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Research Article

Research and Application of the Interactive English Online Teaching System Based on the Internet of Things

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Nowadays, due to the pandemic and other problems, the establishment of physical classes is a big headache for both students and teachers, due to which the education system all over the world is shifted to the online system from the physical system. Advance technologies such as the Internet of Things (IoT) are playing a significant part in various sectors of life such as health, business, and education. In order to effectively improve the effect of online English teaching, this study designed an interactive online English teaching system based on the IoT technology. This study proposes three topological structures for the establishment of the proposed IoT-based online English teaching system. Based on the analysis of the three topological structures of the IoT, this study chooses to design each submodule of the front and back of the system in the network IoT environment to realize the daily operation and various functions of the system and to realize the interactive design of both of the teacher and student side. Based on this approach, an online English teaching system is designed, and the teaching quality based on this system is evaluated with the help of an algorithm known as grey relational analysis algorithm. The experimental results show that, after the application of this system, students have access to the teaching materials and content in a short period of time; and the English test scores were improved and were significantly higher as compared to the traditional teaching system. In addition, at the same time, the internal consistency reliability of the proposed system is very high which fully demonstrates the effectiveness of the proposed system.

1. Introduction

The 21st century is an era of technology, economy, and educational knowledge. The rapid increase and development in knowledge have brought enormous convenience in every field of life.

Among the new technologies, educational technology not only needs to change traditional approaches but also hastens the transformation of people's ideas and educational thoughts. Traditional learning strategies are currently being impacted greatly by the enormous amount of information available. The conventional teaching methods are far from meeting the requirements of the modern century, given the rapid increase in awareness and rapid technological growth.

The teachers and other supporting staff give full attention and value to each student by helping them in their studies and try to assist them using their full potential, for a long time. The use of teaching machines and other supporting tools can improve the personalized teaching and have a direct impact on the performance of the students. Classroom teaching utilities have always been optimized for the needs of education, from the basic teaching machines to the implementation and deployment of the new intelligent teaching systems and devices. The combination of IoT and CAD-based teaching systems has made a novel field of research, which is known as smart teaching system [1, 2]. The student's learning burden will help teachers to be more efficient in the classroom, allowing them to conduct empirical research, intelligent judgement, and a purposeful, accurate, systematic, and targeted instruction, which eventually enhances students' academic performance and overall education quality.

The forms of multimedia teaching are becoming more and more diversified and are developing towards the mode

of independent research and development. At the same time, development in the field of information technology (IT) also promotes new and advanced educational models, and education modernization had become an important resource to improve the quality of education [3]. Among the educational models, teaching system is one of the representative products of education modernization. With the popularization of computer and network technology, the methodology of the teaching system is enhanced, and the scope of its applications has been extended, which results in the development of an interactive teaching system. By giving full attention to the subjective initiative of teachers and students in the teaching process, the teaching system promotes the communication between teachers and students, pays attention to the participation and enthusiasm of students, and effectively integrates the education and learning stages [4, 5].

With the progress of science and technology in the modern era, the online teaching system has made a major breakthrough. Yi et al. [6] designed the mobile terminal interactive teaching system based on augmented reality technology. Their system aims at cultivating the course map and introduces the augmented reality technology into the course teaching process so that the learners can actively participate in the setting of key parameters of the system. At the same time, the system can also present the rendering results to the learners in real time, achieving the effect of immediate feedback and interactive communication. Luan [7] designed a 3D interactive teaching system based on the contradiction space. Based on the analysis of the best demonstration mode of the contradiction space, the system combined with Unity3D virtual reality technology to build a digital 3D interactive teaching system of the contradiction space, so as to solve the problem of poor teaching demonstration effect to the greatest extent. However, in the practical application, it was found that the ideal degree of teaching results of the aforementioned two teaching systems was relatively low.

With the development of economic globalization, countries around the world have formed a community of interests, and the challenges of global issues require all countries to work together to deal with them. In this process, English, as the global language, became a bridge of communication between countries. Online English teaching system breaks the traditional teaching mode limited by time and place. Therefore, with the rapid development of network and multimedia technology, teachers should make full use of the internet technology and multimedia technology to achieve efficient online teaching, so as to improve the diversity, information, knowledge, and fun of the English teaching process and promote the improvement of English teaching quality [8, 9].

The Internet of Things (IoT) is a network that collects information in real time through a variety of sensing devices, radio frequency identification, positioning, scanning, and other technologies, realizes a ubiquitous connection between things and things and between things and people through various possible network access, and effectively manages the collected information [10, 11]. At present, IoT technology has been able to effectively realize the collection, storage, processing, interconnection, and application of data information. The main contributions of this paper are as follows:

In view of the shortcomings of the traditional system, this study applies the IoT technology to the information collection process at different ends of the online education system and designs a new interactive English online teaching system by using the IoT technology

The time of accessing the online English teaching contents is significantly decreased, which reduces the delay problem

The test scores of the randomly selected students are increased and left the other teaching systems far behind

The critical factors that influence the learning process of students using the online English teaching environment were identified

The remaining paper is structured as follows: Section 2 demonstrates building an IoT environment, Section 3 represents the design of the proposed interactive English online teaching system, and Section 4 notifies simulation results and experimental analysis. Finally, we conclude our research work in Section 5.

2. Building an IoT Environment

The IoT is a network based on information carriers such as the internet and traditional telecommunication networks, which enables all ordinary objects that can perform independent functions to achieve interconnection. According to the positions of each measuring point in the IoT, the structure of IoT can be divided into three topological structures: star, tree, and network topology. The specific structure of the mentioned topologies is shown in Figures 1–3.

In all of the three figures, node 1 represents the coordinator, node 2 demonstrates the router, and node 3 shows the terminal device. Figure 1 illustrates the star topological structure. In Figure 1, the star topological structure has a single-hop network composed of a coordinator and multiple terminal devices. There is only communication between the coordinator and each terminal device, and the communication between each terminal device is forwarded by the coordinator.

Figure 2 represents a tree topological structure of the IoT network. The tree structure is composed of a coordinator and a number of router and terminal devices. In addition to point-to-point direct communication with parent or child nodes, the device can only complete message transmission through tree routing [12, 13].

Figure 3 demonstrates the IoT network topological structure diagram. The network IoT structure consists of one coordinator and multiple router and terminal devices. The main difference is that the mesh structure allows all nodes with the routing function to be connected directly, and the routing table in the router is used to realize the network routing of the message, which reduces the message delay at the cost of more storage space and enhances the reliability.

This study mainly focuses on an interactive English online teaching system based on the network Internet of Things environment.

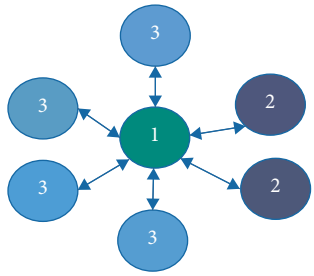

Figure 1: Internet of Things star topology structure diagram.

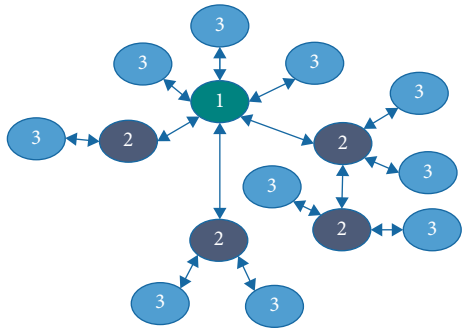

Figure 2: Internet of Things tree topology structure diagram.

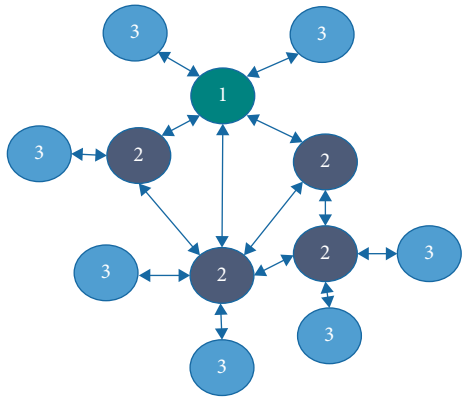

Figure 3: Internet of Things network topology structure diagram.

3. Design of the Interactive Online English Teaching System

The interactive online English teaching system based on the IoT technology is implemented in the network IoT environment by Android and Web dual mode. Among them, the main function of the online interaction part is to provide teachers and students with teaching interaction and English teaching resource-sharing channels. The overall system architecture is shown in Figure 4.

3.1. Designing and Deployment of System Hardware. This section represents the design and deployment of hardware for the proposed interactive online English teaching system. In order to fully reflect the design advantages of the interactive online English teaching system, this study focuses on a comprehensive analysis of teachers' and students' demands for the teaching system. The basic principles which need to be followed in the system design process are represented in a summarized form as follows:

(a) Availability: the online English teaching system mainly takes the demand of both teachers and students as the ultimate design goal of the proposed system. It will be convenient for the users of the system to join the system where they can find a large number of experts in the relevant field, with a greater experience. The real-time analysis and service demand of teachers and students provide the corresponding practical functions at a platform which is used by both students and teachers.

(b) Safety and reliability: a practical teaching system must be safe and reliable [14, 15]. To do so, this paper combines advanced software and hardware in the design process to obtain the best design scheme and ensures the safety and reliability of the proposed teaching system.

(c) Maintainability: indeed, maintenance is an important factor of a system that has a great impact on the performance of a system. The proposed system operates in real time and is maintainable in terms of both hardware and software.

(d) Expandability: the design of the system is mainly not only convenient for the follow-up business development and expansion but also to facilitate the design and maintenance of various aspects of the system.

3.1.1. System Foreground Design. The front desk of the system is divided into five parts, i.e., web page module, teaching resource module, teaching video module, message and discussion module, and user management module. All of the mentioned modules are briefly described in the following:

(a) Web module: this module is mainly used to display the main functions and contents of the teaching system which include the user login, supporting materials, website use, and other related operations.

(b) Teaching resource module: this module is used to facilitate the users to query all the teaching resources contained in the system, including syllabus, teaching plan, electronic courseware, English grammar knowledge, simulation tests, and other contents.

(c) Teaching video module: this module automatically displays all the teaching videos in the database in different terminals with greater detail. Users can watch the corresponding teaching videos after randomly clicking on an English teaching video title. Furthermore, the module is connected with the teaching resource database, which can realize the real-time update of the teaching video.

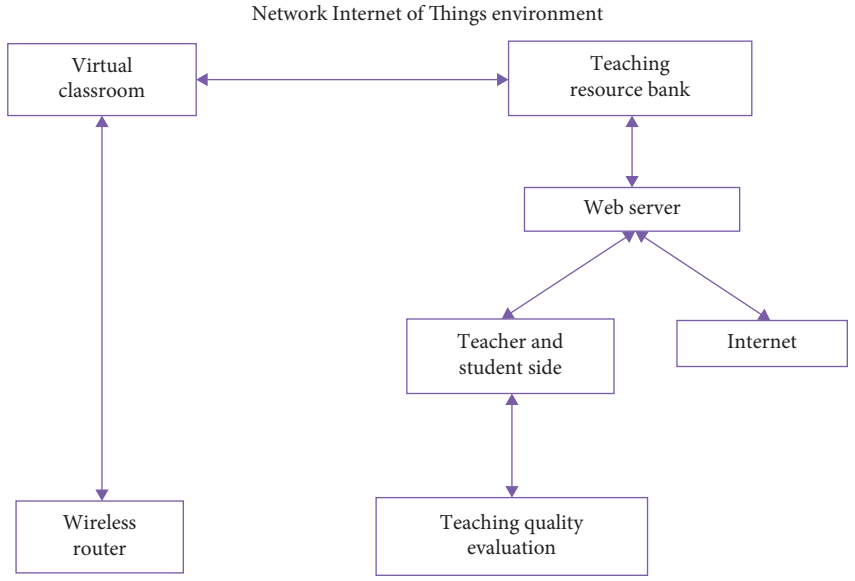

Figure 4: Overall architecture of the proposed system.

(d) Message and discussion module: this is another important module that plays an important role to enhance the quality and flow of communication among the students and corresponding teachers in conveying their messages. The students ask questions which will be transferred to the teachers in real time; after receiving the student message, the teachers will respond to the questions immediately, and hence, the learning process will be improved.

At the same time, in this module, students can complete information exchange, share learning resources with others, and start a group discussion on a certain topic. When the user clicks on the online BBS son module, a window is opened which shows all the information regarding the previous posts in the database. When a student clicks on the "remarks" option, it displays the corresponding presentation box, the students and other users need to be in the input text box in order to input their remarks, and after doing so, they need to click the "Finish" button which will close the remarks page.

(e) User management module: in this module, users can carry out information registration, login, personal information modification, course schedule selection, and other operations, which is also the basis of the whole teaching system.

3.1.2. System Background Design. The background of the proposed interactive online English teaching system is divided into three main parts which include the main interface module, teaching resource management module, and background management module. All of the three mentioned modules are described briefly as follows:

(a) Main interface module: this module uses the TreeView control to display all the functions of the background. The system administrator can enter the corresponding interface of each function by clicking the name of different functions.

(b) Teaching resource management and storage module: in this module, the window administrator can update, delete, and modify the teaching resources in the teaching system website, so as to ensure that the learning resources in the system are more real time and accurate.

(c) Background management module: using the window structure of this module, the administrator can modify and delete the users in the system. At the same time, in this module, the system administrator can also accomplish system maintenance, resource update, and other operations.

3.1.3. Interactive Module Design. In order to fully meet the business needs of the proposed interactive online English teaching system, teachers can interact with the students through the server side, such as checking students' attendance, generating the QR code, pushing relevant test questions of the course, and monitoring the learning status of the students. The composition of the teacher-side interaction module is shown in Figure 5.

This interactive module is mainly used for online interaction between students and teachers, which consists of three functional modules: scanning QR code, classroom interaction, and offline login. Students scan the QR code on the server and sign in, receive the instant message sent by the teacher, and can also reply to the teacher's message. If there is no teacher intranet, offline login is performed to view and review the history of messages pushed by the teacher. Through the online learning interface, students can connect to the external network for independent learning operation. The composition of the interactive module on the student side is shown in Figure 6.

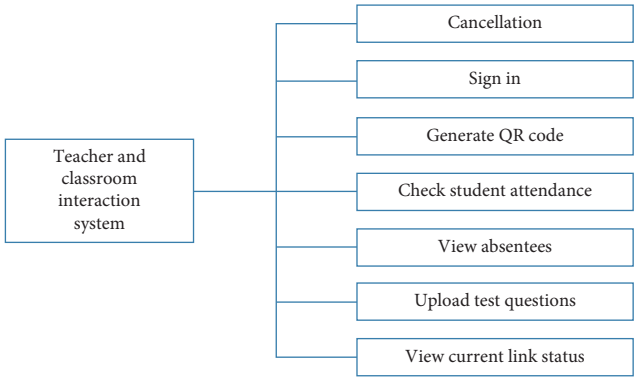

Figure 5: Schematic diagram of the teacher-side interaction module.

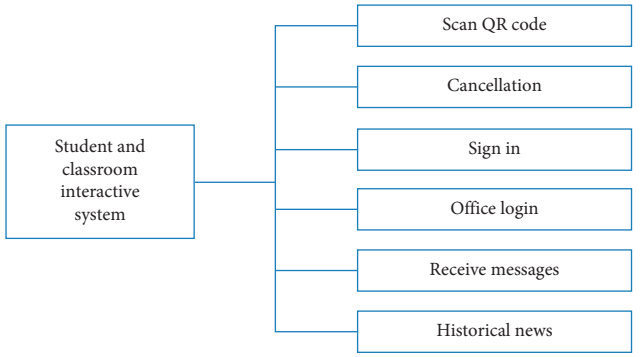

Figure 6: Schematic diagram of the interaction module on the student side.

3.2. System Software Environment Design

3.2.1. Design of the Online English Teaching Process. The teaching process design of the interactive English online teaching system based on the Internet of Things technology is as follows:

(a) Set reasonable teaching objectives:

$$Z_t^f = \begin{bmatrix} z_1^1 & z_1^2 & \cdots & z_1^f \\ z_2^1 & z_2^2 & \cdots & z_2^f \\ \vdots & \vdots & \ddots & \vdots \\ z_t^1 & z_t^2 & \cdots & z_t^f \end{bmatrix}, \quad (1)$$

where Z_t^f represents the teaching objective matrix, t describes the teaching progress, which is reflected by time, and f is the student's grade. As the design of teaching objectives and contents is gradual, their design mainly focuses on the following aspects.

Teaching objectives should have a sense of hierarchy, so as to improve students' English learning ability and effectively reflect the guiding role of online interactive English teaching. At the same time, attention should also be paid to the correlation between educational objectives so that the students can master the correlation between the two in the process of learning, that is,

$$Q_t^f = \begin{bmatrix} q_1^{f-\gamma} & q_1^{f-\gamma+1} & \cdots & q_1^{f-1} \\ q_2^{f-\gamma} & q_2^{f-\gamma+1} & \cdots & q_2^{f-1} \\ \vdots & \vdots & \ddots & \vdots \\ q_t^{f-\gamma} & q_t^{f-\gamma+1} & \cdots & q_t^{f-1} \end{bmatrix}. \quad (2)$$

Among them, Q_t^f represents the correlation matrix before and after educational goals; q denotes the learning factor; and γ notifies the student preference parameter. The design of teaching objectives pays more attention to the overall performance of the design of teaching objectives. In this process, the main focus is on the language knowledge, language skills, and emotional attitude that need to be integrated into the teaching objectives in order to enhance the students' learning ability. The following constraints should meet in the actual operations:

$$I_t^f = Q_t^f \times H = \begin{bmatrix} q_1^{f-\gamma} & q_1^{f-\gamma+1} & \cdots & q_1^{f-1} \\ q_2^{f-\gamma} & q_2^{f-\gamma+1} & \cdots & q_2^{f-1} \\ \vdots & \vdots & \ddots & \vdots \\ q_t^{f-\gamma} & q_t^{f-\gamma+1} & \cdots & q_t^{f-1} \end{bmatrix} \times \left(h^{f-\gamma}, h^{f-1-\gamma}, \cdots, h^{f-1}\right). \quad (3)$$

Here, H represents the grade sequence of students' achievement; h demonstrates the student achievement rating factor, and $h < 1$.

(b) Pay attention to teaching curriculum design:

The design of the English teaching course is the main component of the interactive English online teaching system. The design of the teaching process plays an important part in the achievement of the teaching objectives [16, 17]. Teaching process design is mainly based on teaching objectives and the basic elements of the teaching process. When teachers design the teaching process, they need to focus on the experience of the learning process by using different teaching strategies, teaching methods, and selection of teaching contents for the course organization and focus on the main characteristics of independent, cooperative, and inquiring learning methods.

3.2.2. Teaching System Quality Evaluation Module. In order to check the quality of the proposed system, this study also designs a teaching system quality evaluation module that uses the grey correlation analysis algorithm to evaluate the teaching quality and further improves the functions of the teaching system. The specific operation process is described as follows.

Step 1. Select the analysis sequence: in the first step, the reference sequence and comparison sequence are selected.

The former is the data sequence reflecting the behavior characteristics of the teaching system, and the latter is the data sequence composed of the influencing factors of the system behavior. The expressions of the reference sequence and the comparison sequence are given as follows:

$$A = \{a(k) \mid k = 1, 2, \ldots, m\},$$
$$C = \{c_i(k) \mid k = 1, 2, \ldots, m\} (i = 1, 2, \ldots, n). \quad (4)$$

Step 2. Dimensionless processing of variables: the dimensionless data of the system factor series may be inconsistent, which increases the difficulty of comparison and affects the accuracy results of the system. Therefore, the dimensionless processing strategy should be adopted in the process of grey relational degree analysis.

Step 3. Find the correlation coefficient: the following calculation formula is used to solve the correlation coefficient between the reference value $a(k)$ and the comparison value $c_i(k)$ [18, 19]:

$$\xi_i(k) = \frac{\min_i \min_k |a(k) - c_i(k)| + \delta \max_i \max_k |a(k) - c_i(k)|}{|a(k) - c_i(k)| + \rho \max_i \max_k |a(k) - c_i(k)|}. \quad (5)$$

If there is $|a(k) - c_i(k)| = \Delta_i(k)$, the above expression can be simplified to get the following expression:

$$\xi_i(k) = \frac{\min_i \min_k \Delta_i(k) + \delta \max_i \max_k \Delta_i(k)}{\Delta_i(k) + \delta \max_i \max_k \Delta_i(k)}. \quad (6)$$

In the above formulas, δ represents the resolution coefficient, and its value ranges in $\delta \in (0, \infty)$. The resolution increases with the decrease of the value, and the value range is reduced to $\delta \in (0, 1)$.

Step 4. Solution of correlation degree: the correlation coefficient is too dispersed, so the average of the correlation coefficient of all reference sequences and comparison sequences is g_i, which refers to the correlation degree between the sequences.

Step 5. Sorting of relational degree: the order of relational degree g_i is arranged from large to small. When $g_1 < g_2$, it means that the reference sequence is more similar to the comparison sequence. In other words, it indicates that the data sequence reflects the characteristics of the teaching system and is closer to the data sequence composed of the influencing factors of the system behavior. This process shows that the operation quality of the teaching system is better as compared to the other approaches.

4. Simulation Results and Experimental Analysis

This section represents the simulation results and experimental analysis carried out in the accomplishment of the proposed interactive English online teaching system. In order to prove the significance and effectiveness of the proposed interactive online English teaching system based on IoT technology, various experiments were performed that show the sublimity of the proposed system.

4.1. Design of the Experimental Environment. Indeed, an environment setting for the experimental work is an important and tough task in order to produce good results. All the experiments were performed on laptop systems having the specification of HP EliteBook840 Intel Core i7 7th generation and RAM of 16 GB, Windows 10 is the operating system used, and MATLAB has been used as a tool and programming language to carry out all the simulations. Multiple experiments have been performed to check the performance and efficiency of the proposed system. At first, a total of 10 students were selected randomly from the university students for the experimental work in order to carry out the regular English online teaching. After that, a total of 15 students were selected randomly from the university students for the experimental work in order to carry out the regular English online teaching. In order to avoid the uniformity of experimental results, the traditional mobile terminal interactive teaching system (system 1) based on augmented reality technology and the three-dimensional interactive teaching system (system 2) based on the contradiction space are used as comparison systems in order to show the sublimity of the system proposed in this study.

4.2. Results and Analysis

4.2.1. Time Test of Students' Acceptance of the English Teaching Content. The practical application effect of different systems can be seen from the time students receive English teaching content. The less time students spend on receiving the teaching content, the stronger the application effect of the teaching system is. With the assistance of the teaching system, students can quickly accept and comprehend the English knowledge they have learned.

In view of the same degree of difficulty of the teaching content, three different teaching systems were adopted to conduct online interactive teaching for 10 students, requiring students to fully master the content to be learned. After the implementation process, a comparison study is conducted to show the effectiveness of the proposed system. The comparison results are shown in Table 1.

By analyzing the experimental data shown in Table 1, it can be seen that due to different teaching methods adopted by the three teaching systems, the time for students to receive the teaching content varies greatly. After the application of the two utilized traditional teaching systems, the time for students to receive the teaching content is more than 14 min. However, after the application of the interactive English online teaching system based on the Internet of Things designed in this study, the time for students to receive the teaching content is significantly shortened, and the minimum time is only 10.02 min, and the maximum time taken is 12.45 min. Figure 7 shows a comparison of the time

Table 1: Comparison of the time of students (10 students) receiving the English teaching content.

Test subjects	Minimum time taken by students in accepting teaching contents		
	System 1	System 2	Proposed system
01	15.23	17.02	11.33
02	15.42	14.64	12.15
03	15.43	18.37	10.03
04	15.75	18.37	12.45
05	16.06	17.03	11.78
06	17.56	17.75	12.02
07	15.37	14.86	10.02
08	15.75	16.95	11.54
09	15.29	14.75	10.75
10	14.16	17.37	11.15

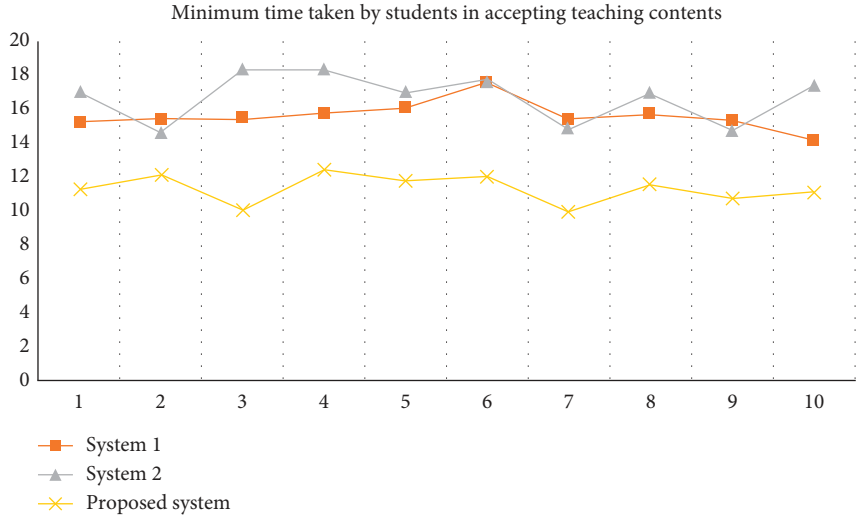

Figure 7: Comparison of the time of students (10 students) receiving English teaching contents.

taken by the students, i.e., 10 randomly selected students, in receiving the English teaching content.

Similarly, another experiment was conducted on 15 students selected randomly from university students using the three different teaching systems mentioned earlier. After the experiment, the three implemented teaching systems were analyzed, and a comparative study was conducted to show the importance of the proposed system over the two earlier approaches. Table 2 demonstrates a comparison of the simulation results attained via the tree teaching systems.

From Table 2, it is obvious that the time to receive the teaching contents varies using the three mentioned teaching systems. From the experimental results, it can be seen that the proposed system has an edge over the others in terms of time efficiency. The time to receive the teaching contents using the earlier two teaching system was more than 14 min, while the proposed system reduced the minimum access time to 10.02 min. Figure 8 shows a comparison of the time taken by the students, i.e., 15 randomly selected students, in receiving the English teaching contents.

4.2.2. Internal Consistency Reliability Test. Internal consistency reliability test refers to the measurement that whether the same results exist when the same teaching system is used to teach English to the same objects under the same conditions. In general, a consistency reliability of more than 75% is considered reliable, indicating that the teaching system can meet the teaching needs. The calculation formula of internal consistency reliability is as follows:

$$\kappa = \left[\frac{1-(X-Y)}{(X+Y)}\right] \times 100\%. \tag{7}$$

Among them, α and β represent the test records of different teaching observers, respectively, and the default is $\alpha > \beta$. The actual teaching process of different teaching modes was observed by different observers, and the observation results were recorded to calculate the consistency reliability among observers. The results of the internal consistency reliability test are shown in Figure 9.

In Figure 9, the internal consistency reliability of system 1 is 69%, and that of system 2 is 66%. The internal consistency reliability of the system proposed in this study is higher than the mentioned two systems, i.e., 96%. The internal consistency reliability of the proposed system exceeds the limit of 75% and far exceeds the internal consistency reliability value of the other two teaching systems. Therefore,

Table 2: Comparison of the time of students (15 students) receiving the English teaching content.

Test subjects	Minimum time taken by students in accepting teaching contents		
	System 1	System 2	Proposed system
01	14.20	17.02	11.33
02	15.34	14.64	12.15
03	15.73	18.37	10.03
04	16.01	18.37	12.45
05	15.40	17.03	11.78
06	16.61	17.75	12.02
07	14.70	14.86	10.02
08	15.72	16.95	11.54
09	16.06	14.75	10.75
10	15.10	17.37	11.15
11	16.22	15.55	10.12
12	14.76	17.23	11.22
13	15.36	16.20	10.80
14	16.12	16.90	10.77
15	15.45	17.20	12.60

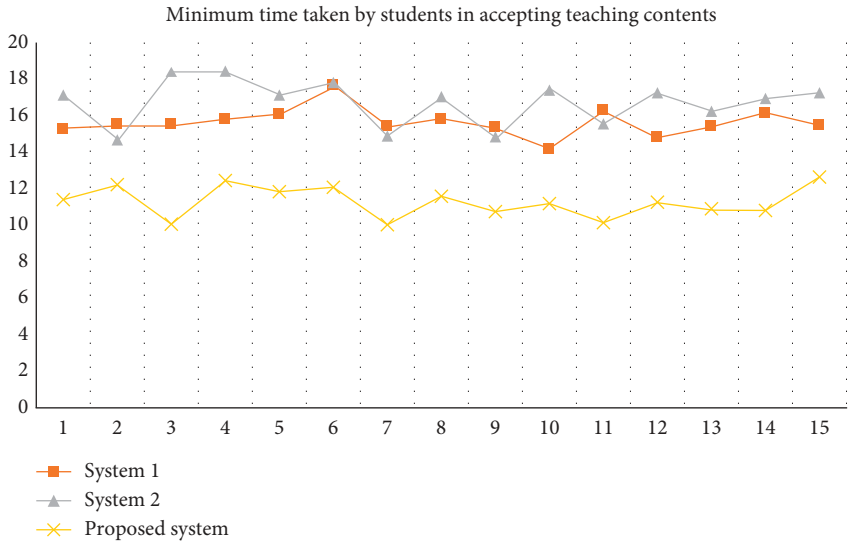

Figure 8: Comparison of the time of students (15 students) receiving English teaching contents.

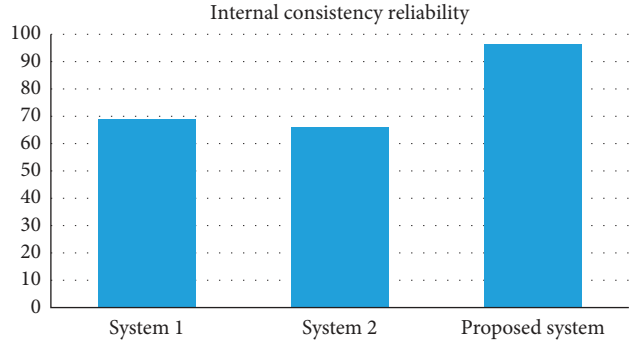

Figure 9: Comparison of the internal consistency reliability of different teaching systems.

it can be concluded that the application of the interactive online English teaching system based on the Internet of Things designed and used in this study can better guarantee the quality of online English teaching in the consistency reliability experiment verification.

4.2.3. Teaching Achievement Inspection. Teaching results can be reflected by the performance of English test scores of the students. The higher the test scores of students, the better the teaching results of the teaching system. Therefore, students' English test scores are used as indicators to verify the

Table 3: Comparison of teaching results of different teaching systems.

Test object number	Student English test score		
	Proposed system	System 1	System 2
01	97	84	89
02	93	95	87
03	93	88	86
04	94	92	82
05	95	91	87
06	96	87	85
07	94	85	85
08	92	85	82
09	95	93	90
10	96	86	87

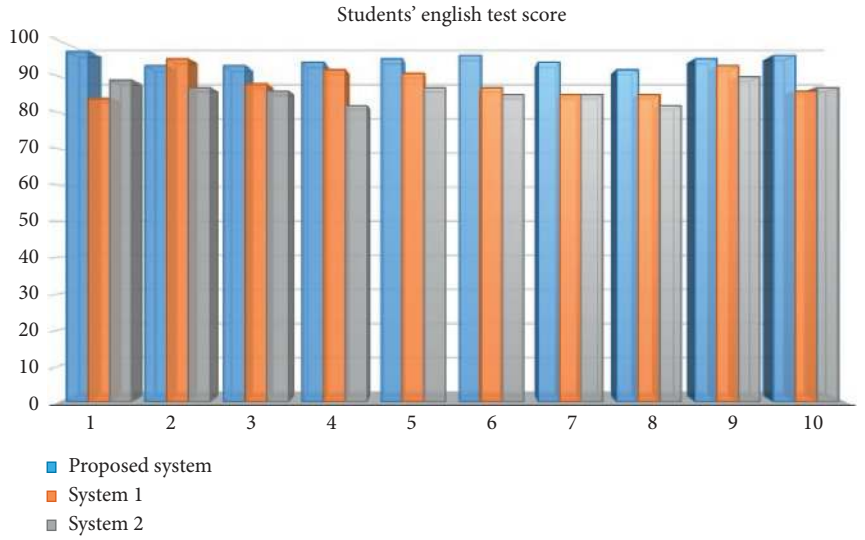

Figure 10: Comparison of teaching results of different teaching systems.

teaching results of different systems. The full score is set as 100 points, with 85 to 100 points as excellent, 60 to 84 points above as qualified, and 60 points below as failing. The results are shown in Table 3.

By analyzing the experimental results in Table 3, it is quite obvious to find out that the student's acceptance of the English teaching content varies with the adoption of different teaching systems. In the proposed system used in this paper, the average English score of all the students was above 90, and the highest test score observed was 97. Table 3 demonstrates that the English test scores of students using the proposed system are significantly higher than those of the other two traditional teaching systems. Figure 10 shows the English test scores of the randomly selected 10 students using the three teaching systems used in this study.

After the application of the interactive online English teaching system based on the Internet of Things technology designed in this study, the time for students to accept the teaching content is shorter, and the test scores of students are significantly higher than those of the other two traditional teaching systems. At the same time, its internal consistency reliability is as high as 96% which is far greater and significantly exceeding the normal threshold value, i.e., 75%. Therefore, the system used in this study has a better application effect and higher application value.

5. Conclusion

The demand for online teaching systems is increasing with the passage of time due to several reasons. Keeping the demand and significance of online teaching systems in consideration, in this study, an interactive English online teaching system is designed in the network Internet of Things environment. The experimental results show that, after the application of the online teaching system designed in this paper, the time for students to accept the teaching content is shorter, and the students' English test scores are significantly higher than those of the traditional teaching systems. At the same time, its internal consistency reliability is high, which fully demonstrates the effectiveness of this system and proves that it achieves the design expectation. Indeed, security is an important factor that increases/decreases the significance and importance of a system. To increase the security of the proposed system, there is a need for a security module which is the future work of this study.

Data Availability

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

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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