Retraction

Retracted: Design of English Mobile Learning Platform Based on GSM-R Wireless Network Communication System

International Journal of Antennas and Propagation

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] X. Liu and H. Liu, "Design of English Mobile Learning Platform Based on GSM-R Wireless Network Communication System," *International Journal of Antennas and Propagation*, vol. 2021, Article ID 9944169, 9 pages, 2021.

Research Article

Design of English Mobile Learning Platform Based on GSM-R Wireless Network Communication System

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Because the traditional English mobile learning platform has low student satisfaction and a long learning time, an English mobile learning platform based on the GSM-R wireless network communication system is designed. A GSM-R wireless network communication system is built through existing facilities, new facilities, and business-side facilities. Platform function modules are designed based on the communication system, including course resource management module, online examination management module, online Q&A management module, platform management module, and user login. Based on this module, the platform software is designed according to the three steps of database design, platform encryption technology, and learning recommendation algorithm to create the English mobile learning platform. The simulation experiment results show that the application of the designed platform can improve student satisfaction and improve student learning efficiency.

1. Introduction

English is one of the most common languages in the world. Learning English well will help us communicate and cooperate with foreigners. Moreover, since China's entry into the WTO, various fields have been continuously in line with the world, and the foreign language ability requirements of talents will become higher and higher in the future. Therefore, it is of great significance to offer college English courses in colleges and universities. However, there are various problems in college English teaching at present, and the overall effect is not satisfactory. To a large extent, the teaching process is still the three centers of "class," "teacher," and "books," basically in "teaching—accept the one-way transmission status." In addition, although college English is taught in small classes, there are still dozens of students in each class, who raise a series of problems. Students with good foundation hope that teachers can add extra learning content in the classroom, and the pace is fast point, and the students with poor foundation hope that the teacher will speak more basic knowledge in the classroom, and the pace will be slower [1]. In addition, the English learning needs of college students are also different (such as some like reading, some like writing, some like listening, and some like speaking), so different college students hope that teachers will explain the knowledge points in class. It can be seen that unified teaching content can no longer meet the different needs of college students, and it is impossible to teach students in accordance with their aptitude. In addition, students hope that they can get guidance and help from teachers in time when they encounter problems in the learning process and also hope that they can contact teachers anytime and anywhere to obtain learning information on weekends and holidays. The problems mentioned above all pose a huge challenge to the traditional teaching mode of college English. The traditional teaching mode has gradually failed to meet the daily teaching requirements. College English needs a new learning method to cultivate students' relearning ability. Students' individual learning needs should be met, information literacy should be improved, teacher-student relationships should be improved, and teaching effects should be optimized [2].

Use the computer and classroom-based English teaching mode to improve the single teaching mode that focuses on teachers' lectures. The new teaching model should be supported by modern information technology, especially network technology, so that the teaching and learning of English can be developed in the direction of individualization and independent learning without being restricted by time and place to a certain extent. As an emerging online learning model, mobile learning is an informal learning. It can be combined with formal learning, that is, classroom teaching, to meet the English learning needs of college students. Therefore, the mobile learning platform of Big English has practical significance [3]. Literature [4] designed an English learning platform based on web technology and mobile terminals. This platform further expanded and improved college English textbooks. Students' learning is no longer restricted by location and time, and students have greater choice. A more superior learning environment has helped students obtain more and more learning opportunities. In terms of media selection, they have met their needs for effectiveness and individualization. The three basic frameworks of the software platform are the user layer, resource layer, and system layer. They explain the platform design process and finally research and learn platform resources in different ways. However, student satisfaction on this platform is low. Literature [5] designed an Android-based mobile learning platform for college English. According to the characteristics of Android applications, platform development principles and platform-related design requirements, starting from the overall platform architecture, login management module, learning module, video module, vocabulary learning module, etc., specific design discussions are carried out, and finally from the mobile learning based on Android University English, the platform's video playback and video learning processes are analyzed. The authors of [6] designed a mobile grammar learning platform based on the Android platform. When designing, based on software engineering theory for demand analysis, it includes grammatical content release, grammatical content management, data analysis, audio and video management, and platform management, which are the five levels of functional modules, to ensure the completeness of the platform functions. Through in-depth research on the Android operating mechanism, the article determines the platform architecture of the Model-ViewerPresenter (MVP), reducing platform coupling by 70% and improving operational stability by 29%. The database design of the platform is based on the SQLite lightweight database embedded in the Android ecosystem, which guarantees the access efficiency of the platform data model under the premise of meeting the storage overhead of the platform. From the perspective of English vocabulary deep learning, the study of [7] investigates the main mobile vocabulary learning in functional architecture and its advantages and disadvantages in promoting English vocabulary and designs and develops a mobile platform-oriented English vocabulary deep learning system. The purpose of the study of [8] is to analyze student supporting and inhibiting factors, the

effectiveness of m-learning, and preventing the spread and impact of COVID-19.

However, the English mobile learning on the above two platforms takes a long time, which reduces students' learning efficiency in learning English. Aiming at the problems of the abovementioned platforms, this paper designs an English mobile learning platform based on the GSM-R wireless network communication system, verifies the effectiveness of the platform designed in this paper through simulation experiments, and provides convenient services for students' English learning.

2. GSM-R Wireless Network Communication System

2.1. System Composition. According to requirements, the system includes equipment and network parts, which can be divided into 3 areas: existing facilities, new facilities, and business-side facilities as shown in Figure 1.

Existing facilities include existing base stations, core networks, access routing, and other existing GSM-R infrastructures of the railway GSM-R network. These existing facilities are the foundation for the construction of this system and the origin of all English mobile learning services.

Newly built facilities include newly built facilities are important for providing users with controllable GSM-R network access capabilities. The objectives and main content of this system include modules, security servers, and authentication servers [9].

Business-side facilities: business-side facilities are facilities that use English mobile learning content, including terminals and business servers.

2.2. Way of Communication. As shown in Figure 2, the terminal equipment and the service platform are located on the user side, and the secure channel provides a safe and reliable communication method for the user.

Module: connect and communicate with terminal equipment through pins to provide terminal equipment with GSM-R network access capability. By establishing an encrypted channel based on the national secret algorithm and the security server, safe and reliable transmission of English mobile learning data is ensured [10].

Security service: a secure channel is established between encryption technology and the built-in security client of the module to ensure data security. The proxy gateway provides transparent communication services from the platform to the module for access to the management platform.

Access management platform: through the security service through proxy gateway or transparent transmission, communication with the module is realized. The access management platform provides terminal learning management and control services, student learning behavior analysis, and course business release. It enables communication with the business platform through the SDK or interface released to provide business services [11]. A schematic diagram of communication mode is shown in Figure 2.
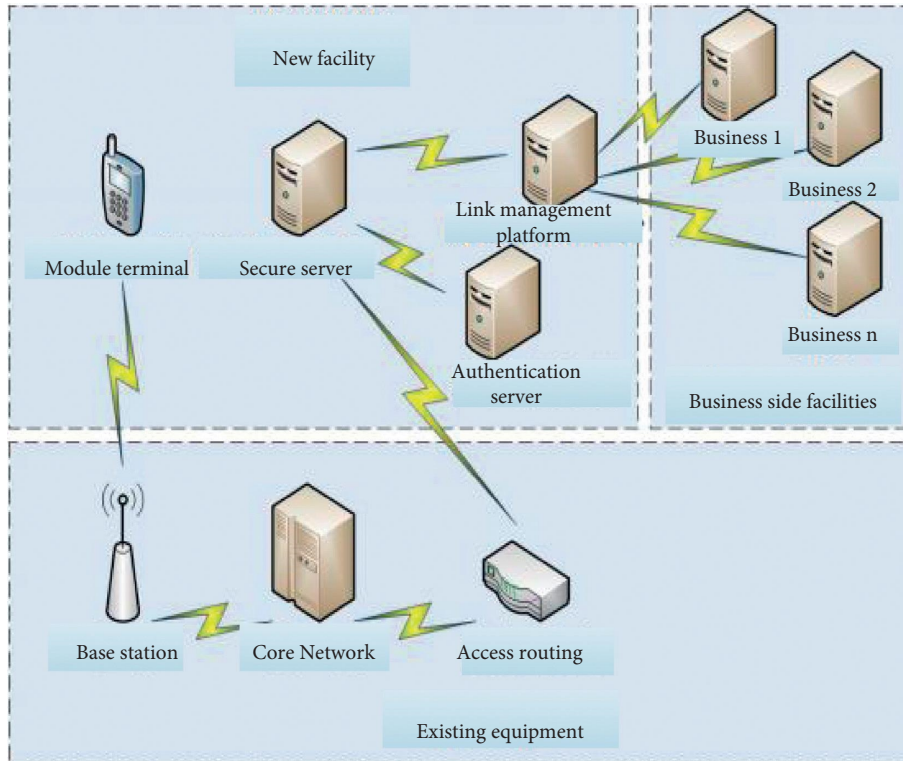
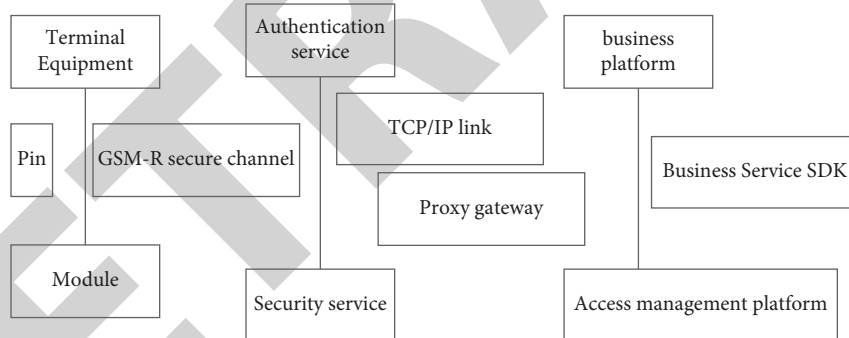Figure 1: GSM-R wireless network communication system composition.

Figure 2: Schematic diagram of the communication mode.

3. English Mobile Learning Platform Design

3.1. Functional Module Design

3.1.1. Course Resource Management Module. The English mobile learning course resource management module is a functional management module, which mainly includes relevant teaching materials and courseware for teachers. Students can view the course resource information uploaded by the teacher through the English mobile learning platform. It has the function of online learning. Figure 3 shows the flow chart of the course resource management module of the mobile learning platform.

3.1.2. Online Exam Management Module. Teachers can use the online test management module in the English mobile learning platform to inspect students' learning conditions

and evaluate students' autonomous learning conditions through the online test mode. The test papers used in the online test process are all issued by the teacher. According to the course of study, select the corresponding test paper in the English mobile learning platform. After the paper is handed in within the specified time, the system will score according to the correct answers and display the scoring results on the display interface. The workflow of the online exam management module in the English mobile learning platform is shown in Figure 4.

3.1.3. Online Q&A Management Module. The main function of the online Q&A management module is to provide a communication platform for teachers and students in the English mobile learning platform. In the English mobile learning platform, students can ask the teacher the questions
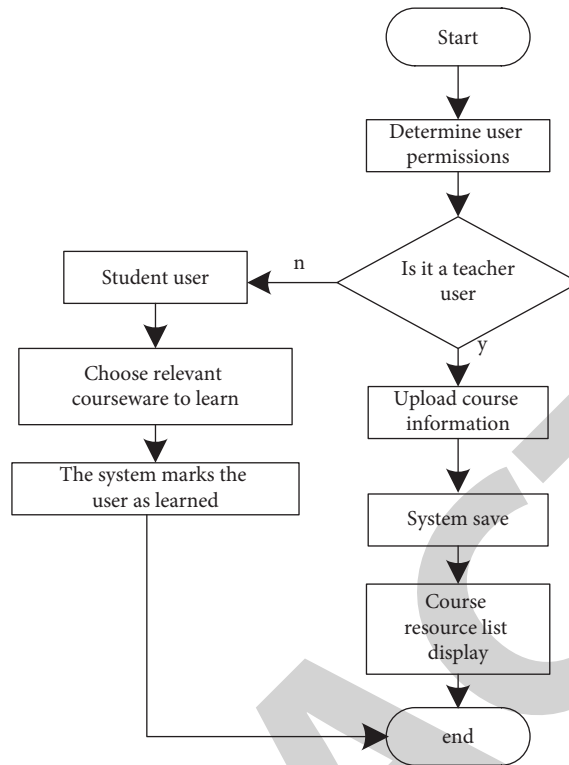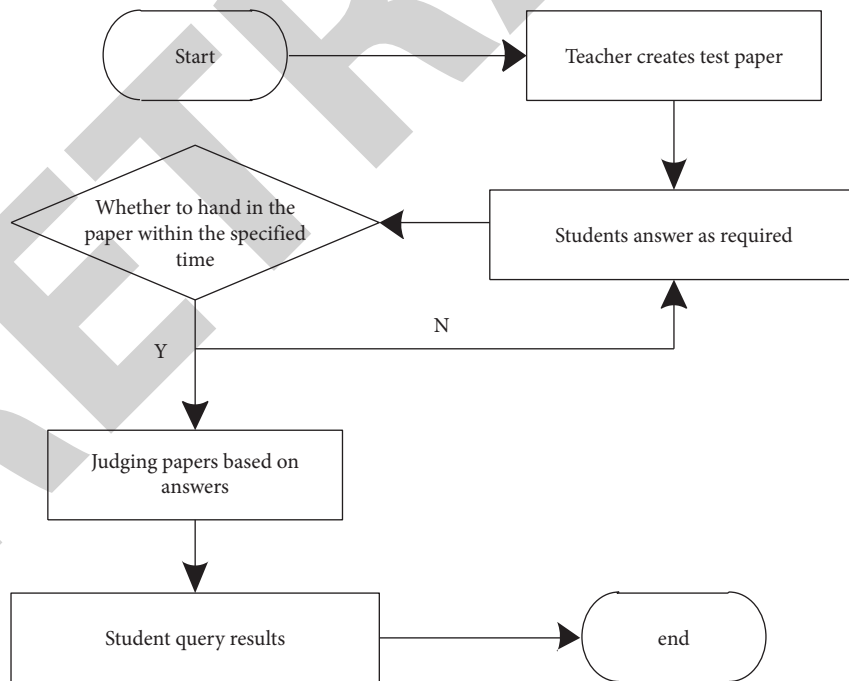
FIGURE 3: Course resource management process.

FIGURE 4: Online test process.

they do not know during the online learning process, and the teacher can use the online Q&A module. For students to answer, the workflow is shown in Figure 5.

3.1.4. Platform Management Module. The platform administrator manages the English remote self-learning system through the platform management module. In the platform
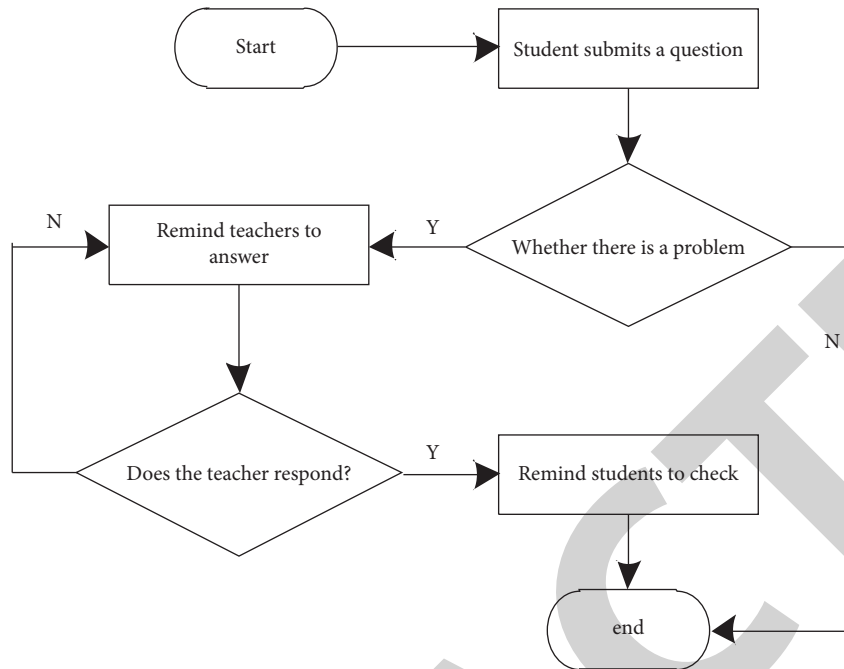
FIGURE 5: Online Q and A management module.

management module, the administrator first needs to determine the user's corresponding authority. According to the English mobile learning platform's functional module design and demand analysis, log in to the administrator account [12]. The workflow of the platform management module in the English mobile learning platform is shown in Figure 6.
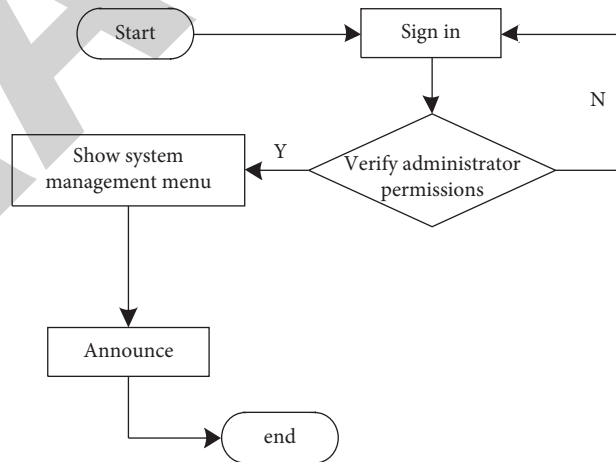
3.1.5. User Login Module. The user login system is the prerequisite for realizing various functional operations, so the basis for operating various functional modules is the user login system. Designing the user login module in the English mobile learning platform mainly includes password verification and user account verification. The main target of the English mobile learning platform is students and teachers, but the login process of students and teachers is the same when logging on to the English mobile learning platform [13]. According to the characteristics of ordinary software passwords and account authentication, combined with the actual situation of the English mobile learning platform, the work flow chart is shown in Figure 7.

3.2. Platform Software Design. Through the GSM-R wireless network communication system constructed above, the platform function module is designed according to the course resource management module, online examination management module, online Q&A management module, platform management module, and user login module [14].

3.2.1. Database Design. The user management function is the most basic function of each online English mobile learning platform. Its main purpose is to manage all

FIGURE 6: System management process.

registered personnel who use this website, confirm user roles, assign corresponding permissions, and effectively manage the entire online English teaching process from all aspects. The registered personnel include administrators, teachers, and students. The administrators can use all the functions of this website. The course administrator assigns the identities of teachers and students. Teachers have the authority to manage course content, monitor student learning, and judge student performance. Students can use any learning resources provided on the website for online learning activities [15]. In the platform of this article, the user data table format in the database is shown in Table 1:

Visitors must register as a user before performing various operations. Each visitor can create his own account in the English mobile learning platform and participate in online English courses. If the registered user does not
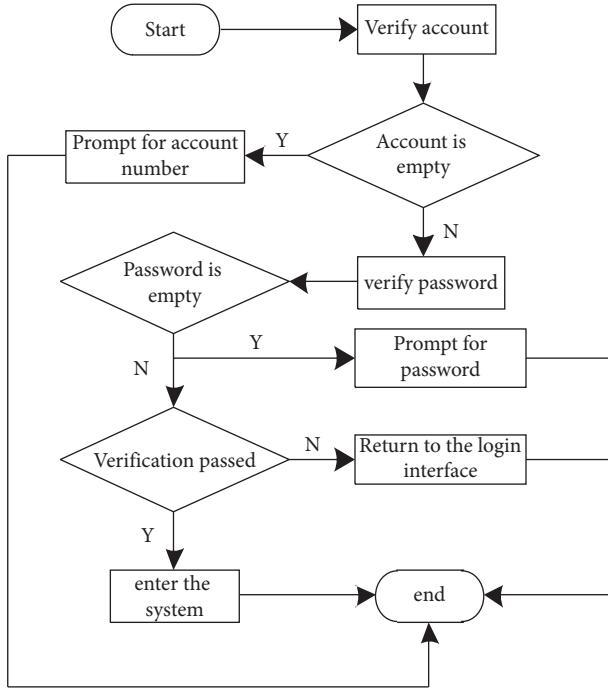
Figure 7: User login module.

Table 1: User data sheet.

Field name	Data type	Is it empty	Length
Number	Int	N	10
User name	Varchar	N	100
Use password	Varchar	N	32
Personal e-mail	Varchar	N	100
Name	Varchar	N	100
Surname	Varchar	N	100
City	Varchar	N	20
Country	Char	N	2
First login time	Int	N	10
Last login time	Int	N	10
Login IP address	Varchar	N	15
Modification time	Int	N	10

participate in activities for a period of time, the administrator will record [16]. This platform supports any electronic documents, PPT, flash animation, and video and sound files, and the platform administrator can upload files and manage files. The list of files uploaded by users and the operation of existing files are realized through directory functions and file system functions.

In addition to viewing and obtaining information related to directories in the resource management module of the database, we can also obtain information about files on the web server and interact with these files [17].

3.2.2. Platform Encryption Technology. In this English mobile learning platform, the encryption technology uses MD5 technology. The full name of MD5 is message-digest algorithm 5 (message-digest algorithm), and its function is

to enable large-capacity information to be "compressed" into a confidential format before signing the private key with digital signature software (that is, to put an arbitrary length, the byte string is transformed into a large integer of a certain length). The implementation process of the one-way MD5 encryption algorithm is to add the Security. cs class to the system card project and define the Security. Encrypt() method in the class. When we are registering a user, the Security. Encrypt (passtex. Text) method can be called in the Regist Click event to realize the encryption of the password, and finally, a fixed-length string is stored in the database.

The verification code is generated to prevent attackers from using harmful programs to register many web service accounts in vain and then use these accounts to create trouble for other users, such as sending spam or logging in multiple accounts at the same time slow down the service. The verification code technology is used to prevent users from using robots to register, log in, and fill water in vain. The so-called verification code generates a picture from a string of randomly generated numbers or symbols, adds some interfering pixels to the picture (to prevent OCR), and the user can visually recognize the verification code information, enter the form, and submit it to the website for verification. The verification is successful. Then, you can use a function.

3.2.3. Learning Recommendation Algorithm. Suppose U represents the user set; T represents the user resource tag set; and C represents the user access thing set.

Based on the user resource tag set T, count the number of times $T_{u,k}$ of each tag of user u and the total number of times in the English mobile learning platform. Let $\Phi_u(k)$ represent the feature vector corresponding to the state, and its calculation formula is as follows:

$$\Phi_u(k) = \frac{1 + x_{u,k}}{\sum_{s=1}^{M} 1 + x_{u,k}}. \tag{1}$$

In the formula, M represents the total number of users; $x_{u,k}$ describes the number of times the kth tag corresponding to user u existing in the English mobile learning platform.

Use a user resource tag set T to count the total number of resource tags appearing in the system, according to the statistics of the total number $\sum_{j=1}^{n} N_j$ of the tags appearing on the basis of the user u's visit collection, where N_j describes the total number of tags j appearing in the English mobile learning platform when user u_t is accessed by user u in the English mobile learning platform.

Sort the user u in the user-visited thing set C in the order of time from the nearest to the farthest, obtain the sorting result C'_u, set the time attenuation factor λ according to the empirical value, and set the initial function value to zero. The weight of each dimension of the user label vector and the initial user value function is set to zero.

The learning vector of the user u learns according to the sorting result C'_u, and the transition set of the resource a is obtained according to the resource a accessed by the user u at each moment $i + 1$. Let $\widehat{V}_{i+1}(s)$ represent the user value function, and its calculation formula is as follows:
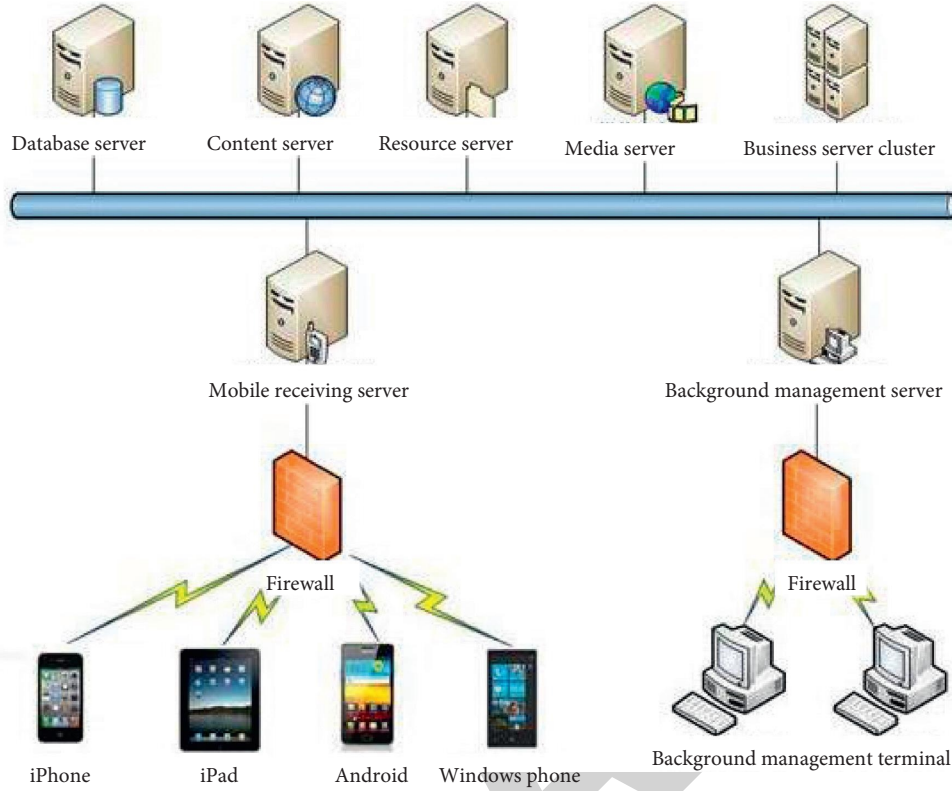
Figure 8: English mobile learning network terminal structure.

$$\widehat{V}_{i+1}(s) = W_i \Phi_u. \tag{2}$$

In the formula, W_i describes the corresponding weight of the k-th dimension label after processing the user's step $i + 1$ access to the data.

According to the calculation result of formula (2), the weight corresponding to the tag existing in resource a_t is updated by the following formula:

$$W_{i+1,k} = W_{i,k} + \alpha\lambda^{n-i}\frac{N_k}{\sum_{j=1}^{n} N_j} \cdot \left(R_{i+1} + \gamma\widehat{V}(s_{i+1}) - \widehat{V}(s_i)\right)\nabla\widehat{V}(s_i), \tag{3}$$

In the formula, $\widehat{V}(s_i)$ describes the actual state value function; α describes the parameters of convergence speed and control stability, that is, the convergence factor; and R_i describes the immediate reward value.

Simplify the resource set. When a resource appears in the historical access records of the user to be predicted, delete the resource, and use the remaining resources to form a candidate resource set.

For any candidate resource, the user scores its level, calculates the current need to predict the similarity between user s and user s_i that has visited, combined with the actual score obtained by user's nearest neighbor user's evaluation of the predicted resource, and scores $\mathrm{per}(s, a)$ for resource a. For prediction, the expression of $\mathrm{per}(s, a)$ is as follows:

$$\mathrm{per}(s, a) = \frac{1}{\sum_{i|a_i=a}\mathrm{sim}(s_i, s)}\sum_{i|a_i=a}\mathrm{sim}(s_i, s)R_i. \tag{4}$$

In the formula, $\mathrm{sim}(s_i, s)$ describes the similarity between user s and user s_i; $\sum_{i|a_i=a}\mathrm{sim}(s_i, s)$ describes the sum of similarity between user s who has visited resource a and the nearest neighbor user.

According to the calculation result of the recommendation score $\mathrm{per}(s, a)$, the resources existing in the candidate set are sorted to realize the recommendation of English mobile learning resources.

4. Simulation Experiment Analysis

In order to verify the performance of the English mobile learning platform based on the GSM-R wireless network communication system designed in this paper in practical applications, a simulation experiment is performed. The structure of the English mobile learning network terminal is shown in Figure 8.

Using the English mobile learning platform based on the GSM-R wireless network communication system designed in this paper, the English learning platform based on web technology and mobile terminal designed by literature [4] and the college English mobile learning platform based on Android designed by literature [5], a comparative analysis of student satisfaction is carried out, and the comparison result is shown in Figure 9.
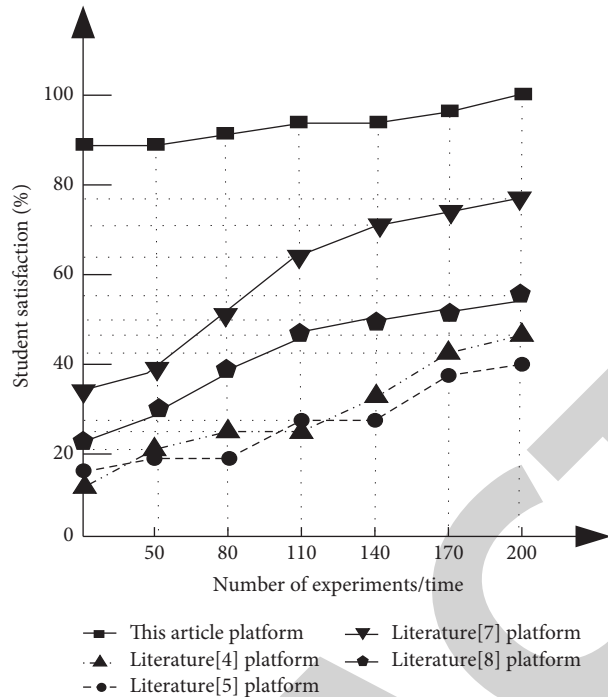
Figure 9: Comparison results of student satisfaction.

Table 2: Comparison results of students' study time.

Experiment times/time	Literature [4] platform	Literature [5] platform	Literature [7] platform	Literature [8] platform	This article platform
10	55.22	45.23	57.63	37.13	30.67
20	56.04	45.42	57.76	37.51	30.23
30	55.87	45.07	57.07	37.07	30.22
40	55.44	45.88	57.11	37.88	30.12
50	55.96	45.09	57.09	37.09	30.42
60	56.23	45.32	57.36	37.31	30.42
70	56.66	45.20	57.60	37.10	30.66
80	56.85	45.62	57.66	37.81	30.78
90	56.22	45.56	57.56	37.58	30.99
100	57.21	45.99	57.99	37.99	30.99

According to Figure 9, the student satisfaction of the English mobile learning platform based on the GSM-R wireless network communication system designed in this paper can reach up to 100%, which is better than the English learning platform and literature based on web technology and mobile terminals designed in the literature [4, 5]. The Android-based mobile learning platform for college English has high student satisfaction.

In order to further verify the effectiveness of the platform in this article, the English mobile learning platform based on the GSM-R wireless network communication system designed in this article, the English learning platform based on Web technology and mobile terminal designed by literature [4] and the English learning platform designed by literature [5], an Android-based mobile learning platform for college English, a comparative analysis of students' learning time, and the comparison results are shown in Table 2.

According to Table 2, the students' learning time of the English mobile learning platform based on the GSM-R wireless network communication system designed in this paper is about 30 min, which is lower than that of the English learning platform based on web technology and mobile terminal designed in document [4] and the College English mobile learning platform based on Android designed in document [5], which shows that the platform designed in this paper can improve students' learning efficiency.

5. Conclusion

Mobile learning is a means of learning in spare time. With the development of China's distance education and the rapid advancement of modern communication technology, mobile learning content and methods are becoming more and more abundant. From the initial way of learning by mailing teaching materials in correspondence teaching to now-

ubiquitous online teaching, the way of teaching has undergone tremendous changes. Therefore, designing a reasonable mobile learning platform can effectively make up for the singularity in traditional learning. Traditional education has shortcomings such as small scalability, fixed location, and poor flexibility. Breaking the time and space constraints of traditional education and allowing users to learn anytime and anywhere are the main research content of the moment. So, from this concept, the English mobile learning platform is a comprehensive platform that combines the embedded software design of the mobile platform, the design of the backend support system, wireless access and verification technology, and mobile interactive technology. This article designs an English mobile learning platform through the GSM-R wireless network communication system to improve students' English performance. Due to the defects of existing deep learning algorithms in time performance, this paper adopts the method based on similarity measure to make recommendations. But this method of experiment is not very accurate. Therefore, in the future work, we will combine deep learning methods to improve the system.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Disclosure

Part of the paper is mentioned in 7th EAI International Conference eLEOT 2021 Xinxiang China June 20-21, 2020, Proceedings Part I.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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