, the speed of urban rail transit construction in our country is swift and violent. According to the relevant planning, the urban rail transit operation mileage exceeds 3100 km at the end of 2014. Beijing, Shanghai, Guangzhou, Tianjin, Suzhou, Nanjing and other 40 large and medium cities have or are building subways, and more and more cities are joining the ranks of urban rail transit construction. The urban rail transit industry has entered a stage of all-round high-speed development, and the shortage of related professional and technical personnel of rail transportation requires the support of a large number of high-quality professionals.

In order to meet the increasingly strong demand of rail transit talent, all colleges and universities have opened the related professionals of city rail transportation, and built the teaching laboratory and
practice base, through systematic training, complete function, can increase the intensity of teaching practice. However, the urban rail transit training equipment is large, and the training conditions are limited, which limits the students' hands-on learning ability.

At present, the application of modern teaching technology at home and abroad is developing towards multimedia, networking, informatization, diversification of educational technology application mode and popularization of distance education mode. In twenty-first Century, China made great efforts to promote education informatization, and research the educational teaching model to train high-quality professionals. Under the background of educational reform, mobile education as a new education method will surely become a supplement of the traditional education, and that as a new form of distance education will let the learners to get rid of the restriction of space and time to study at any time and in any place according to the need of autonomous learning. Mobile learning represents the trend of learning in the future, and it will be a new and individualized learning style in distance learning.

Design of mobile teaching platform is a new remote teaching model based on the mobile Internet to provide a good reference for the curriculum construction, to make the communication between teachers and students more effective, to reform the classroom teaching and education, to promote the innovation of learning ability in the new information environment and teachers' teaching methods, in order to promote good the establishment of efficient and feasible new teaching mode[2].

The mobile internet teaching platform based on mobile digital campus server operating environment, establish the platform and the mobile terminal connection and communication mechanism, provide the user authentication, mobile application management, application management, release and upgrade data transfer session, auditing and other functions, the platform should have the ability to expand.

2.1. Design Idea
I)Design from the following three aspects:
   a) Research on the multimedia mobile training mode of urban rail transit based on the mobile operating system;
   b) Structure multimedia mobile training platform of cross space urban rail transit;
   c) Application of multimedia interactive training course for urban rail transit on Intelligent equipment.
II) Five functions of mobile teaching platform:
   a) Teachers and students identity authentication;
   b) Interaction between teachers and students;
   c) The assignment of exercises
   d) Examination questions are handed down and handed in
   e) Achievement push.

2.2. Mobile Instructional Platform Design Framework
The platform design framework is listed in figure 1.
The object of mobile teaching platform is the components of services content and the basic composition.

The following specific design:

a) investigation and study
The main task is to analyze and study the real practice teaching environment, extract the elements needed for the implementation of the system and collect system application requirements.

b) platform design
The main task is to analyze the various resources and requirements collected at the previous stage, abstract and extract the object model, and build the platform model based on it.

c) system implementation and verification
Through technical means, the design requirements of the platform are achieved and compared to the real city rail transit multimedia interactive environment inspection and correction system.

In the real environment to test the network and hardware equipment, the software system for performance capacity, pressure test and trial operation to ensure that the system functions can be used normally, and meet the needs of professional practice teaching, and find and correct the potential problems as much as possible before the formal run[3].

Physical design framework based on mobile internet teaching platform, showing in figure 2.
3. Construction Of Mobile Teaching Platform

3.1. Key Technology of Platform Design
Component diagram of technology development.

Platform design using Java technology with the advanced development and management tools to complete the implementation of the software development life cycle, the establishment of data interface, powerful system management, data access, data transmission application management platform provides data exchange tasks for the client. J2EE platform is a distributed, high reliability and advanced solution for enterprise applications. The main code of J2EE platform adopts Java programming language and server Java technology[4].

Native App is better at accessing and being compatible because it is located above the platform layer. It can support online or offline, message push or local resource access, and the capture of camera dialing function.

Web App doesn’t need to be installed, and its adaptability to device fragmentation is better than Native App. It only needs to execute WAP technology in any mobile browser by means of XHTML, CSS and JavaScript.

The cell phone used by the user is not within the scope of the client's development. The corresponding client program cannot be installed, and limited data access is accessed through the WAP browser access mode. WAP format is mainly developed by using WAP2.0 or HTML5 technology.

Hybrid App is between web-app and native-app, although it looks like a Native App, only one UI WebView, which access is a Web App. Hybrid App (hybrid mobile application mode) with Native App good user experience advantage "and" cross platform Web App the advantage of development"[5].

3.2. Plan of platform construction
The terminal application platform to achieve docking and session management, user authentication, business components, business logic and application management, application release and upgrade management functions, and realize data sharing with the docking data center and application systems, and data preprocessing.

a) protocol conversion
The platform provides a set of perfect data communication interface mechanism, which can easily handle any form of agreement, protocol, and also provide a realtime database as the core of the distributed client server access and service mechanism for third party companies such as: DDE, OPC, TCP/IP, ODBC, DbCom and API access control access function data.
b) Data processing

The real-time database based on network distributed structure provides open access to the outside world and supports the application of C/S and B/S. The real-time data of each system can be conveniently gathered together to provide a reliable universal real-time data platform for the further development and application of data resources.

The platform is designed to handle constantly updated, rapidly changing data and event processing. Various operations can be performed in a variety of ways, including data processing, historical data storage, statistical processing, alarm processing, and service requests.

Provide time for real-time database driven scheduling and resource allocation algorithm using real-time technology, according to different application requirements and characteristics, design the real-time data model, real-time transaction scheduling and resource allocation strategy, real-time data communication using the theory research and systematic, structured in-depth.

The introduction of virtual memory technology (reduced disk I/O), memory allocation and management method, data dictionary and special structural design, and the use of multithreading and parallel processing way to further strengthen the efficiency of data processing.

c) Data conversion

The data converter provides methods for converting data from the source to the target system. This function has traditionally been done by programmers, which is extremely inefficient, because the need to write different data extraction and loading programs for each data source. The platform provides a general solution for data conversion, to generate the program code that is loaded in a graphic way, which visually and efficiently generate a special data converter, thus reducing the 70% to 80% of the work.

The specific process can be divided into three steps: the first is from the data source (business system underlying), extracted data will be needed; and then converted to a target data storage format of the data; finally transformed data will be loaded into the data warehouse, in order to solve the problem of the dirty data. After data conversion step, it also adds data cleaning function.

D) Business system data access

Service system data access consists of real-time data and non real time data access.

- Non real time data, the use of shared data center system for data synchronization input docking mode. The shared data center through the data routing path, establishing Middle Library, data structure and business system comparison needed, finally perform synchronization data, the business system data set according to the rules of the data center onto the digital campus platform.

- The real-time data is provided by the service system interface, and the platform server implements the interface, and provides the call processing method for the digital campus client. Of course, real time data docking uses the WAP model, and the business functions are directly handled by the WAP program of the business system.

e) User information management

The module provides actions to add and delete functions to users.

Manual management: you can manually add, modify, and delete, query user information;

Import and export: you can import user information files written in the specified format into the system, generate user information, or export user information to the specified format file;

f) Role and authority management

The module provides role and authority management. The system administrator can set different roles according to the operational needs of the system, and give the role permissions.

When adding a user, the corresponding role name can be selected, and the user can enjoy the permission of the corresponding role.

Roles and permissions management include but not limited: roles definition (role name, role description, creator, creation time, etc), role query, menu permissions, personnel allocation, menu authority assignment, etc.

3.3. Test of Platform Feasibility

The platform feasibility test is divided into four phases:

- Unit testing: test each unit to make sure that each module works properly
- Integration testing: assembly test the modules that have been tested to ensure that the functional logic process is running properly
- Regression testing: perform regression testing on the tested version to ensure the stability of the version
- Acceptance testing: the final test of the deployed software to ensure the normal flow of the online version

Results: compatibility supports Android4.0 and above, more than ios8.0 system. Front and back test results can be executed.

4. Application Prospect

After the successful development of the platform, the professional practice teaching mode is also a change and promotion, and it is the change of teacher education idea and working mode. It can improve the level of the application of information technology teachers, update teaching concepts, improve teaching methods, improve teaching effectiveness, and improve the level of the application of information technology teachers, update teaching concepts, improve teaching methods, improve teaching effectiveness using in teaching and learning interaction between teachers and students in the limited space. It also encourage students to active learning, autonomous learning by means of information, enhance the ability to analyze and solve the problems by using information technology, which let students make full use of the mobile platform for teacher-student interaction, necessary training exercises and examination in the limited space. Students can take advantage of the limited time and strengthen their study.

The four design goals of mobile teaching practice platform is "interface unification, resource sharing, auxiliary teaching, mobile service".

A. Interface unification: digital campus platform is a public platform for information gathering and interaction, including the formulation, publication and management of business and technical standards. To protect the business system of different development companies and different development technologies, it is convenient, timely and efficient to connect with the digital campus platform, and to promote the continuous enrichment and perfection of mobile applications.

Resource sharing: on the basis of resource data electronization, the campus network and mobile learning platform are used to let the resources flow. Not only the transmission and reception, but also the establishment of "one to many" or "many to many" business information flow model according to the business requirements, forming a mobile information layer of cross system knowledge sharing.

C. Auxiliary teaching: using the latest information technology means, to strengthen the teaching process of new, intuitive and vivid way of information interaction, so that the entire teaching process has become vivid and three-dimensional. Students use debris time in a relatively relaxed state, combining with individual actual learning situation, targeted access to knowledge and information, auxiliary teaching purposes further achieved.

D. Mobile services: provide one-stop mobile services for campus services, teaching staff and students and parents. Improve work efficiency, improve management efficiency, improve decision-making efficiency, and improve information utilization. Actively display the school resources and research and technological achievements, to provide the community with more abundant and useful knowledge achievements, and enhance the service ability of the society.

Mobile teaching platform design and application of the new times, the distance teaching model based on the mobile Internet, to provide a good reference for the course construction, the communication between teachers and students more effective, conducive to classroom teaching and education reform, promote the innovation of learning ability in the new information environment and teachers' teaching methods, to promote in order to establish efficient and feasible new teaching mode.

Mobile digital platform is not only a new direction in technology research and development, but also a change in educational philosophy and working style. With the development of mobile and communication technology, the trend from digital learning to mobile learning is becoming more and more obvious. The growing popularity of mobile phones, the increasingly powerful function, to break the time and space constraints of mobile learning provides good hardware support. Therefore, the development of mobile learning platform based on WAP technology has a good application prospect. It is expected that the mobile internet teaching platform will have a broader application prospect.
5. Reference

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