

Research on Mobile Learning Platform Building Based on 4G Network Technology

Chenglin Huan

Abstract – Mobile learning is the development strategic objective of the international education in the 21st century. As the 4G launch and commercial, mobile learning ushers in the new development opportunity. Using 4G wireless communication network and mobile terminals, learners can get high quality learning video, do real-time voice and video interaction, and comprehensively manage learning. Based on these, Combination relevant elements of online learning, knowledge management and informal learning, such as community, sharing, interactive elements, the thesis constructs mobile learning platform based on 4G network technology.

Keywords – 4G Network Technology, Mobile Terminal, Mobile Learning, Learning Platform, System Architecture.

I. INTRODUCTION

At present, smart phones and the mobile terminal is a vast popularity, mobile learning becomes an important way of learning. In this context, the introduction and the popularization of 4G network technology will bring important influence on the development of mobile learning. 4G network technology provides a high-speed channel for mobile learning. Learners use mobile terminals supported 4G technology to access online learning resources and interact at anytime and anywhere. And mass video courses, fine courses and MOOCs are not restricted by the transmission rate [1]. It can be said that the 4G network technology provides us with more learning opportunities and new learning environment.

II. 4G NETWORK TECHNOLOGY OVERVIEW

4G is the fourth generation mobile network communication technology, integrating the third generation of network communication technology and the WLAN. It is the large capacity of high-speed cellular systems, and supports interactive multimedia services, high quality images, 3D animation and broadband Internet access [2]. 4G network technology has the following characteristics.

(1) High transmission speed. Comparing with 2 MBPS of the third generation mobile communication system data transmission rate, 4G technology can support 100 Mbps - 150 Mbps downstream network bandwidth, the descending speed of up to 12.5 Mbps - 12.5 megabits per second. High transmission speed makes it can use HD video, multimedia interactive business in mobile learning.

(2) Communication is more intelligent and flexible. Using the intelligent signal processing technology, 4G networks can distribute resources according to the data flow and channel changes in the environment adaptively. Not only can communicate anytime and anywhere, more can be

downloaded two-way transfer material, pictures, video, etc. Users can also extend application business through other network, and implement various functions by 4G terminal equipment[3].

(3) Good compatibility. 4G network implements communication under the variety network environment, to solve compatibility of three big mobile communication standards about CMDA, GSM and TDMA. It can march seamless connection in 3G, WLAN, and Internet.

(4) The communication quality. Although the 3G communication system can realize a variety of media communication, but communication quality is not high, stability is not strong. 4G networks have a wide network of spectrum, can much improve the quality of communication and fluent in multimedia transmission, and let users smoothly various online and download activities in real time.

(5) All the media communication. 2G and 3G network mainly solve the problem of some voices; also include some small amount of video. 4G network can high-speed process images, music, video and other media forms, and provides all media information services, including web browsing, telephone meetings, e-commerce, interactive video, etc.

III. 4G NETWORK TECHNOLOGY APPLICATION IN MOBILE LEARNING

4G network technology provides a high-speed channel and the popularity of intelligent terminal provides convenient learning tools for mobile learning. Mobile learning has the following form under 4G technical supports.

(1) Video courses learning based on 4G high quality video services. Compared with other forms of learning resources, video Integrates text, audio and video that it stimulates the learner's various senses to make complex knowledge become more image and intuitive. Based on the 4G technology providing the high quality of video service, students autonomously learn online HD-video courses by VOD, including teachers' teaching video, in view of the difficult point of teaching video clips, operation demo recording screen video, etc. And also watch live online video, through the lens with the teacher face to face[4].

(2) Based on 4G real-time voice and video communications learning interaction. Mobile learning way is mainly written communication before 4G popularity. Due to the limited text expression, it is not convenient to discuss some problems, and text communication is not convenient that it needs write through keyboard input. Communications by 4G technology can do non real-time voice-video communication activities by transmission

synchronous high quality voice and video to the server. Also can undertake real time audio communication between the two sides, even organize group discussion activities[5].

(3) Learning management based on 4G smart flexible communication. Than the traditional learning has teachers and administrators of regulation, mobile learning mostly belongs to the autonomous learning; learners must be self-management for learning behavior and learning outcomes. Intelligent flexible 4G communications not only is intelligent operation of terminal equipment, more important is powerful function. It can realize real-time management of learning activities under the support of the 4G network technology. Such as learning process planning, statistical analysis of learning behavior and learning effect of immediate evaluation, etc. About

knowledge management, it supports cloud storage base of the knowledge repository and terminal more collaborative of management tools, easy information storage, sharing, communication and retrieval of application and innovation[6].

IV. THE CONSTRUCTION OF MOBILE LEARNING PLATFORM

4.1 The General Architecture of Mobile Learning Platform

According to mobile learning supported by 4G technology, mobile learning platform architecture can be divided into the presentation layer, application logic layer and data layer [7]. The concrete is shown in figure 1.

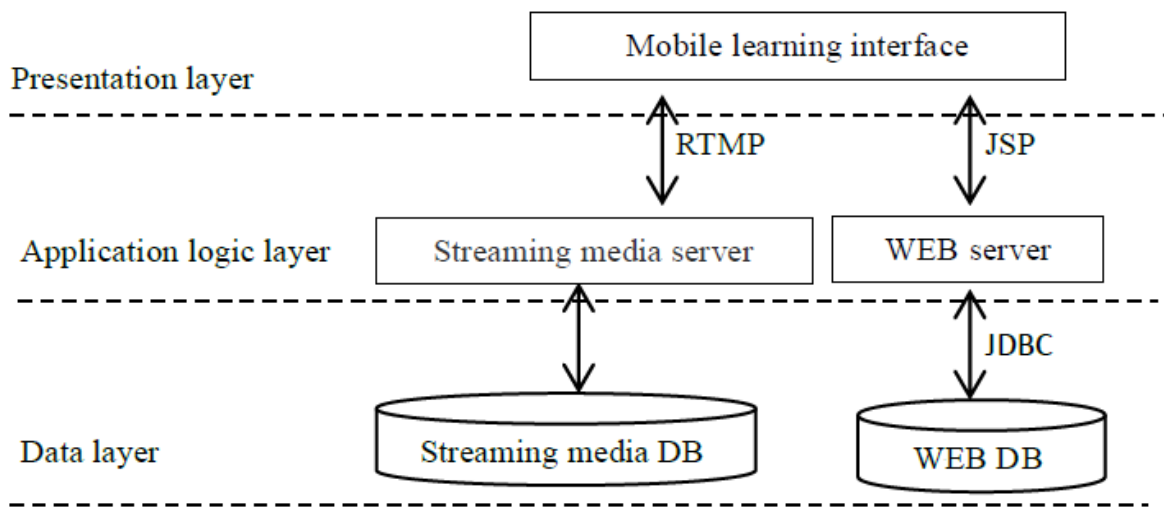


Fig.1. The general architecture of mobile learning platform

The presentation layer is the entrance to the user to access system, to provide the user login page, functionality, navigation, curriculum resource access page, etc. And provide an entrance for interaction and personal knowledge management.

Application logic layer includes server and background program, its function is the logical process of the system, data access and process control. To establish connection with streaming media server through the RTMP protocol, realize the video transmission function, but also for data exchange and data server.

The data layer is used to store data related system. Mainly includes the video courses and exams, job information, information interaction, and the related data of learner knowledge management.

4.2 System Function Building of Mobile Learning Platform

According to the general architecture of mobile learning platform, combining with formal learning, knowledge management, and some elements of informal learning, such as sharing, interactive and circle, the function of the mobile learning platform is divided into three parts, including learning center, interactive center, and personal center. The following is shown in figure 2.

4.2.1 Learning Center

Learning center is a major implementation to display course, select course, watch the micro-video learning, examine, etc. In the exhibition column area can view all course, and system will be pushed to show the most popular courses. After logging in, Learners can choose target course by direct search, or choice of courses independently by view the course introduces. Every course has profile, including course guideline, instructor, prepared knowledge, teaching plan and learning evaluation way. "My courses" records selected course. Here, learners complete the preparation for learning, and enter into the curriculum to learning by watching the video. "My test" provides support services to apply certificate of graduation or curriculum, including performance test, examination, etc.

4.2.2 Interaction Center

Interaction center mainly realizes information release, learning communication and resource sharing, and to build learning community [8]. Information announcement released mainly learning activities to remind, survey data feedback and other dynamic data. Study BBS corresponds to the corresponding courses, to provides learning support about academic exchange and management consulting

services. Accordingly, sets "consultation" and "learning" section, to provide consulting about tuition, homework,

test, application and answer some questions surrounding the course content.

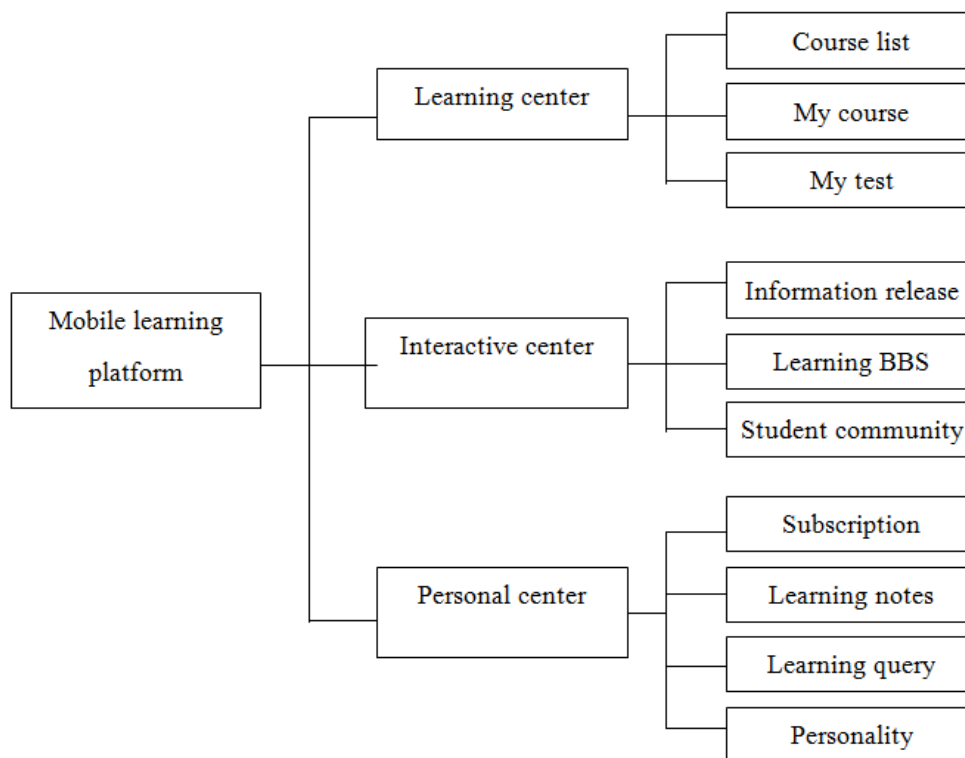


Fig.2. Mobile learning platform basic function

4.2.3 Personal Center

Personal center helps learners to achieve individualized learning management and personalized settings of the mobile platform. Learners can subscribe to your interested in content, timely grasp the content update and change of state. "Learning notes" meets learners to collect valuable information and writing learning log. "Learning situation query" records the learners' learning process, including online learning time, homework submitted and evaluation feedback, participation in the BBS discussion, learning assessment test scores, etc., lets the student a clear understanding about learning behavior and result, and provides support for timely adjustment of learning. "Personality" is mainly used in the version number information, video cache clearing, and selection whether or not notice of any messages sent; setting the background of the group chat, exit function. "Third party applications" mainly provides interfaces for the integration of third-party applications. It can be achieved across application jump function, meets the personal demand of students[9].

V. SUMMARY

The launch of the 4g network technology and commercial application meet the demand of communication, and also bring enormous opportunities for development of mobile learning. With some characteristics of high communication rate, intelligent flexible, and all the media support., 4G network technologies have made great breakthrough in following aspects, such as high-definition

video transmission, real-time speech video communication and comprehensive learning management. Based on these, the research builds a mobile learning platform supported by the 4g network technical. Its main function is divided into three parts, including learning center, interactive and personal center. Learning platform with functional maturation will provide learners with a looser, free, flexible and diverse learning environment.

REFERENCES

- [1] LIU Yating, "The Current Status and Prospect of Mobile Network 4G," Computer Knowledge and Technology, vol.7, Jul.2014, pp. 4682-4683.
- [2] Wikipedia, "4G," 4.2015. [Online].Available: <http://en.wikipedia.org/wiki/4G>.
- [3] Yang Qiang, "Learning Platform Construction for Distance Education with 4G Network Technology," Software Guide, vol.5, Apr.2014, pp.125-127.
- [4] Lin Hanhui, "Mobile learning based on 4G," Fu Jian computer, vol.4, Feb.2014, pp. 75-76.
- [5] Liu Fukui, Yang Gaixue, "Mobile learning system based on WAP technology application," Modern Distance Education Research, vol.101, Apr.2009, pp.62-66
- [6] Huang Jianjun, Zhang Lu, "Mobile learning application environment building research," Electrochemical education research, vol.243, Jul.2013, pp:59-63
- [7] Dang Xiaochao, Hao Zhanjun, "Research on Mobile learning platform building based on GSMModem," E-Educaiton research, vol.6, Apr.2010, pp. 94-97.
- [8] Huang JJS, Yang SJH, Huang YM, Hsiao IYT, "Social Learning Net-works: Build Mobile Learning Networks Based on Collaborative Services," Educational Technology & Society, vol.5, Aug.2010, pp. 78-92.

- [9] Hang Guozhu, "4g mobile education under the network application research," Computer Knowledge and Technology, vol.10, Oct.2014, pp.6894-6895.

AUTHOR'S PROFILE



Chenglin Huan

Born in Shiyan city, Hubei province, china in 1978. Educational background: Majored in educational technology of Education College of Hubei University (1999-2003), and earned bachelor's degree. During 2007-2010, majored in educational technology of Mathematics & Science College of Shanghai Normal University, and earned master's degree.

He works at College of computer science in Yangtze University. Major Field of study are modern distance education technology and e-learning in the enterprise.

Huan Chenglin, College of computer science, Yangtze University, No.1 Nanhuan Road, Jingzhou, China