

Retraction

Retracted: An English Online Homework Tutoring System Supported by Internet Database

Journal of Mathematics

Received 30 January 2024; Accepted 30 January 2024; Published 31 January 2024

Copyright © 2024 Journal of Mathematics. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] H. Hao, "An English Online Homework Tutoring System Supported by Internet Database," *Journal of Mathematics*, vol. 2021, Article ID 5960185, 12 pages, 2021.

Research Article

An English Online Homework Tutoring System Supported by Internet Database

Huanxiang Hao 

School of International Education, Jiaying Nanyang Polytechnic Institute, Jiaying 314001, China

Correspondence should be addressed to Huanxiang Hao; 11603029@zju.edu.cn

Received 29 October 2021; Revised 23 November 2021; Accepted 24 November 2021; Published 14 December 2021

Academic Editor: Naeem Jan

Copyright © 2021 Huanxiang Hao. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

College English tutoring is an important content of current research, and how to provide more effective methods for teaching tutoring is currently a hot research topic. Therefore, this paper designs an Internet-based online tutoring platform for college English teaching, which is accelerated by using the K-means clustering algorithm. The data processing efficiency and processing methods to improve user satisfaction require more practical experience to summarize. In the business logic layer, the uploaded information is mined through the K-means clustering algorithm to form an online tutoring university English database to provide platform data support, realize the business logic judgment of the data, convert the data in the database, and return to the user interface of other formats, to provide users with browsing and consulting. In the data access layer, the data from the business logic layer is processed. After the processing is completed, data can be added, deleted, modified, and checked in the database. Finally, the operation result of the database is fed back to the business logic layer for processing. Experimental results show that the designed platform has good data mining performance, low connection speed and low response delay, good compatibility, low CPU usage, fast resource sharing speed, and high user satisfaction. It can be connected to different operating systems.

1. Introduction

In traditional English education, teachers are the source of knowledge, and students learn English by receiving the information provided by teachers. As a teaching recipient, students are only in a passive position to accept knowledge in English teaching, and their initiative cannot be fully mobilized. The quality of teaching is usually evaluated by students' English learning achievements, which leads to an overemphasis on scores and only paying attention to the education of a few top-notch students, which hurts the self-esteem of most students and ignores the development and cultivation of most students' abilities [1]. From this point of view, this is a great waste of educational resources and strangles students' personalities and creativity.

As early as the 19th century, Issac Pittman proposed the first generation of Network Teaching—correspondence education. With the rapid development of multimedia technology, multimedia classrooms have been widely established in many colleges and universities. Many courses

are carried out in multimedia classrooms. The teaching mode of English courses has changed from traditional classroom teaching to computer-aided teaching based on multimedia classrooms. In the process of English teaching, teachers use multimedia equipment to show students the English teaching content of pictures, texts, sounds, and images through multimedia courseware and other multimedia materials, so that students can be influenced by them and receive information in an all-round way, to achieve good English teaching effect. However, there are some shortcomings in this teaching mode: firstly, multimedia English teaching has a large amount of information dissemination, students have to listen carefully in class, many students do not have the habit of taking notes, and some students try to take notes but often cannot keep up with the progress of teachers' lectures, which is not conducive to students' self-study review after class. Secondly, by using multimedia English teaching, class teachers have to put the required teaching courseware and other materials on a mobile storage device, which is portable and very inconvenient. Thirdly,

there is no improvement in interaction with students [2–4]. In view of the above problems, some teachers make personal home pages to provide students with English learning materials after class, answer students' questions, and regularly update the content of personal home pages. Every time they update the home page's content, they must use HTML editing tools to modify the home page, which is very inconvenient.

In recent years, the rapid development of Internet technology has declared that human beings have entered the "information age." "Global village" has been accepted by most people. With the rapid development of multimedia technology and network technology, network learning has become possible. It breaks the boundaries of the traditional campus and can create a broader and diversified learning environment without time and space constraints. The network can make learners more actively participate in and enhance their interest in learning and achieve non-real-time teaching. Therefore, with the development of network technology, online teaching platforms based on the Internet are an effective auxiliary teaching tool and the best way to achieve information exchange and resource sharing. From this aspect, Luo Xian studied the university's SPOC-based public curriculum information teaching platform, and Jia et al. designed the Android-based physics mobile learning platform of the university, but they had obvious pertinence [5, 6]. Meanwhile, security and online communication are also important issues in the field of online teaching. Thus, we have to strictly protect data communication network maintenance and security management during online teaching to ensure that the learning platform is safe and efficient. In the face of the development of English education for online education, it is necessary to develop a more personalized online tutoring teaching platform for college English. With the help of the online tutoring teaching platform of college English, students can change their passive learning into active learning of English at any time in the network environment. In this platform, students are the center of teaching. Students carry out personalized learning so that teachers and students break through the limitations of time and place in the communication process. In the network English teaching, the contradiction between fewer class hours and a substantial increase in teaching information is well solved. The contradiction between a substantial increase in the number of students and few teaching staff members is solved. The online tutoring teaching platform of college English can cultivate students' ability to acquire knowledge by using the network and promote the cultivation of students' independent spirit and cooperative quality. Recently, mobile learning has grown in popularity and complexity with the proliferation of mobile devices and online video services [7]. New challenges include the multitude of mobile devices with different characteristics and limitations and the exponential growth in educational multimedia content. While several adaptive m-learning systems have been previously proposed, none of these has thoroughly addressed the adaptation of educational multimedia content. Moldovan and Muntean [8] propose the novel DQAMLearn framework to support mobile learners'

seamless access to educational multimedia content from various mobile devices with different characteristics. Meanwhile, mobile devices have become more affordable and powerful, and an increasing range of rich media applications could offer mobile users a highly realistic and immersive experience. However, this comes at the cost of very stringent Quality of Service (QoS) requirements, putting significant pressure on the underlying networks. Comşa et al. [9] propose an innovative machine learning-based scheduling solution that supports increased quality for live omnidirectional (360°) video streaming to accommodate this new rich media application and overcome its associated challenges.

For online tutoring, the data objects of college English are divided into k clusters based on the K-means clustering algorithm, which is conducive to the formation of each group in line with the conditions that the objects in the same collection are very close and the things in different clusters are completely different. The clustering algorithms can be conducted to form each group in line with the conditions that the objects in the same collection are very close and the things in different clusters are completely different. The main assumption of DBSCAN [10] is that two dense regions are separated by one sparse region. Since DBSCAN works with density, it can easily model nonglobular structures. In addition, DBSCAN is better suited for datasets with disproportional cluster sizes and whose data can be separated in a nonlinear fashion.

However, existing models have a bottleneck of low efficiency in transmitting large amounts of data, which has a terrible effect on the quality of online tutoring. To improve the teaching effect of English tutoring, this paper designs an Internet-based online tutoring platform for college English teaching to speed up data processing efficiency and improve user satisfaction. The K-means clustering algorithm at the business logic layer is utilized to form an online tutoring college English database to provide data support for the platform. Meanwhile, it can realize the business logic judgment of the data, convert the data in the database, return to the user interface of other formats, and provide users with browsing and consulting. The main contributions of this work are as follows:

- (i) An Internet-based online tutoring platform for college English teaching is designed to speed up data processing efficiency and improve user satisfaction
- (ii) The K-means clustering algorithm at the business logic layer is utilized to form an online tutoring college English database to provide data support for the platform

The rest of this paper is organized as follows. The framework and technical details of our proposed system are described in Section 2. In Section 3, we present extensive experimental results to demonstrate the effectiveness of the proposed model. Finally, we conclude our work in Section 4.

2. Web-Based Online Tutoring Platform

In this section, different components of online tutoring platforms are described such as their basic structure, functional structure, database, and data mining and its algorithms.

2.1. Basic Structure of the Platform. In this paper, the development of online tutoring platform of college English is based on .NET three-tier architecture, namely, user interface layer, business logic layer, and data access layer. The user layer is at the top layer, and the user is the operator of this layer. This layer has a visible and user-friendly interface, through which users can safely operate the layer, and they cannot consider the implementation of this layer. The business logic layer of the platform is in the middle. In the operation interface, the data input by the user will be reflected in the business logic layer, and the obtained data will be judged by business logic. On the other hand, the data in the database will be converted into other formats by calculating the data. After returning to the user interface, it can facilitate user's browsing and consulting. What the function of the operation interface can realize can be explained by the business logic layer of the platform; the data access layer is at the bottom of the platform. After the data processing in the business logic layer is completed, the data in the database can be added, deleted, modified, or queried, and other operations can be performed. It needs to return the final database operation results to the business logic layer and then transfer the data operation results to the middle layer for processing [11, 12]. As shown in Figure 1, the overall architecture of the online tutoring platform of English teaching is shown.

Online tutoring platform of English teaching adopts .NET three-tier framework, mainly because it has the following advantages: the client and the system servers are directly connected, and there is no need to connect through other parts, so the response time of the system will be very short; the user interface is friendly and beautiful, and the interface style is changeable, which can meet the various needs of users; the transaction processing ability is relatively strong, and the complex business process can also be realized [13].

The separation of each layer is the biggest advantage of this framework, which can reduce the coupling between the functional modules to the maximum and fully practice the viewpoint of "low coupling, high cohesion" in software engineering [14]. According to the developer's point of view, this method is helpful to the change of business requirements of the system. When there is a change, there is no need to modify all the code, and the business logic can be adjusted accordingly. Therefore, the development efficiency of the program can be improved, and the development cost of the system can be reduced.

2.2. Design of Platform Functional Structure. In this paper, the role of online English tutoring platform for colleges and universities is divided into students, teachers, and administrators. There are four main function modules of the platform, which are teaching support, resource management, educational administration management, and platform management. After that, users can log in to the online English tutoring platform for colleges and universities according to their permissions. Figure 2 shows the main functional structure of the platform.

Among them, the role of the teaching support module is mainly teachers and students. After users log in to the platform, English teachers can manage the courseware online, arrange and modify the homework, and upload the relevant information of the courseware. Students can browse English course content, complete homework online, and address questions to teachers. The module mainly includes two submodules: course teaching and communication between teachers and students. The course teaching submodule has the functions of courseware browsing, course announcement, tutoring and answering, VOD on-demand, homework review, and so on. It can centrally manage the courseware resources that have been developed and formed. Students can browse the courseware according to the corresponding courseware address provided by the selected course, while teachers can browse the courseware according to the corresponding courseware address provided by the course and release an instant message about the course. Teachers upload auxiliary teaching documents, classic cases, and common questions and answers related to English courses for students to download and learn, and provide excellent teaching video resources of English for students and teachers; teachers arrange, correct, and analyze course assignments and browse the overall situation of assignments; students modify and submit assignments online and can browse teachers' comments to understand the mastery of knowledge points; teachers can input English test questions and answers through the platform, and students can choose the corresponding chapters to test. After the user logs on to the online tutoring teaching platform of college English, the platform will automatically track the user's operation and provide detailed attendance records and log reports at any time [15–17]. The submodule of the teacher-student exchange platform has the functions of classroom discussion and academic forum. Users can discuss and express their opinions on problems related to English courses, as the submodule provides a powerful online communication tool for teachers and students.

The resource module contains shared software resources and teaching material resources. The shared software resources are for all users and provide rich shared software resources for users. The teaching material resources are mainly for teachers and provide rich and diversified multimedia material resources to meet the teaching needs of teachers in developing network courseware [18, 19]. The module mainly consists of four parts: resource storage submodule, resource type management submodule, resource modification submodule, and resource retrieval submodule. The resource type management submodule is for system maintenance personnel, and the administrator can establish the resource directory according to the type and also has the operation authority to add, delete, and modify the resource directory; the resource storage submodule is for teachers and system maintenance personnel and can add various types of teaching resources to the resource database. The resource modification submodule is for teachers and system maintenance personnel. The author and administrator of the resource can modify the attributes of the resource, including description, type, author, size, and

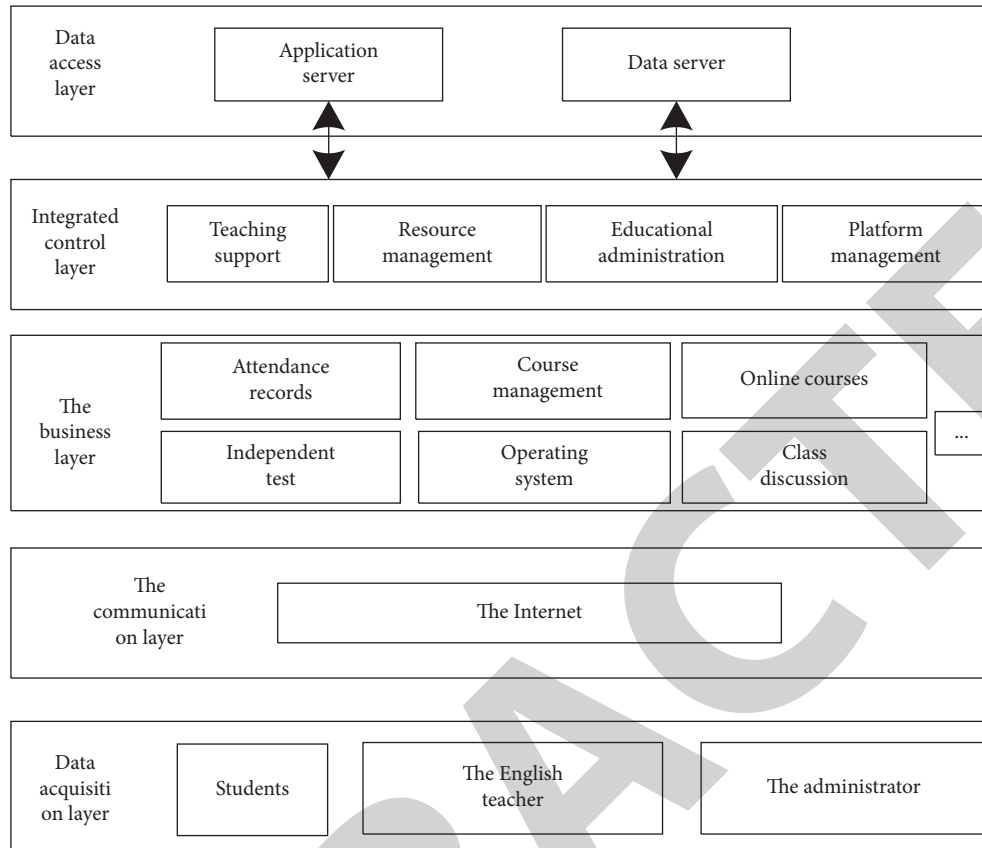


FIGURE 1: The overall structure of the Internet-based online tutoring platform of college English teaching.

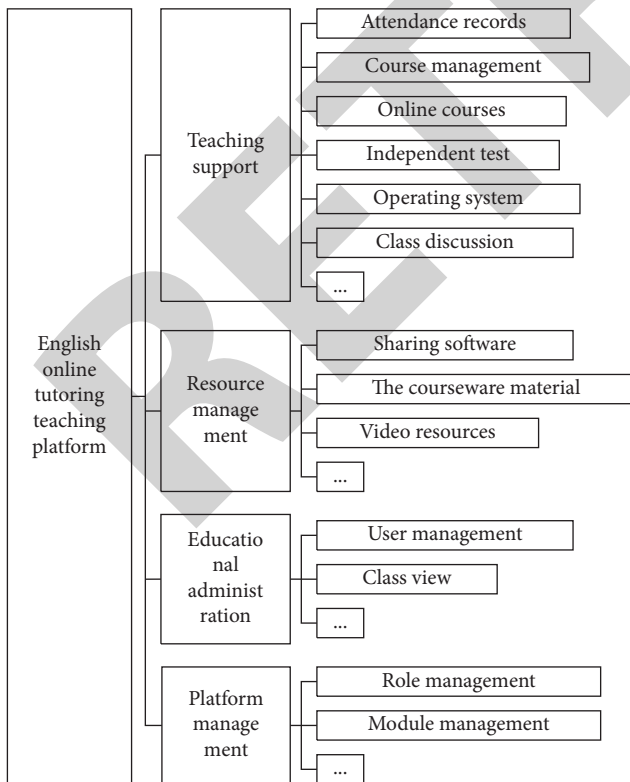


FIGURE 2: Main function structure of platform.

other related information or delete a resource record. The resource retrieval submodule searches the shared software resources for all users, and the teaching material resources are mainly for teachers. Full text retrieval based on representation is adopted in the retrieval, which has a variety of combination retrieval methods according to keywords and resource types.

Teaching management module mainly provides English teaching related management functions, including user management, course management, classroom observation, and other submodules. User management submodule is object-oriented for educational administrators and system administrators. User management is the management of system user information and permissions. The system includes user role management, user authority management, user role authority management, user password maintenance, and other functions [20]. The content of user management includes viewing the basic information of users and course selection, suspending the activation of an account, and resetting the user's password. The course resource management submodule includes adding and modifying new courses, setting course charges, and checking the payment of the students of the course. In the classroom observation submodule, the educational administrators can check the traditional classroom teaching arrangements of English courses after logging in.

The platform management module is for platform administrators, and its main functions include customizing system interface, customizing user permissions, and managing various function submodules, providing powerful functions for platform management and upgrading.

2.3. Design of Platform Database. In the database design work, platform developers abstract the relational database structure and internal relationship of the platform by establishing the E-R database model of the platform. The relationship correspondence between entities in the E-R model graph is the correspondence between parameters and the data table in the database, which can be divided into three types (1:1, 1:M, M:N) [21] from the mathematical model. On the basis of E-R model, with the determination of each specific data table in the database, it can further get the detailed model of platform database composed of platform data table and its dependency. The platform database model composed of main data tables and their dependencies is shown in Figure 3.

2.4. Data Mining. For online tutoring, the data objects of college English are divided into k clusters based on the K-means clustering algorithm, which is conducive to the formation of each group in line with the conditions that the objects in the same collection are very close and the things in different clusters are completely different.

2.4.1. Framework of K-Means Clustering Algorithm. After users input data in the operation interface of the platform, K-means clustering algorithm is applied to mine data in the business logic layer to provide data support for the Internet-based online tutoring platform of college English teaching. This paper takes the number of clusters k of online tutoring data of college English as the goal of K-means and divides the data into k clusters, so that the data objects in the cluster are close to each other, while the data outside the cluster are far from each other. K-means clustering algorithm is to select k points as the initial cluster center, then calculate the distance between each sample and the cluster center, put the data object into the cluster center nearest to the data, and finally calculate the adjusted cluster center. If the two adjacent cluster centers do not change, the sample adjustment is completed, and the clustering criterion function has converged [22]. K-means clustering is simply a division of the set of data objects into nonoverlapping subsets (clusters) such that each data object is in exactly one subset, while hierarchical clustering is a set of nested clusters that are arranged as a tree. DBSCAN solves some of the problems of K-means by working with the density of points. This is a density-based method. The main assumption of DBSCAN is that two dense regions are separated by one sparse region. Since DBSCAN works with density, it can easily model nonglobular structures. Furthermore, DBSCAN is better suited for datasets that have disproportional cluster sizes and whose data can be separated in a nonlinear fashion.

K-means clustering algorithm belongs to dynamic clustering algorithm. The algorithm completes the iterative process by batch modification. Each iteration needs to reclassify data objects, and then use the adjusted classification to calculate a new clustering center and implement the next iteration. If all data objects are classified correctly in a certain iteration, it is not necessary to continue to implement the adjustment, and the clustering center is not changed, indicating that the algorithm has been completed and the clustering criterion function has converged [23]. The mathematical description of K-means clustering algorithm is as follows.

When clustering, the sample dataset $\{x_1, x_2, x_3, \dots, x_n\}$ and the number of clusters k are determined, the initial data cluster center $\{c_1, c_2, c_3, \dots, c_k\}$ is randomly selected in the sample dataset of k online tutoring data objects of college English, and the distance $D\{x_i, c_j\}$ between the remaining data objects and each cluster center is calculated $\{i = 1, 2, \dots, n; j = 1, 2, \dots, k\}$.

The Euclidean distance method is used to calculate the distance, and the equation is

$$D(x_i, c_j)' = \sqrt{(x_{i1} - c_{j1})^2 + (x_{i2} - c_{j2})^2 + \dots + (x_{im} - c_{jm})^2}, \quad (1)$$

where $D\{x_i, c_j\}$ denotes the distance, x_i denotes the i -th sample, and c_j denotes the j -th cluster center.

If $D(x_i, c_j)$ satisfies the following equation:

$$D(x_i, c_j) = \min\{D(x_i, c_j)'\}, \quad (2)$$

Then the data object x_i of online tutoring of college English is classified into c_j clustering.

After the data objects are classified into the corresponding clusters, the new cluster center is recalculated according to the adjusted cluster, and the equation is

$$c_j^* = \frac{1}{n_j} \sum_{i=1}^{n_j} x_i^j, \quad (3)$$

where the number of online tutoring data objects of college English in c_j -cluster is n_j .

The criterion function J of the sum of squares of errors is calculated as follows:

$$J^* = \sum_{k=1}^{n_j} \sum_{j=1}^k \|x_k^j - c_j^*\|^2. \quad (4)$$

If $|J^* - J| < \xi$, the clustering criterion function converges, and the final clustering result is obtained; if $|J^* - J| > \xi$, the distance between the remaining data objects and each clustering center is calculated iteratively until $|J^* - J| < \xi$ is satisfied.

2.4.2. Process of K-Means Clustering Algorithm. The central idea of K-means clustering algorithm is to divide n online tutoring data objects of college English into k clusters, which is conducive to the formation of each cluster in line with the conditions that the objects in the same cluster are very close

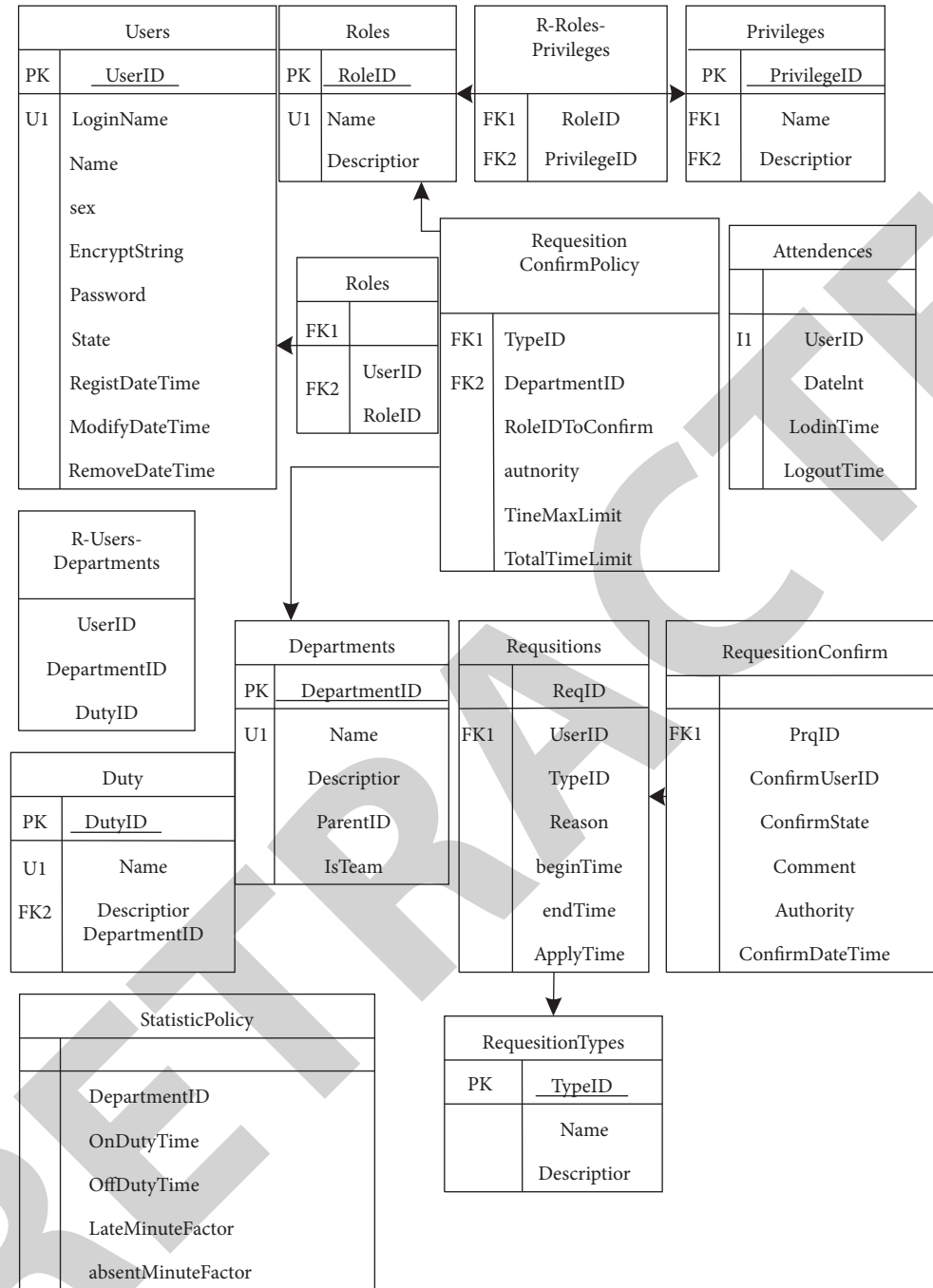


FIGURE 3: Diagram of platform database model.

and the objects in different clusters are completely different [24]. The input of K-means clustering algorithm is k clusters, in which the dataset has n objects; the output is k clusters where the final clustering center and data objects are located; Figure 4 illustrates the workflow of K-means clustering algorithm.

The processing steps of K-means clustering algorithm are as follows:

Step 1: the initial clustering center is k objects randomly selected in the sample dataset of n data objects

Step 2: calculate the distance between the remaining data objects and each cluster center, and assign the data objects to the nearest cluster

Step 3: after all data objects are allocated, recalculate the cluster center according to the new cluster

Step 4: compare the two adjacent cluster centers; if the cluster center changes, go back to step 2; if the cluster center does not change, continue to step 5

Step 5: output the cluster with k final clustering centers and data objects, that is, the final clustering result

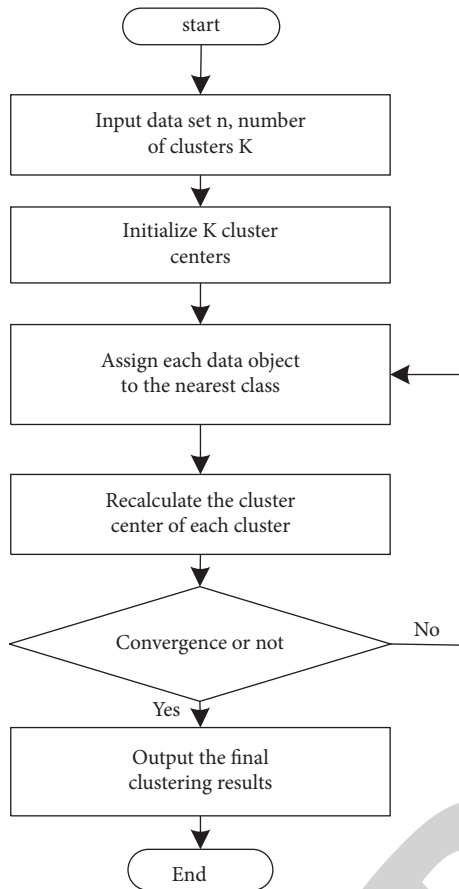


FIGURE 4: Workflow of K-means clustering algorithm.

3. Experimental Analysis

Taking a university in a province as the experimental object, this paper tests the function of the platform and transmits data through the Internet. There are 36887 English teachers and students in this university. The platform is put into use on March 1, 2019. Experiments are carried out using one GPU (GeForce GTX 1050 Ti) and an Intel Core i7 with 16 GB RAM system.

In order to verify the data mining ability of the platform in this paper, the following experiments are carried out. The collection time interval of online tutoring information features of college English is set as 100 s, the training set size as 500, the big data distribution length as 2000, and the code width of intelligent scheduling of online tutoring information of college English as 0.15 ms. The original data mined by this platform is shown in Figure 5.

As can be seen from Figure 5, the time-amplitude and frequency-amplitude fluctuations of this platform are relatively stable, which indicates that the platform in this paper can stably mine online tutoring information data of college English and has good data mining performance.

The connection speed delay response test of the platform can reflect the server configuration, the platform coding optimization, and the comprehensive performance of the platform running network environment. Three users are randomly selected to operate the platform, and the

connection speed delay response of the platform is measured by testing the throughput of the user's operation process. The test results are shown in Figure 6.

Here, we conducted comparative experiments on the effect of platform connection delay response 8 times (as shown in Figure 6, Test1–Test8). It can be seen from Figure 6 that the throughput of the platform in this paper is above 1200/byte in 8 tests of 3 users, which is much better than the baseline models. This indicates that this platform's connection speed delay response is small and can meet the actual application requirements.

The time of HTTP timeout of the interface is set as 900 s, the execution time of the whole test is 44 minutes, the maximum number of users of the platform is 200, and the number of hits is 130606. Figure 7 shows the pressure curve of the platform. In the test, all cases of the platform are successful, and none of them fails. It can be seen from the pressure curve that the operating parameters of the platform conform to and meet the requirements of the Internet-based online tutoring platform of college English teaching.

Because the framework selected in the development process is universal, in order to ensure the maximum compatibility of the platform in this paper, the client access test of this platform is carried out through Windows XP, Windows 7, Linux kernel's Ubuntu, Red Hat, Debian, Apple's iOS, and other operating systems. Table 1 shows the compatibility test instructions.

According to the analysis of Table 1, the platform can be accessed normally through the browser on the above operating systems, and the platform compatibility is good, so there is no problem in the operating system test of the platform client.

The platform of this paper, university's public course information teaching platform based on SPOC and university's physics mobile learning platform based on Android are used to collect data and verify the accuracy of data collection results. The comparison platform is represented by the platform in [5]; the platform in [6], which is based on the analysis of the current situation of college physics teaching and the needs of students learning (a college-based physical mobile learning platform based on Android system is designed and developed in this paper, and it is also applied to the curriculum to be carried out in the teaching practice); the platform in [7], which is a type of Fab Lab-based learning system; and the platform in [8]. The data collection results of all platforms are shown in Table 2. It should be noted that the parameters of the baseline models are obtained from the corresponding papers. Meanwhile, we implement all models under the same hardware environment for guaranteeing fairness.

It can be seen from Table 2 that the data acquisition results of all platforms are different at different times. The data acquisition results of the platform in this paper are always higher than those of the other four platforms. Meanwhile, there is little difference between the data output and the input results, while there is a big difference between the input and output results of the other four platforms, which proves that the data acquisition results of this platform are effective and accurate.

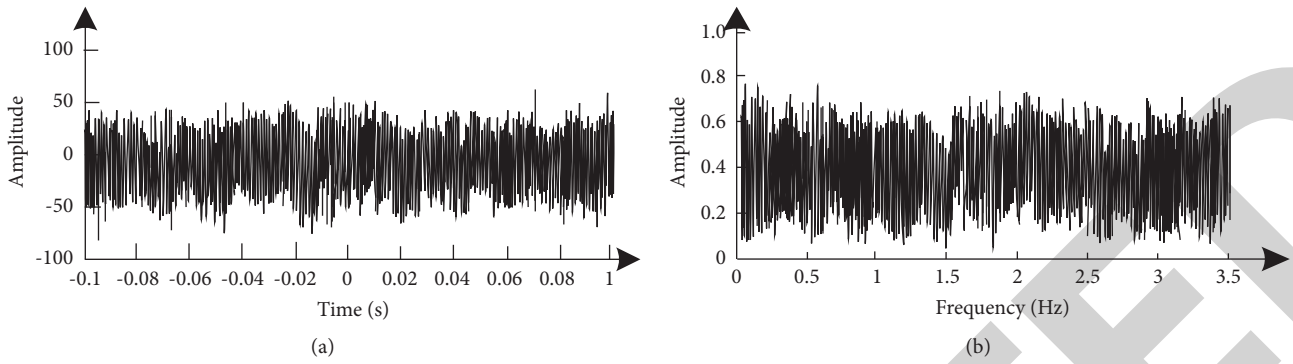


FIGURE 5: Results of innovation and entrepreneurship information mining: (a) time amplitude; (b) frequency amplitude.

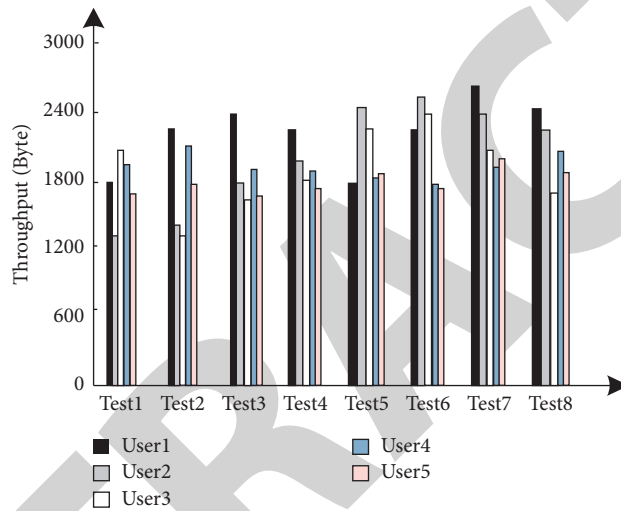


FIGURE 6: Test effect of platform connection delay response.

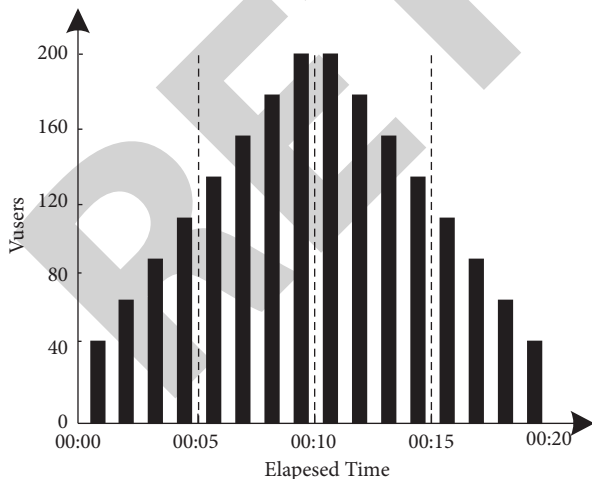


FIGURE 7: Pressure curve of platform operation.

To verify the stability of the platform, the CPU occupancy and network flow rate of the four platforms are compared. The results are shown in Tables 3 and 4.

According to Tables 3 and 4, the CPU occupancy range of [5] is 0.5~0.7, and the network flow rate range is 2800 kb/

s~4000 kb/s; the CPU occupancy range of [6] is 0.4~0.5, and the network flow rate range is 1000 kb/s ~ 2500 kb/s; the CPU occupancy range of [7] is 0.3~0.5, and the range of network flow rate is 2500 kb/s~3700 kb/s; the CPU occupancy range of [8] is 0.4~0.5, and the network flow rate range is 1700 kb/s~3100 kb/s; and the CPU occupancy rate of the platform in this paper is 0.3~0.4, and the network flow rate range is 5000 kb/s~6000 kb/s. Specifically, there are still problems of subjective ways and little entirely reasonable sampling in the model of [7], which results in a lower flow rate. The method in [8] is a kind of multiview based method, which has high computational complexity. Thus, the high requirements of the hardware in the synchronization method of [8] result in a lower flow rate. The CPU occupancy rate of the platform in this paper is the lowest among all platforms, the network flow rate is the highest, and the change range of this platform is small, which proves that the CPU occupancy rate of this platform is small and the resource sharing speed is fast and stable.

In order to test the practical application effect of the platform, six months after the platform was put into use, a questionnaire survey was started according to the voting function of the platform's personalized service. The four aspects of teaching support, resource management,

TABLE 1: Compatibility test description.

Use case number	D001	D002	D003	D004	D005
Use case description	IE6 + browses the system	Firefox browses the system	Safari browses the system	Chrome browses the system	Opera browses the system
Operation	Run the system using Internet Explorer 6	Run the system using the Firefox browser	Run the system using the Safari browser	Run the system using the Chrome browser	Run the system using the Opera browser
Expected	Normal operation display	Normal operation display	Normal operation display	Normal operation display	Normal operation display

TABLE 2: Data acquisition results of all platforms.

Time (min)	Bytes per second (k)									
	Platform of this article		Platform of literature [5]		Platform of literature [6]		Platform of literature [7]		Platform of literature [8]	
	Input	Output	Input	Output	Input	Output	Input	Output	Input	Output
5	179	189	121	101	59	71	135	125	156	114
10	250	250	201	209	238	238	215	215	178	158
15	255	182	131	151	90	180	196	180	221	215
20	265	265	112	120	15	15	169	172	236	226
25	270	270	78	150	15	15	202	15	239	229
30	280	220	158	99	161	101	223	220	252	248
35	285	300	260	240	261	301	256	251	261	258
40	285	280	180	150	250	240	198	198	268	225
45	290	280	250	300	285	180	253	256	285	270
50	295	295	133	170	200	265	156	153	298	299
55	300	300	300	240	300	299	256	256	299	299
60	300	300	190	158	299	300	163	163	300	300

TABLE 3: Comparison of CPU occupancy of all platforms.

Time (min)	CPU share				
	Platform of this article	Literature [5] platform	Literature [6] platform	Literature [7] platform	Literature [8] platform
5	0.361	0.500	0.412	0.374	0.422
10	0.363	0.550	0.421	0.431	0.431
15	0.363	0.570	0.418	0.454	0.438
20	0.362	0.568	0.416	0.466	0.436
25	0.363	0.568	0.408	0.458	0.438
30	0.363	0.568	0.405	0.465	0.435
35	0.364	0.600	0.400	0.463	0.430
40	0.364	0.653	0.454	0.454	0.454
45	0.363	0.651	0.459	0.459	0.459
50	0.364	0.622	0.460	0.460	0.460

TABLE 4: Comparison of network flow rates of all platforms.

Time (min)	Network flow rate (kb/s)				
	Platform of this article	Literature [5] platform	Literature [6] platform	Literature [7] platform	Literature [8] platform
5	5000	3000	1236	2582	1789
10	5125	2988	1651	2652	1982
15	5210	3250	2210	2556	2156
20	5182	3530	1000	2665	2262
25	5223	2800	1346	2685	2265
30	5734	3076	2500	2688	2568
35	5742	3561	1500	2788	2685
40	6000	3010	2100	2960	2695
45	5993	4000	1700	3652	2890
50	6000	3500	1800	3650	3006

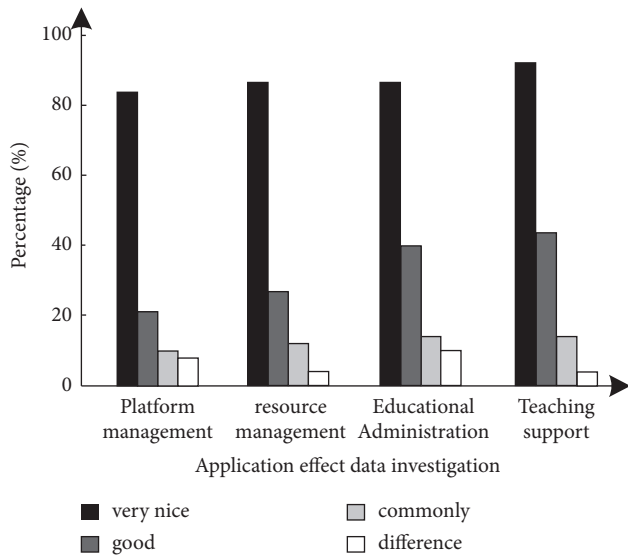


FIGURE 8: Investigation of application effect.

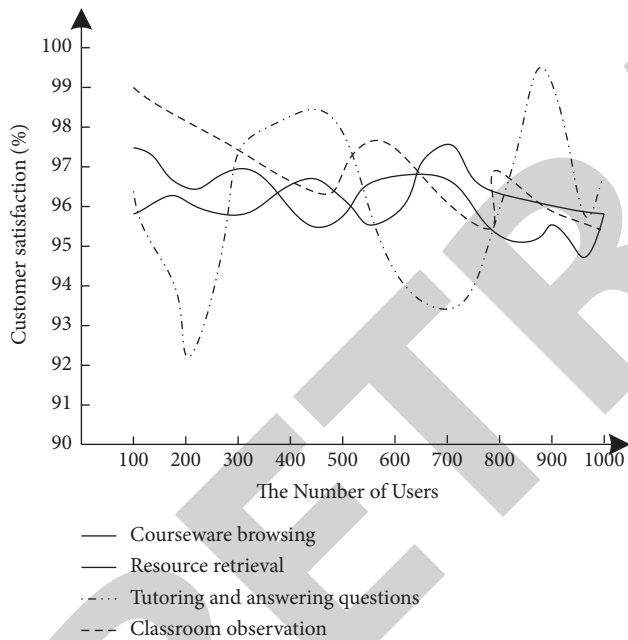


FIGURE 9: Customer satisfaction survey.

educational administration management, and platform management were investigated. The four voting options of “very good, good, average, and poor” were set. 300 users were randomly selected to conduct the questionnaire survey. The survey results are shown in Figure 8.

As can be seen from Figure 8, 89% of the users think that the teaching support module is “very good” and “good,” only 5% think that it has no effect at present, and the other indicators of “very good” and “good” are more than 80%. Generally speaking, the Internet-based online tutoring platform of college English teaching is widely praised by users and has very good applicability; in particular, the teaching support module is the most recognized by users.

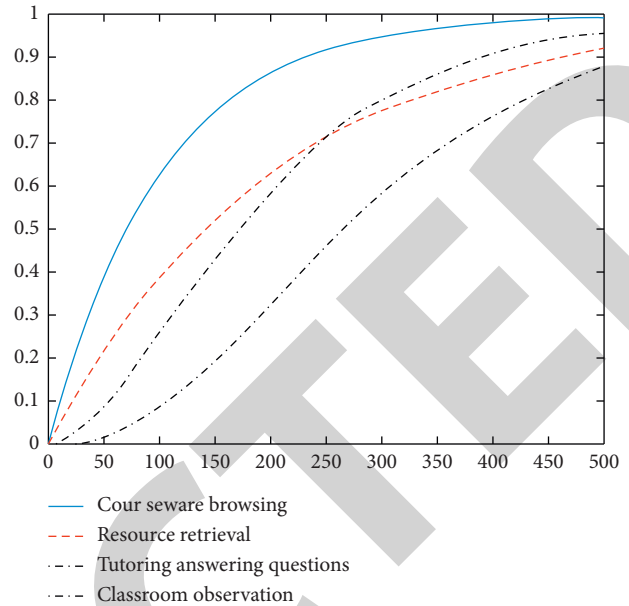


FIGURE 10: The cumulative distribution function of the user satisfaction.

The satisfaction with the platform function is investigated. To verify the superiority of the proposed model, we select 100 users to score the satisfaction with the platform after the operation. Certainly, the satisfaction with the platform scored by the users can help us to further perfect the accuracy and reliability of the system design. The satisfaction with the functions represented by courseware browsing, tutoring and answering, resource retrieval, and classroom observation is tested. The test results are shown in Figures 9 and 10.

The experiment investigates the users’ satisfaction with the platform functions. The results show that the satisfaction of 100 users with the courseware browsing, tutoring and answering, resource retrieval, and classroom observation functions of the platform in this paper is more than 93%, indicating that the users are satisfied with this information service platform. Finally, according to the experimental results and the satisfaction with the platform scored by the users, we will make a great adjustment to the mode to perfect the structure of the mode so that it can be used easily by users in practice.

4. Conclusion

The focus of the current discussion is college English teaching. How to realize the function of online English tutoring and solve the problems that students and teachers may encounter in English learning and teaching has become a hot topic for scholars. Further optimization of the online tutoring platform for English teaching, under the premise of ensuring the stability of the platform, can also enhance the security of communication, data transmission, and data storage; vigorously promote the networked online tutoring platform for college English teaching to help students and teachers get rid of the traditional classroom; and improve the

subjective initiative of students and teachers in the process of work and learning. Since the experimental data is only the test data in the laboratory environment, more standardized and stricter network optimization and server deployment connection tests should be carried out after the platform is officially deployed to ensure that the response delay time of the platform is as short as possible. In addition, our method is to use data communication networks to maintain data security. However, our model also has some limitations. For example, our system lacks query functions and erased data recovery functions. Therefore, it is very important to improve system functions in the future.

Data Availability

The datasets used and/or analyzed during the current study are available from the author on reasonable request.

Conflicts of Interest

The author declares that he has no conflicts of interest.

Acknowledgments

This work was supported by the First Batch of Teaching Reform Projects in the 13th Five-Year Plan of Zhejiang Province Higher Education, “Research on the Evaluation System of International Ability in Higher Vocational Teaching of Chinese as a Foreign Language” (Grant no. jg20180821), and by Jiaxing Nanyang Polytechnic Institute, “Smart Teaching of College English Based on the Cultivation of International Innovative Talents Model Construction” (Grant no. p30017jg101) and “Testing to Promote Learning: Research on the Improvement of Vocational Students’ Deep Learning Ability in the Realm of National Talent Examination” (Grant no. p30018ky011).

References

- [1] F. H. Wang, “An exploration of online behaviour engagement and achievement in flipped classroom supported by learning management system,” *Computers & Education*, vol. 114, pp. 79–91, 2017.
- [2] R. A. Sottolare, R. S. Baker, A. C. Graesser, and J. C. Lester, “Special issue on the generalized intelligent framework for tutoring (gift): creating a stable and flexible platform for innovations in aided research,” *International Journal of Artificial Intelligence in Education*, vol. 28, no. 2, pp. 139–151, 2018.
- [3] Y. I. Dimitrienko, E. A. Gubareva, K. M. Zubarev et al., “Open BMSTU platform and teachers training in online courses development and implementation areas,” *ITM Web of Conferences*, vol. 35, no. 2, Article ID 03015, 2020.
- [4] E. A. Tarim and H. C. Tekin, “Performance evaluation of webtrc-based online consultation platform,” *Turkish Journal of Electrical Engineering and Computer Sciences*, vol. 27, no. 6, pp. 4314–4327, 2020.
- [5] Y. Jia and L. Zhang, “Research and application of online SPOC teaching mode in analog circuit course,” *International Journal of Educational Technology in Higher Education*, vol. 18, no. 1, pp. 1–14, 2021.
- [6] Y. Yu, “Design of mobile learning service platform based on data mining,” *Journal of Physics: Conference Series*, vol. 1757, no. 1, Article ID 012134, 2021.
- [7] M. A. Togou, C. Lorenzo, G. Cornetta, and G.-M. Muntean, “Assessing the effectiveness of using Fab lab-based learning in schools on K-12 students’ attitude toward STEAM,” *IEEE Transactions on Education*, vol. 63, no. 1, pp. 56–62, 2020.
- [8] A. N. Moldovan and C. H. Muntean, “DQAMLearn: device and QoE-aware adaptive multimedia mobile learning framework,” *IEEE Transactions on Broadcasting*, vol. 67, no. 1, pp. 185–200, 2020.
- [9] I. S. Comşa, G. M. Muntean, and R. Trestian, “An innovative machine-learning-based scheduling solution for improving live UHD video streaming quality in highly dynamic network environments,” *IEEE Transactions on Broadcasting*, vol. 67, no. 1, pp. 212–224, 2020.
- [10] Y. Chen, L. Zhou, N. Bouguila, C. Wang, Y. Chen, and J. Du, “BLOCK-DBSCAN: fast clustering for large scale data,” *Pattern Recognition*, vol. 109, Article ID 107624, 2021.
- [11] X. Wang, Q. Tan, and M. Goh, “Attention-based deep neural network for internet platform group users’ dynamic identification and recommendation,” *Expert Systems with Applications*, vol. 160, no. 5, Article ID 113728, 2020.
- [12] K. Xu, T. Li, H. Wang et al., “Errata to “modeling, analysis, and implementation of universal acceleration platform across online video sharing sites”,” *IEEE Transactions on Services Computing*, vol. 11, no. 4, p. 740, 2018.
- [13] W. Sheng, Y. Jing, and M. Qiang, “Design and implementation of learning platform based on MOOC model—take anhui sanlian university as an example,” *China Computer & Communication*, vol. 11, 2019.
- [14] D. Baneres and C. Robert, “Evaluation of a new self-study platform for introductory digital systems,” *International Journal of Engineering Education*, vol. 35, no. 1, pp. 286–303, 2019.
- [15] M. Mohd Yusof, N. Lee Wah, R. Mohamed, and M. Othman, “E-learning tutoring system for Sijil Pelajaran Malaysia (SPM) English,” *MATEC Web of Conferences*, vol. 150, no. 5, Article ID 05001, 2018.
- [16] X. Zhou, J. Wang, M. Guo, and Z. Gao, “Cross-platform online visualization system for open BIM based on WebGL,” *Multimedia Tools and Applications*, vol. 78, no. 20, pp. 28575–28590, 2019.
- [17] S. Benatti, F. Montagna, V. Kartsch, A. Rahimi, D. Rossi, and L. Benini, “Online learning and classification of emg-based gestures on a parallel ultra-low power platform using hyperdimensional computing,” *IEEE Transactions on Biomedical Circuits and Systems*, vol. 13, no. 3, pp. 516–528, 2019.
- [18] V. M. Ribeiro and L. Bao, “Professionalization of online gaming? theoretical and empirical analysis for a monopoly-holding platform,” *Journal of Theoretical and Applied Electronic Commerce Research*, vol. 16, no. 4, pp. 682–708, 2021.
- [19] W. Y. Liang, “The design of flash network courseware,” *Advanced Materials Research*, vol. 933, pp. 720–722, 2014.
- [20] B. Schiemer, S. Elke, and G. Grabher, “Collaborative innovation online: entanglements of making content, skills, and community on a songwriting platform,” *Research in the Sociology of Organizations*, vol. 64, no. 293, p. 316, 2019.
- [21] S. Chen, “Design of internet of things online oral English teaching platform based on long-term and short-term memory network,” *International Journal of Continuing Engineering Education and Life Long Learning*, vol. 31, no. 1, p. 1, 2021.

- [22] X. Bi and X. Shi, "On the effects of computer-assisted teaching on learning results based on blended learning method," *International Journal of Emerging Technologies in Learning*, vol. 14, no. 1, 2019.
- [23] S. Li and C. Qi, "Simulation of machine aided translation model based on bilingual E-chunk," *Computer Simulation*, vol. 36, pp. 345–348, 2019.
- [24] H. Chen, "The influence of online English writing platform on writing metacognitive strategies and writing performance—a study based on English majors in vocational colleges," *Journal of Shaanxi Institute of Education*, vol. 35, no. 3, pp. 97–100, 2019.

RETRACTED