Design and Implementation of Road Transportation Vocational Skills Service System Based on Mobile Internet

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Abstract. In recent years, with the rapid development of the road transportation industry, the number of road transportation employees has increased sharply. With the concerted promotion of all parties, the safety level of the road transportation industry has been gradually improved, but there are still many potential safety hazards. In order to improve the skill level of employees in the road transportation industry and promote the online vocational skills training of employees in the road transportation industry, starting from the job characteristics and functional requirements of employees in the road transportation industry, this paper designs and implements a road transportation vocational skills service system based on mobile Internet. Based on the jQuery framework, the functions of the system are quickly implemented by using PHP language and other advanced technologies. The system includes PC terminal and mobile terminal, which is convenient for employees in the road transportation industry to study in their spare time at any time. The video course adopts the form of short video, combines theory with examples to facilitate users' understanding, and has achieved good application results. This paper also studies the learning time period of the personnel of automobile inspection institutions in the road transportation industry after the system is put into online application, so as to further optimize the relevant functions of the new curriculum.

Keywords: Mobile Internet · Road Transportation · Vocational skills · Online Learning

1 Introduction

In recent years, the safety level of road transportation industry has been gradually improved, but there are still many hidden dangers. For example, the managers of road transport enterprises are not familiar with the relevant laws and regulations of road transportation, and pay little attention to the continuing education of drivers. The training organized by safety managers of road transport enterprises is not targeted and the effect is poor. The quality of road transport drivers is uneven The driving operation is

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not standard and there are many bad habits. Compared with the vocational skills continuing education in Europe and the United States, there is still a certain gap in system and practice in China, and there is still a certain room for improvement. The grass-roots management departments of road transportation also need to improve the professional quality of employees in road transportation industry through an effective way.

Starting from the job characteristics and functional requirements of employees in the road transportation industry, this paper designs and implements a road transportation vocational skill service system based on mobile Internet, which aims to improve the skill level of employees in the road transportation industry and promote the online vocational skill training of employees in the road transportation industry, It also studies the learning time period of personnel in automobile testing institutions in road transportation industry. Based on the jQuery framework, the functions of the system are quickly implemented by using PHP language and other advanced technologies. The system includes PC terminal and mobile terminal, which is convenient for employees in the road transportation industry to study in their spare time at any time. The video course adopts the form of short video, combines theory with examples to facilitate users' understanding, and has achieved good application results.

2 System Requirement Analysis

2.1 Scientific Classification

The number of employees in the road transportation industry is huge, and the knowledge and skills that people in different positions need to master are different. Therefore, it is very important to classify courses and users scientifically. Through the investigation of the road transportation industry, we have carried on the thorough analysis to the system demand, has carried on the scientific classification to the curriculum, the training and the system use organization. Among them, the courses include policies and regulations, standard services, driving skills, emergency response and rescue, and industry services; the training includes four categories: professional qualification training, pre job

Table 1. System related classification properties.

Serial number	Attribute	Content
1	Course classification	Policies and regulations, standard services, driving skills, emergency response and rescue, industry services
2	Training classification	Professional qualification training, pre job training, safety training, continuing education and training
3	Organization classification	Road transport enterprises, automobile production enterprises, vehicle testing institutions, road transport management institutions, emergency rescue enterprises

training, safety training and continuing education; the users of the system include road transport enterprises, automobile production enterprises, automobile testing institutions, road transport management institutions and emergency rescue enterprises. The details are shown in Table 1.

Because of different positions in different institutions, the courses that all kinds of personnel need to learn are also different. Therefore, this paper classifies the target users, is shown in Table 2.

Table 2. System target user classification.

Serial number	Organization classification	User classification
1	Road transport enterprises	Highway passenger transport driver, ordinary freight driver, dangerous freight driver, bus driver, escort, loading and unloading administrator, coach, enterprise leader, safety administrator
2	Automobile manufacturers	Production management personnel, R & D personnel, vehicle type declaration personnel
3	Vehicle inspection organization	Testing management personnel, testing personnel and drivers
4	Road transport management organization	Vehicle management, transportation management, maintenance management
5	Emergency and rescue Enterprises	Maintenance personnel, rescue personnel, management personnel, operators

2.2 Curriculum Design

In order to improve the effect of online learning course, the course has been made scientifically. The popular short video form is used to deepen the learning impression by combining theory with examples. In the system, users should be able to view their own learning progress at any time. For the ranking of learning duration in the organization, they can directly view it to improve their learning enthusiasm.

3 System Design

3.1 System Architecture Design

(1) System technical architecture

The technical architecture of the system is shown in Fig. 1, which is composed of infrastructure layer, data acquisition and transmission layer, data layer, application layer

and user layer from bottom to top, as well as information standard specification system, information security guarantee system and information operation and maintenance guarantee system.

The infrastructure layer mainly includes server, storage, operating system, network. The data layer stores all kinds of user information, course information and various documents generated by the system; the application layer includes all kinds of users of the system. The gateway layer is in the way of unified access, flow control, protocol adaptation and other operations to facilitate the call of internal services, current limiting and security. The application layer includes the system PC end and system app end. The user layer is the information exchange channel between the application system and users. The users of the system include various users in road transportation enterprises, automobile production enterprises, automobile detection institutions, road transport management organizations and emergency rescue enterprises, as shown in Table 2.

There are three guarantee systems: the information standard specification system includes the relevant national technical standards that should be observed at all levels in the system implementation. The information security guarantee system provides security support for the system, mainly based on the strict security management system and security technical specifications, to implement the security protection of all levels of the system; the operation and maintenance management guarantee system is the stable and continuous development of the system achievements The important guarantee of the exhibition is to ensure the long-term stable operation and sustainable development of the road transportation vocational skills service system.

The system technical architecture based on mobile Internet is shown in Fig. 1.

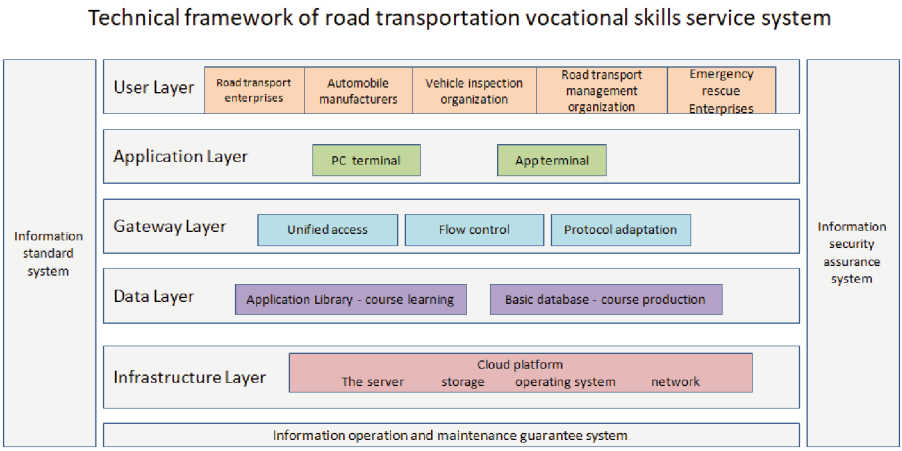

Fig. 1. System technical architecture.

3.2 System Function Design

The system includes PC terminal and app terminal, and the functions are basically the same. The app terminal is designed to be more convenient for users to operate mobile phone based on smart phone. After the organization has completed the registration, the personnel of each post in the organization can log in the system and study the course. Among them, the PC terminal of the system includes the functions of knowledge base, my course, about us and personal center; the app terminal of the system includes home page, knowledge base, learning and my functions. After logging in the system, users can learn post related knowledge and select their favorite courses according to the course classification index. In the system knowledge base, all courses in the current system will be displayed. Under each course classification, the video courses will be sorted according to the learning times of all users. At the same time, each course will show the number of people who are studying. After logging into the system, users can edit their own position information in the "personal center" module, which is convenient for the system to push relevant courses according to their positions. In the "my courses" module, users can learn courses, and can view their learning progress and learning duration ranking in the organization at any time. In the "about us" module, the introduction and contact information of technical support units will be given. If users have any questions, they can leave a message to communicate at any time. The functional architecture design is shown in Fig. 2.

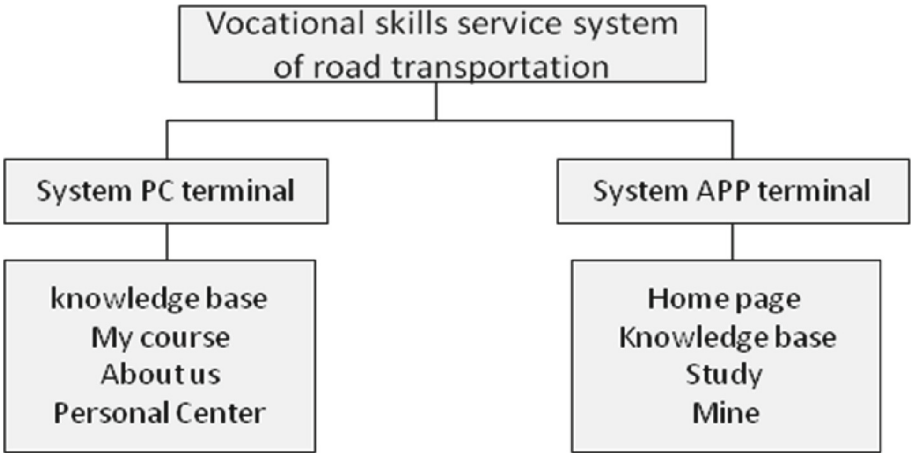

Fig. 2. System function design diagram.

4 System Design System Development and Implementation

4.1 System PC Terminal

The PC terminal of the system is developed based on jQuery framework. The main programming languages are PHP and JavaScript. The CodeIgniter framework is used to implement the multi-dimensional management of courses, and NoSQL and Memcache are used as data storage.

JQuery framework [1–5] is a lightweight JavaScript framework, which greatly simplifies the JavaScript programming, and can efficiently and quickly carry out the front-end system development work. JQuery provides a powerful element selector for getting jQuery objects that encapsulate HTML elements in HTML pages, such as basic selector, hierarchy selector, filter selector and form selector. At the same time, jQuery has built-in some simple and useful built-in animations. It also supports the use of animation based on positioning mechanism to customize animation effects, which provides a lot of convenience for displaying a large number of learning videos in this system. PHP language [6–8] has high development efficiency, supports object-oriented, has good cross platform, can well meet the needs of system development and construction, can well meet the technical requirements of the system in this paper.

4.2 System APP Terminal

The app terminal of the system is developed based on Android architecture. The main programming languages are Java and fluent. The browser with WebKit core is built in. It supports HTML5 web standard, opengles2.0 and lightweight SQLite database.

Java language [9] is a pure object-oriented language with platform independence, good security and robustness. At the same time, Java itself provides a lot of built-in class libraries, which simplifies the programming work of developers and shortens the project development time. Flutter language [10, 11] has a good performance and cross platform language. Together with Java language, it is used as the development language of system app end, which improves the system performance and shortens the development cycle.

4.3 System Deployment

The software system is deployed on two servers on cloud, one as a database server and the other as an application server, which runs well as a whole. The configuration of cloud server is: CPU 4 cores, memory 16 g, operating system Cent OS 7.664 bits, bandwidth 10 Mbps. At the same time, cloud security products such as web application firewall, situation awareness, and knight are configured to ensure the data security of the system.

5 Research on System Application Data

Since the system was put into operation, 999 users have been put into use. After a one-week study period for 100 users of automobile testing institutions, it is found that the number of users who log in to the system on Tuesday is the most; Compared with each

time period of the same working day, the number of users who log in to the system from 9:00 to 10:00 in the morning is the largest, followed by 10:00–11:00 in the morning and 16:00–17:00 in the afternoon. The above data show that users of testing institutions have a strong willingness to learn on Tuesday. In each working day, the willingness to learn in the morning is higher than that in the afternoon. Subsequently, we will continue to analyze a large number of data (Table 3).

Table 3. Number of learners of users of automobile testing institutions in each period

Learning period	Monday	Tuesday	Wednesday	Thursday	Friday
09:00–10:00	12	55	42	25	21
10:00–11:00	11	11	15	5	10
11:00–12:00	5	1	6	2	4
12:00–13:00	6	7	5	2	7
13:00–14:00	23	16	3	4	4
14:00–15:00	5	13	9	8	4
15:00–16:00	7	17	8	1	2
16:00–17:00	24	7	11	3	7
17:00–18:00	6	11	5	1	0

6 Concluding Remarks

Based on the full analysis of user function requirements, this paper designs a road transportation vocational skill service system based on mobile Internet, and implements the functions of the system quickly and comprehensively by using advanced technologies such as PHP language based on jQuery framework. The system includes PC terminal and mobile terminal, which is convenient for users to use their spare time for online learning and improve their skills at any time. The video course adopts the form of short video, combines theory with examples to facilitate users' understanding, and has achieved good promotion results. The road transportation vocational skills service system has been put into use, which has effectively promoted the improvement of the skills of employees in the road transportation industry, made them better understand the standards, specifications, policies and regulations, and improved the safety level of the industry. This paper also studies the number of users of vehicle inspection institutions in the road transportation industry in different learning periods after the system is online, so as to further optimize the online related functions of the new course.

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