Construction of Mobile Internet Distance Education Teaching Platform from the Perspective of Industry Education Integration

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Abstract. Aiming at the problems of traditional education and teaching platform, such as low use satisfaction, low platform security and poor operation stability, this paper constructs a mobile internet distance education and teaching platform from the perspective of industry education integration. Through the mobile terminal, wireless network and learning resource server, the structure of distance education teaching platform is constructed. The framework of distance education data processing platform is built by using mobile learning course module, mobile course test module, mobile course question answering module and download zone module. Optimize the function of mobile Internet distance education teaching platform, according to the construction goal of Internet distance education platform, improve the data management function structure of mobile distance education platform, and realize the operation of mobile Internet distance education teaching platform. The experimental results show that the stability of the platform is good, which can effectively improve the user satisfaction and platform security.

Keywords: Industry education integration · Mobile internet · Distance education · Teaching platform

1 Introduction

Network teaching refers to the use of computer hardware and network environment to achieve remote teaching. Network teaching is an important form of information-based teaching and a powerful supplement to traditional on-site teaching. It breaks the restrictions of traditional teaching time, place and personnel, and allows more people to arrange their own time, study, discuss and share knowledge in distance [1]. To better carry out network teaching, we must rely on the excellent network teaching platform. As a new stage in the development of modern distance higher education, mobile learning is transforming from theoretical research to practical application. The mobility of learning form, the customization of learning content, the portability of learning equipment and the relevance of learning situation fit the essential characteristics of the separation of time and space in distance education and the value concept of promoting learners'

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development and meeting learners' personalized learning needs. In the process of transformation from radio and TV University to open university, how to build a network teaching platform and how to effectively implement teaching management are directly related to whether the open university can better meet the challenges of the times and expand new development space in the new historical period [2]. At present, some scholars have done some research on the construction of teaching platform in related fields, and have achieved some research results. Reference [3] proposed the construction of distance learning platform based on mobile communication technology. By analyzing the application types of mobile communication technology in distance education, this paper uses mobile communication technology to build the framework and functions of distance learning platform, and draws the specific platform system framework and function module diagram to complete the construction of distance learning platform based on mobile communication technology. The system can meet the design requirements, can achieve distance learning and mobile learning, but the stability of the system is poor. Therefore, the mobile Internet distance education teaching platform is constructed from the perspective of industry education integration. Using mobile terminal, wireless network and learning resource server, combined with mobile learning course testing, question answering and download module, the distance education teaching platform is constructed. Optimize the function of teaching platform, according to the construction goal of education platform, improve the data management function of education platform, and realize the establishment of mobile Internet distance education teaching platform. Network teaching platform includes hardware facilities and software supporting network teaching. It is an important tool for network teaching, and its advantages and disadvantages directly affect the effect of network teaching. Through the analysis of the existing network teaching platform, thinking about its construction mode, summarizing its structure and function, analyzing its common problems, to lay the foundation for building a more mature network teaching platform.

2 Construction of Mobile Internet Distance Education Teaching Platform

2.1 Structure Construction of Distance Education Teaching Platform

Distance education can make full use of the characteristics of network technology for high-quality teaching. Specifically, network technology can realize the following forms of education in distance education. According to their own situation, learners can selectively study the course. As long as the network is covered, learners can learn all day long through smart phones or tablets [4]. At the same time, when constructing course learning resources, distance education institutions should consider allowing students to download course content and learning resources in real time, so as to meet the needs of students' offline learning. In the learning process of students, if they encounter difficult problems, the distance education platform still needs to provide learning assistance. Distance education institutions can publish various teaching information in a timely manner on the learning platform for students to view. Dynamic information includes various learning

tasks, expert lectures, real-time Q&A information, online test information, etc. The distance education learning platform is mainly composed of three parts: mobile terminal, wireless network and learning resource server. Its structure is as Fig. 1.

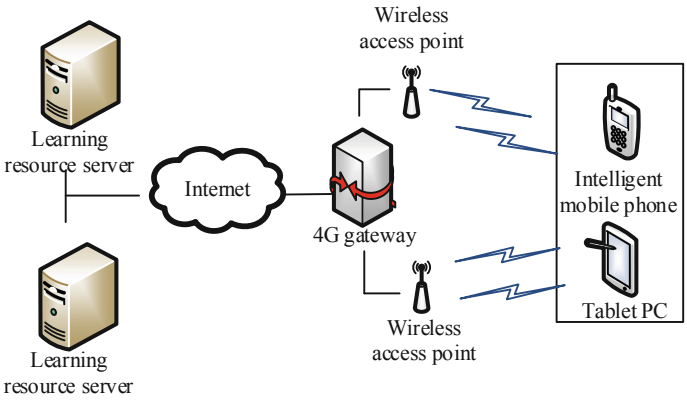

Fig. 1. Structure of mobile internet distance education teaching platform

In Fig. 1, in the Internet distance education platform, online audition and online course teaching are the most frequently used, so the selection of courses must be high-quality. That is to say, on the basis of digital transformation of existing teaching resources, multi-channel development and construction of teaching resources will be carried out. The best of the best courses will be selected, and the targeted, classic and representative courses will be provided to learners for multi-channel download and learning [5]. The construction of teaching management mode makes the course teaching quality, teaching design process, management order, service individualization, learning autonomy, teachers' high level and teaching evaluation socialization, which constitute the teaching management mode of modern distance education mobile network. No matter what kind of learning platform learners use, they can complete the learning task more easily and smoothly, and regard learning as their own interest [6]. In the Internet distance education platform, the function design of mobile learning is in the main position in the whole platform design, including mobile learning course module, mobile course test module, mobile course question answering module and Download Zone module. The framework of distance teaching data processing platform is as Fig. 2.

In Fig. 2, in the process of platform design, the requirement of device configuration is supported by ESB bus, which is the abbreviation of enterprise service bus and the product of the combination of Web services, XML and middleware technology [7]. In the overall framework of Internet distance education platform, ESB provides the most basic connection center in the network to eliminate the technical differences between different applications. Coordinated operation of different servers, played a compatible role, and realized the integration and communication between different services. This is to meet the functional requirements of multi service in the Internet distance education platform. Among them, the server needs to build five server clusters: basic platform server cluster, application server cluster, data storage server cluster, data exchange server cluster, basic

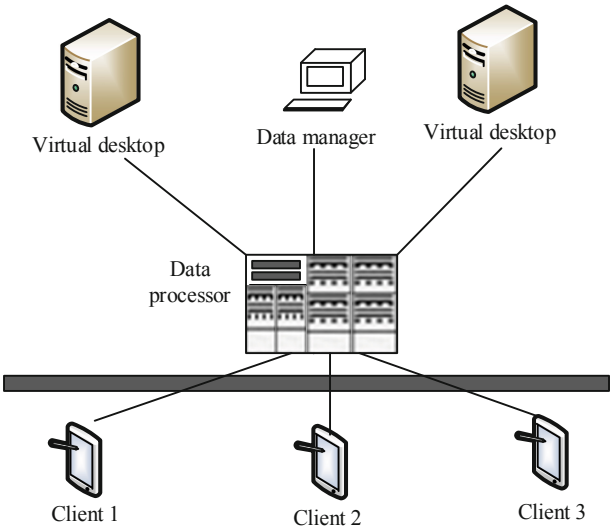

Fig. 2. Framework of data processing platform for distance education

application network and security [8]. Furthermore, three simulation warehouses are established in the platform to effectively manage massive teaching resources, including user data warehouse, application data warehouse and resource data warehouse. The structural framework of Internet distance education platform is as Fig. 3.

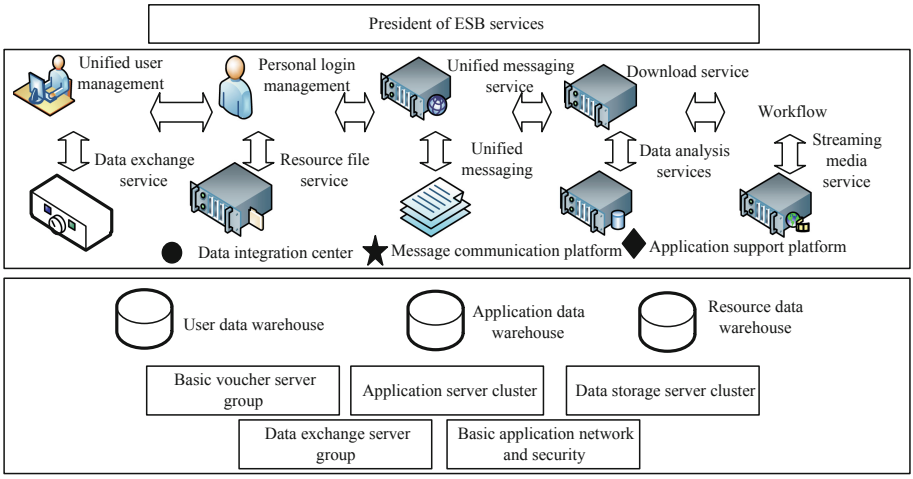

Fig. 3. Structure framework of internet distance education platform

In Fig. 3, add educational information query module, mobile microblog module and database module in the platform to facilitate the management of teachers, and form the whole Internet distance education platform.

2.2 Function Optimization of Mobile Internet Distance Education Teaching Platform

In order to ensure the quality of teaching, this paper further describes the functional modules, contents and user objects of the Internet distance education platform as Table 1.

Table 1. Function modules and objects of internet distance education platform

Functional module	Content	User object
Mobile learning course	1. Select courses by major: check the course introduction, key and difficult points, course specific content and review guidance	Learner
	2. Deal with students' course selection, add and modify course introduction, key and difficult points, course specific content and review guidance	Teacher
	3. Delete and modify the course introduction, key and difficult points, specific contents and review guidance	Administrators
Mobile classroom test	1. Select test course, grade test, check answers and evaluation	Learner
	2. Write test content and view student test statistics	Teacher

According to Table 1, the construction goal of the Internet distance education platform is to build a comprehensive information platform, which can centrally manage the people, money and materials in the Open University. Through a series of information application platforms, it supports the school's teaching, management, service and other activities, so as to realize the goal of "everyone can register, learn and test all the time and everywhere" proposed by the Open University [9]. The construction of network platform should be "unified standards, data concentration, application integration, hardware cluster", integrate and optimize the educational resources, and build an open university education platform with the goal of unified user management, unified authority control, unified resource sharing service, and personalized information service. The network platform should realize educational informationization, scientific decision-making and standardized management. The network platform should build an advanced virtual open campus, provide all kinds of resources and services for all kinds of learning users, provide all kinds of teaching, scientific research, learning and other interactive activities for educators and the educated, and improve the level of running a school and the quality of Teaching [10]. Through the mobile learning network platform, educational administrators at all levels can grasp the status of schools, enrollment, teachers, examinations and graduation in real time. Through standardized management, they can provide support for decision-making and ensure the teaching quality of open education. The construction goal of Internet distance education platform is as Table 2.

Table 2. Construction objectives of internet distance education platform

Integrated information platform	
The construction goal of mobile learning system	Everyone can register, study and test all the time and everywhere
	Unified standard, data centralization, application integration, hardware cluster
	Unified user management, unified authority control, unified resource sharing service and personalized information service
	Educational informationization, scientific decision-making and standardized management

According to Table 2 the goal and content of constructing the Internet distance education platform, using the modern, holistic, platform and network thinking mode, and based on the digital transformation of the existing teaching resources, the platform of

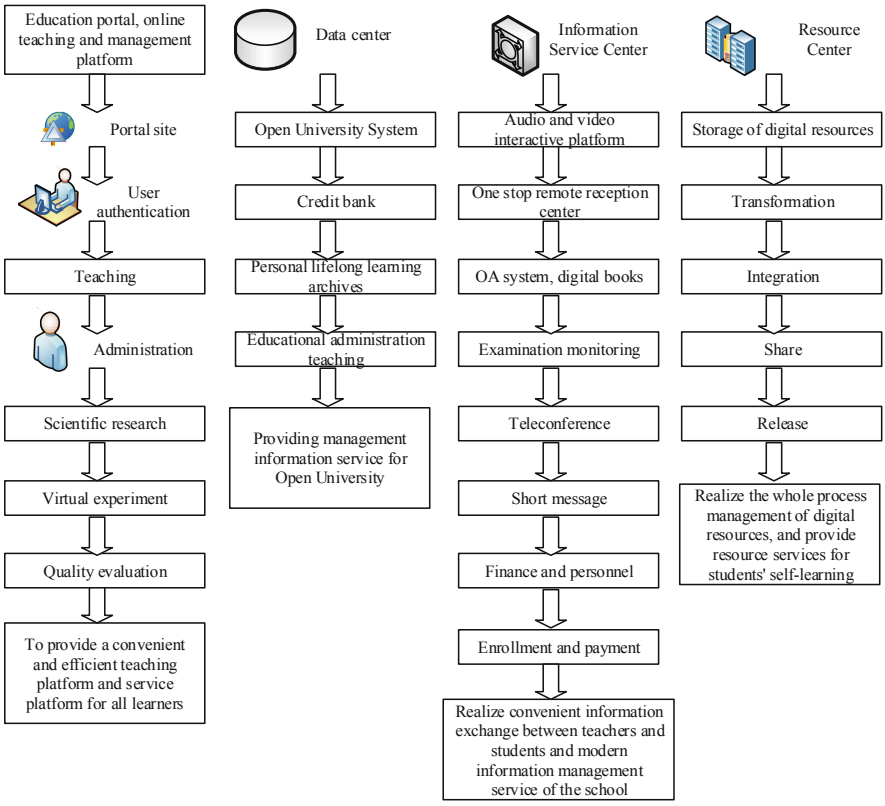

Fig. 4. Data management structure of mobile distance teaching platform

Internet distance education platform is gradually established by creating, introducing, developing and constructing teaching resources through multiple channels [11]. Through the construction of a portal platform and three centers, an information service system serving open education and lifelong education is built, and teaching resources are managed and optimized. Based on this, the data management function structure of mobile distance education platform is improved as Fig. 4.

As shown in the Fig. 4, through the mobile learning network platform, learners can learn from time to time, participate in online communication, manage personal information, meet the personalized requirements of different learners, and meet the learning needs of learners on the job, at school, at home anytime and anywhere [12]. Through the mobile learning network platform, teachers and educational administrators can carry out teaching research, teaching, educational administration management, examination evaluation management, financial charges, textbook subscription and other educational administration management. Through such a platform, teachers can timely understand students' learning situation, interactive communication and learning feedback needs.

2.3 Operation Method of Internet Distance Education Platform

Mobile learning network platform fully embodies the education concept of Open University, adapts to the trend of diversification and diversification, provides different forms, different levels and different types of education services for different learning subjects, and meets the learning needs of learners on the job, at school and at home anytime and anywhere. The Internet distance education platform adopts the service-oriented software architecture, realizes the service of the application platform and the integrated application among various services, quickly integrates the business application platform, and easily realizes the transformation of various functions [13]. The Internet Distance Education Platform relies on the rich educational resources in the existing distance higher education platform to complete its own educational functions, so the Internet distance education platform has the structure of general distance education websites, which inevitably shows the similarity and inheritance with general distance education websites. The structure and function framework of Internet distance education platform is as Fig. 5.

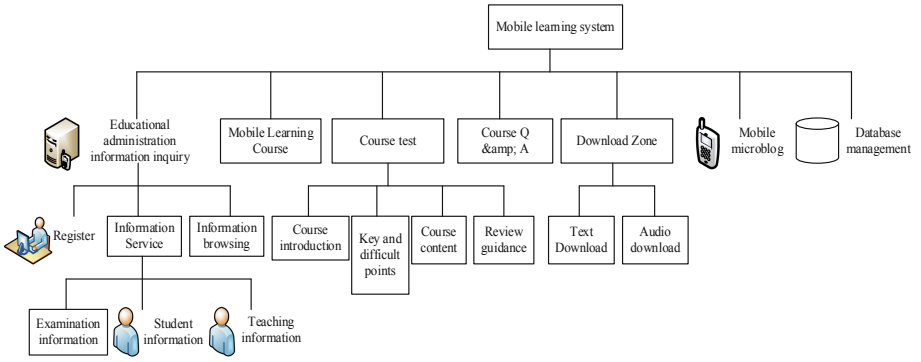

Fig. 5. Structure and function framework of internet distance education platform

In Fig. 5, in the framework of Internet distance education platform, learners can query information anytime and anywhere, use mobile phones to learn and test courses, ask questions online whenever they encounter problems, Download Text and audio courseware, listen to lectures anytime and anywhere, and communicate with other learners and express their opinions through mobile microblog. Teachers can carry out mobile teaching through the Internet distance education platform, answer questions online anytime and anywhere, view learners' self-test results online, communicate with learners, publish announcements and so on, so as to improve the practical application effect of education and teaching platform and better ensure the quality of teaching.

3 Analysis of Experimental Results

In order to ensure the rationality of the Internet distance teaching platform designed in this paper, the use process of the Internet distance teaching platform is simulated under the web network environment. Observe the use process of the platform, use SF test software to test the fluency of the platform, and use FPS index to measure the stability of the platform. The security level index is used to evaluate the security of the platform, the THU index is used to measure the operation effect of the platform, and the satisfaction index is used to evaluate the satisfaction of students and teachers to the platform. In order to ensure the validity and accuracy of the experimental verification, comparative test is used. Compare the traditional teaching platform with the internet teaching platform designed in this paper, analyze the experimental results and draw a conclusion. The experimental parameters are as Table 3.

Table 3. Experimental data

Number of tests	Types of uploaded data	Client call rate %
1	3.0	0.1
2	4.0	0.2
3	5.0	0.3
4	6.0	0.4
5	7.0	0.5
6	8.0	0.6

According to the experimental data in Table 3, using SF test software to load on the platform for use, the loaded SF software will not affect the normal use of the platform, and has little impact on its network data transmission. In order to ensure the accuracy of detection, this paper compares the traditional security evaluation methods of the information management and control platform with the research methods in this paper, and designs the operation evaluation parameters. The evaluation and record of information management and control platform running under different platforms are as Table 4.

Table 4. Comparison of platform operability evaluation

Data volume	Traditional method		Method of this paper	
	Information content	Safety degree	Information content	Safety degree
	500	74%	500	96%
2000	1600	68%	1600	95%
20000	17000	72%	17000	93%
50000	40000	65%	40000	91%

Analysis of Table 4 shows that when the negative average information is 40000, the average security level of the traditional method is 69.8%, and the average security level of this method is 93.8%. Therefore, the security level of text method is high, which can effectively improve the security of the platform. Further testing software uses FPS indicators to measure platform fluency, and thu parameters to measure platform operation effect. The FPS indicators and thu parameters of the Internet distance teaching platform designed in this paper from the perspective of industry education integration are compared, and the specific test results are as Fig. 6.

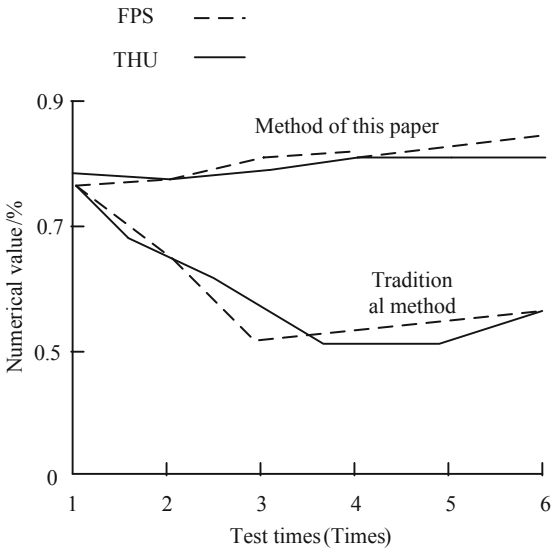

Fig. 6. SF parameter test results of internet distance learning platform

According to Fig. 6, the average values of FPs and THU parameters are 81% and 78% respectively, which can be maintained at more than 70% during operation, while the average values of FPS and THU parameters are 62% and 58% respectively. Which proves that the mobile Internet of things distance teaching platform in the perspective of industry education integration has good stability in the practical application process,

and can ensure the effect of multiple people using at the same time. The satisfaction of teachers and students in the process of using the platform is further investigated, and the statistical results are as Fig. 7.

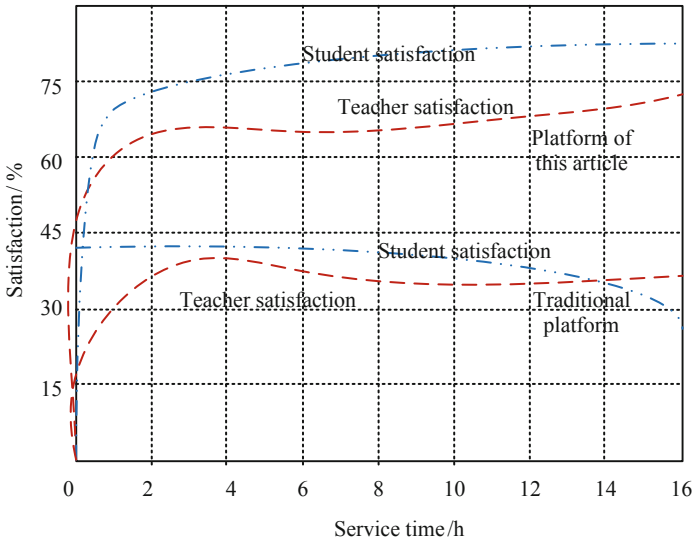

Fig. 7. Comparison results of platform use satisfaction

According to Fig. 7, when the service time is 16h, the average satisfaction of students and teachers in the traditional platform is 35% and 32% respectively, while the average satisfaction of students and teachers in this platform is 77% and 63% respectively. Therefore, in the actual use of the platform, the satisfaction of teachers and students is significantly higher than that of the traditional platform, which has a good use effect. To sum up, the Internet distance teaching platform designed in this paper can maintain a good running state in the network environment, and can maintain high fluency and upload efficiency. The satisfaction of teachers and students in the use process is also significantly higher than that of the traditional teaching platform, which proves that the platform has high use value.

4 Conclusion

In order to improve the use satisfaction and security of traditional education and teaching platform, and ensure the stability of operation, the mobile Internet Distance Education and teaching platform is constructed from the perspective of industry education integration. Through the construction of distance education teaching platform structure and distance education data processing platform framework, optimize the function of mobile Internet distance education teaching platform, realize the operation of mobile Internet distance education teaching platform. The experimental results show that:

(1) The average security level of the platform is 93.8%, which can effectively improve the security of the platform.
(2) The average values of FPS and THU parameters are 81% and 78% respectively, which proves that the distance teaching platform of mobile Internet of things has good stability in the practical application process and can ensure the effect of multiple people using at the same time.
(3) In this paper, the average satisfaction of students and teachers is 77% and 63% respectively. In practical use, it can effectively improve the satisfaction of teachers and students, and has a good effect.

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