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Research Article

Optimization Design and Implementation of Smart Multimedia College English Classroom Integrating Internet of Things Technology

Ning Gao,[1] Yajun Chen ,[1] and Yunxia Bai[2]

[1]*College of Humanities, Baotou Medical College, Baotou 014040, China*
[2]*College of Computer Science and Technology, Baotou Medical College, Baotou 014040, China*

Correspondence should be addressed to Yajun Chen; 102013076@btmc.edu.cn

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With the rise of the Internet of Things technology and the improvement of college teaching requirements, more and more schools gradually use multimedia to carry out teaching activities for students. However, in today's teaching environment, teachers' teaching activities still do not get rid of the traditional thinking mode, and there is no fundamental change in teaching contents. In this context, the application of smart multimedia college English classroom teaching integrating Internet of Things technology was born. This paper mainly studied the optimization effect of smart multimedia integrated with Internet of Things technology on college English classrooms. The students of Baotou Medical College were taken as the research object; first, carry out information perception and data mining analysis work related to English, and finally, carry out diversified and situational teaching through smart multimedia. The degree of effect of optimization is reflected by the changes in the scores of students with different English abilities before and after. This paper mainly studied the optimization of college English classrooms with smart multimedia integrated with IoT, and the effect of optimization was reflected by the changes in the scores of students in Baotou Medical College before and after the experiment with different English abilities. This paper selected 10 sophomore students in Baotou Medical College and used their final English test scores as the benchmark to make statistics on different ability scores. Then, these students were given smart multimedia English classroom teaching activities, and they were tested on their English scores; a comparative analysis of the performance of different students with different English language skills before and after the test had to be done. The results showed that after 30 days of smart multimedia teaching, the English ability of 10 students has been improved. Among them, the average score of listening comprehension increased by 10.2 points, with the largest increase of 53.7%, and the average score of written expression ability increased by 1.1 points, with the smallest increase of 15.3%. Through a specific analysis of its ability, it was concluded that in terms of listening comprehension ability, the score of student 5 was improved to 13 points, the largest increase was 86%, the score of student 2 was improved to 7 points, and the smallest increase was 28%. In terms of reading comprehension, student 4's score increased by 9 points, the largest increase was 56%, and the scores of students 2 and 9 were 2 points; the smallest increase was 7%. To sum up, the smart multimedia in the framework of the Internet of Things technology has a positive feedback effect on the optimization of college English classrooms, and different students' different English abilities have been improved to varying degrees. This provides some guiding suggestions for the subsequent changes in the learning modalities of the undergraduate English classroom.

1. Introduction

As the education model is changed and adapted, the traditional teaching model can no more satisfy the current teaching environment. According to the State Council's plan for talent development, it is essential to create compound talents with integrated knowledge, ability, and morality and other factors. In this context, especially in the current stage of college education, to break the past "cramming" teaching mode, it cannot be limited to offline teaching. The vigorous development of science and technology has provided new ideas for changing the existing teaching mode. In the "14th Five-

Year Plan" of English teaching in many colleges, it is clearly stated that English teaching activities should be combined with Internet of Things technology and multimedia. Make full use of the convenience of the Internet of Things technology and the richness of multimedia resources to realize the diversification and interest of English classroom teaching. It makes full use of the intelligent management and control of the Internet of Things technology and the richness of multimedia resources and realizes the diversification and interest of English classroom teaching.

Following the speedy growth of Internet of Things technology, many scholars have carried out the information-based teaching of English. According to the characteristics of English teaching, a multi-integrated system of listening, speaking, reading, writing, and translation is established through the Internet of Things technology. At the identical time, with the help of multimedia technology, an English teaching environment that integrates various elements such as sound, image, text, and video is created. It allows students to truly experience the pure English teaching and fully mobilize students' interest in English learning. The smart multimedia integrated with IoT technology not only provides a near-real English atmosphere for students' English learning but also provides certain ideas for teachers' teaching behavior change. It truly realizes the intelligent teaching of multimedia, breaking the past that multimedia was only regarded as another offline teaching tool. It gives full play to the multifunctionality of multimedia and brings guiding significance to the subsequent mode change of English teaching.

In the traditional English classroom teaching, there are not only offline teaching, but also multimedia teaching methods. How much influence does multimedia teaching have on English learning? Many scholars have carried out related research on it. Mahdi used a mixed method to divide 40 students into an experimental group and a control group, and they studied the same course to explore the impact of interactive multimedia environment on students' oral ability [1]. Liu conducted a two-year teaching experiment on the network multimedia English teaching model of vocational colleges in China through questionnaires and mathematical statistics. The experimental results showed that network multimedia English teaching not only improves students' English scores but also promotes students' autonomous learning ability [2]. Xia's research and analysis concluded that multimedia situational teaching can help students to standardize pronunciation and correctly understand grammar knowledge, which not only expands vocabulary but also stimulates students' enthusiasm for English learning [3]. Zhao and Liu found that multimedia courseware has the advantages of intuitive and vivid teaching, so college English teachers should design multimedia teaching courseware that conforms to the characteristics of students according to the actual situation of students [4]. Ying conducted a survey on students and teachers in some higher vocational colleges through questionnaires and interviews. Through interviews with the respondents, it was concluded that multimedia teaching can meet the diverse needs of students and improve students' autonomous learning ability and make students' learning content have a certain pertinence to enhance the effectiveness of student learning [5]. It can be seen that multimedia teaching is widely used in college English classrooms, which not only diversifies course learning but also greatly improves students' learning interest and autonomous learning ability. According to the requirements of the "14th Five-Year Plan," it is essential to combine the Internet of Things technology with multimedia to create a new teaching model. Where does IoT technology come in handy? Many scholars have studied this growing technology and found that IoT technology can provide great help in daily life. Zhao-Hui proposed the digital construction of intelligent navigation and identification management of museum collections using RFID technology based on Internet of Things technology [6]. With the intelligent use of Internet of Things technology in equipment, diversified and remote services can be provided for people's fitness. Liu found that the use of IoT technology to analyze digital sports and community fitness showed that future sports fitness requires not only good fitness equipment and fitness environment but also more convenient and intelligent health management, social entertainment, and other services. At the same time, by providing modern fitness service products, it can provide a broader channel for people to choose fitness services [7]. Alam found that the Internet of Things can set up unique identification numbers for different mobile medical devices and then combine these devices with the utilization of the IoT technology to give swift succor and to remotely detect patient, to reduce costs [8]. As it can be seen, there are intelligent identification and easy access to services, among other features of IoT technology. Under this circumstance, combine the current multimedia with IoT technology, and use the highlights of the Internet of Things technology's intelligent recommendation service to improve the daily multimedia English teaching of students, which can realize the diversified and unique service teaching of English classroom teaching.

At present, there is not much research on usage of the IoT technology in environmental detection, building and home automation, energy management, etc. in multimedia college English classrooms. Hence, the combination of IoT technology and smart multimedia is a bold innovation and attempt. The innovation of this paper is to combine the advantages of information perception and lean computing of the Internet of Things technology with multimedia to form a new smart multimedia. Improve the multimedia teaching that is no different from the traditional offline teaching in the past, and make full use of the extensive resources of multimedia and the ability to carry out situational teaching and other characteristics, to carry out personalized and targeted teaching for students' different abilities. It breaks the traditional English learning situation that only considers the whole student, and conducts intelligent and diversified teaching for the different abilities of each student.

2. Theories Related to Internet of Things Technology

2.1. Theory of IoT Technology. The Internet of Things is a new concept technology method of multitechnology integration. It relies on modern information technology to closely

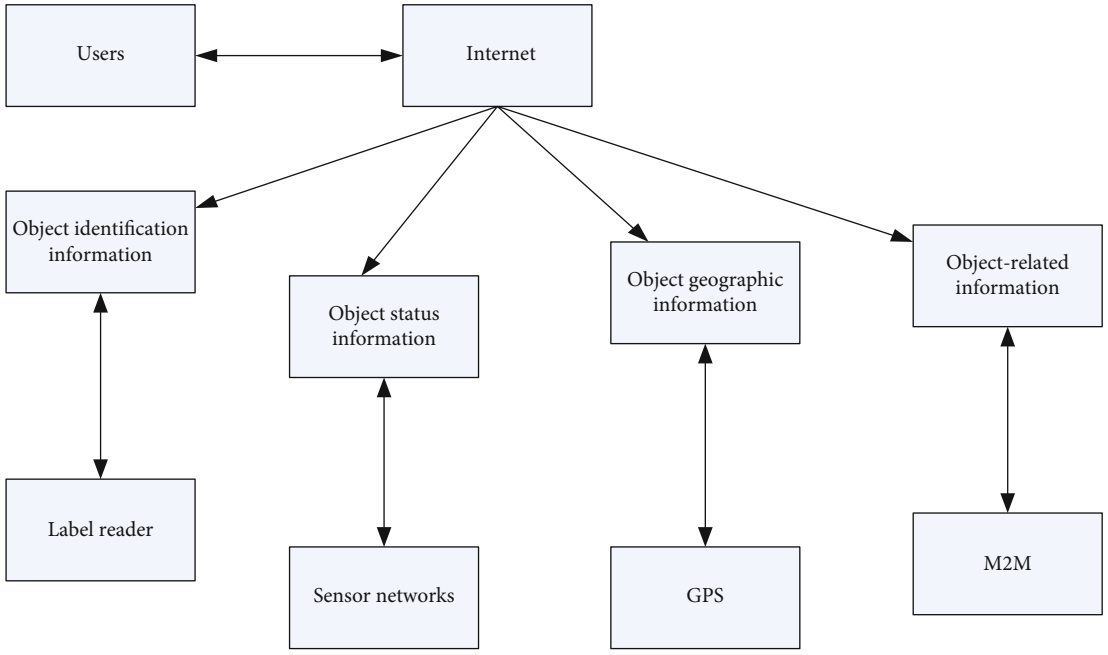

Figure 1: Schematic diagram of IoT sensing and operation.

connect people and objects through technologies such as perception, mobile networks, and automation, so that an unprecedented intelligent system management is constructed, and the links such as item transportation and resource allocation are scientific, efficient, and rational [9]. Part of the operation of the Internet of Things is shown in Figure 1.

(1) Ubiquitous Sensing Technology

Perception technology is the basis for the operation of IoT technology. Without perception technology, the advantages of IoT will disappear. Perception technology is mainly used to identify objects and then obtain the basic information of objects [10]. The general means of collecting information include GPS, sensors, and RFID identification tags.

(2) Information aggregation technology

Information convergence technology is a rising technology [11]. To put it simply, the information aggregation technology is to retrieve the information of the same object from multiple sensors at the same time, then obtain the multidimensional information of the object, and finally fuse the information to make the extracted information more accurate [12]. It can also be said that the information is collected and processed through the Internet of Things; then, the information data is uploaded, and the data is processed through the IoT technology and finally solved and serviced by specific applications.

(3) Lean computing technology

Data mining is to fully mine data information through algorithms corresponding to the data, analyze the potential relationship between the information, and then promote the diversified utilization and dissemination of information [13]. The lean computing of IoT technology is based on data and integrates data mining, multimedia technology, and cloud computing and other technologies [14]. Under the IoT technology, it is essential to interactively process some multimedia information such as text, images, and sounds, so as to establish a certain connection between multimedia, and the final result achieves the required theoretical expectations [15].

2.2. Theory of Data Mining Algorithms. On the theoretical basis of the Internet of Things technology, it is essential to mine the information data existing in the IoT technology and then perform technical processing on this information and finally obtain the required key information data. Data mining requires distributed storage of data, and there are at least storage nodes with a number greater than 1 in the Internet of Things [16]. For any data mining node, the conditional expression that needs to be satisfied is as

$$E_1(A) = \sum_{t=0}^{A\_>L} \int f_1(t)dt. \tag{1}$$

Among them, $E_1(A)$ is the total interactive data stream transmission bandwidth, A is the resource consumption required for mining, and $f_1(t)$ is the efficiency of mining nodes. There is a linear correlation between mining efficiency and mining time.

When a node has multiple concurrent data streams, its mining expression is as

$$E_2(A_1) = A_1 \sum_{L} \oint f_2(t)dt. \tag{2}$$

$E_2(A_1)$ is the transmission bandwidth of the next stage of the data flow, A_1 is the mining bandwidth of a certain node, and $f_2(t)$ is the data mining efficiency of a certain node in the current stage.

In the process of data mining, affected by the transmission bandwidth, mining bandwidth, and node cache, the mining efficiency and data accuracy may be reduced [17]. Therefore, it is necessary to optimize these influencing factors. In the field of data exploration, it is essential to consider the fluctuation rate of transmission bandwidth and the fluctuation rate of mining bandwidth. The calculation is as

$$\begin{aligned} E[T(x)] &= \frac{E|T(x)| - \alpha}{1 - \alpha^2 E\left|T(x)^2\right| - E|T(x)|}, \\ E[P(x)] &= \frac{\alpha 1 - \alpha^2 E\left|T(x)^2\right| - E(T(x))}{E|T(x)|}. \end{aligned} \tag{3}$$

Among them, $T(x)$ is the transmission bandwidth volatility, $P(x)$ is the mining bandwidth volatility, $E|T(x)|$ is the mean of $T(x)$, and $E|T(x)^2|$ is the variance of $T(x)$. There is an inverse correlation between $E[P(x)]$ and $E[T(x)]$.

In the process of data mining, when the expected value of the transmission bandwidth fluctuation rate is a positive number, network bandwidth fluctuations will fluctuate, resulting in low mining efficiency. Therefore, the node cache usage x_1 can be used to suppress the transmission bandwidth fluctuation rate, thereby reducing data mining errors [18]. There is a positive mapping relationship between $T(x)$ and x_1, and the relationship expression is as

$$T(x) \longrightarrow x_1. \tag{4}$$

When $E[T(x) \longrightarrow x_1]$ satisfies the time-varying relation, its relational expression is as

$$E[T(x) \longrightarrow x_1] = \oint E(T(x)). \tag{5}$$

It assumes that the current mining node cache usage remains unchanged, the expression for $T(x)$ in the next stage is as

$$T(x) = \int E(T(x)) + E[T(x) \longrightarrow x_1]. \tag{6}$$

The relationship between Δt and $\Delta T(x)$ at any given stage is as

$$\Delta T(x) = x_1 \int_{\Delta}^{\Delta t} \sqrt{\Delta^2 - T(x)^2}\, dx. \tag{7}$$

Among them, x_1 is the node cache usage, and $T(x)$ is the transmission bandwidth fluctuation rate.

Therefore, the expression for the strength index of data mining can be derived as

$$\Delta\alpha = \int_{\Delta}^{\Delta t} \sqrt{\Delta^2 - T(x)^2}\, dx. \tag{8}$$

The conditions that the entire data mining process needs to meet are as

$$T(x) = \Delta(1-\Delta)\left(\sqrt[\Delta]{1-\Delta\alpha}\right). \tag{9}$$

In the process of mining IoT data, there may be a phenomenon of data fusion. At this time, it is necessary to characterize the data to facilitate the research and analysis of key data [19]. It assumes that there is a data set X, and there is a data x in the data set, according to the information entropy algorithm; the information entropy of x is obtained as

$$E(x) = -\sum_{x \in X} p(x) \ln p(x). \tag{10}$$

According to formula (10), all the detection data are arranged in a descending order, and the information entropy value is larger as the cluster center, and then, the information detection is performed on the remaining data [20]. Its distance expression is as

$$\text{dist} = \frac{|m \cap n|}{|m \cap \bar{n}| + |\bar{m} \cap n| + |m \cap n|}. \tag{11}$$

Among them, m and n are randomly selected cluster centers. When the dist value of a cluster center is smaller than the preset threshold, the data needs to be reselected, and then, the above operation is repeated until all the calculation results are greater than the preset threshold and the program is terminated.

After these operations, the information data mined may have differences in data dimensions, so the information data mined by the Internet of Things technology should be standardized. Its expression to normalize the data is as

$$\begin{aligned} \theta' &= \frac{\theta - \overline{\theta}}{X_\theta}, \\ \theta_t' &= \frac{\theta - \overline{\theta}}{Y_\theta}, \\ \overline{\theta} &= \sum_m \theta \frac{1}{m}, \\ Y_\theta &= \sum_m \frac{\left|\theta - \overline{\theta}\right|}{m}, \\ X_\theta &= \sqrt{\sum_m \frac{\left(\theta - \overline{\theta}\right)^2}{m-1}}. \end{aligned} \tag{12}$$

Among them, θ' is the standardized data, θ is the attribute mean of the data, X_θ is the attribute standard deviation of the data, Y_θ is the average deviation of the attribute, and m is the number of iterations.

3. Current Situation of Multimedia Teaching in College English Classroom and Classroom Optimization Design

3.1. Survey Objects. For the sake of ensuring the authenticity and validity of the survey data, the subjects of this survey are the second-year students of Baotou Medical College, and a total of 110 questionnaires were randomly distributed. According to statistics, there are 100 valid questionnaires, 55 men and 45 men and women, 30% of English majors, and 70% of non-English majors.

3.2. Survey Data Statistics

(1) Gender and major of the survey respondents

After statistical analysis of the returned questionnaires, it is found that boys account for 55%, and girls account for 45%, of which English majors account for 30% and non-English majors account for 70%. The proportion of gender and professional population is shown in Figure 2.

(2) Situation of English teachers using multimedia teaching

In daily English teaching activities, different teachers have different teaching behaviors. Some teachers prefer traditional teaching mode, while others prefer multimedia teaching. When carrying out multimedia teaching, some teachers' multimedia teaching methods are relatively simple, such as teaching completely according to the template; the effect can be imagined, while some teachers fully understand the students' interest in learning and intersperse the teaching activities with images, videos, and other content, which greatly improves the students' interest in learning. Its different English teaching methods and teaching contents are shown in Figure 3.

(3) Students' use of multimedia

In the daily learning process, different students have different attitudes towards multimedia teaching. Some prefer traditional teaching, while others prefer multimedia teaching. They think that multimedia teaching is more lively and interesting. Statistical analysis of students' use of multimedia learning and the content of multimedia learning is now carried out, and the results are shown in Figure 4.

From the above survey results, it can be seen that most teachers tend to use multimedia for English teaching activities. And in teaching activities, combined with images, videos, and other resources to carry out diversified teaching for students, improve students' interest in English learning. Most of the students not only prefer multimedia teaching but also use multimedia to learn different contents of English outside the classroom, which further improves their English performance.

3.3. Classroom Optimization Design and Implementation of Smart Multimedia Teaching in College English Classrooms. In the classical pattern of instructional, the teaching behavior is generally based on offline teaching and supplemented by multimedia teaching. In daily teaching activities, teachers do not make good use of multimedia resources and only regard multimedia as an auxiliary tool, which not only reduces the benefits of multimedia but also deviates from the original intention of multimedia. Building on the IoT technology and relying on the characteristics of the IoT technology, such as information perception and rational allocation of resources, the existing multimedia teaching was processed intelligently. It is necessary to correctly recognize the potential relationship between students, English courses, and teachers, so that teachers can truly understand the needs of students' English courses and the lack of ability in certain aspects, rather than blindly completing English teaching activities. Fully integrate English teaching activities, campus resources, and teaching management; improve students' interest in learning; and change teachers' teaching behavior. Through the implementation of diversified, flexible, and intelligent teaching activities, the teaching behaviors were focused on different English contents, and the resources were allocated rationally and scientifically. It allows students to improve their English ability to a certain extent and further improves their English course performance and classroom learning atmosphere.

In daily English teaching activities, students mainly train in English listening, reading, writing, and translation skills. Taking listening skills training as an example, in the past teaching mode, listening skills training was generally carried out in the speech room. Mainly through the teacher repeatedly playing the relevant listening materials, let the students capture the information related to the topic to answer the question. During the training, because the students could not really perceive the environment in which the listening materials were played, they did not have enough grasp of the key information, which affected the score of this part. When teaching students listening training, teachers cannot accurately recognize students' grasp of the material and can only play the listening materials one-sidedly based on students' feedback. This behavior not only wastes time but also reduces learning efficiency. This paper used the IoT technology to construct smart multimedia teaching, and for a certain piece of listening material, the listening material was accurately segmented according to the students' scores and cognitive level, so that teachers can correctly understand the specific degree of students' grasp of the listening material. For example, a piece of listening material examines both grammar and Western culture, as well as the actual context of language. Different listening requirements were divided and processed through technologies such as information perception of Internet of Things technology, and then, the results were fed back to teachers, so that teachers can focus on teaching the content of listening materials based on the analysis results. Before listening training, relying on smart multimedia tools, students can supplement the knowledge related to the materials, predict the possible situations of the materials, and also carry out follow-up training for

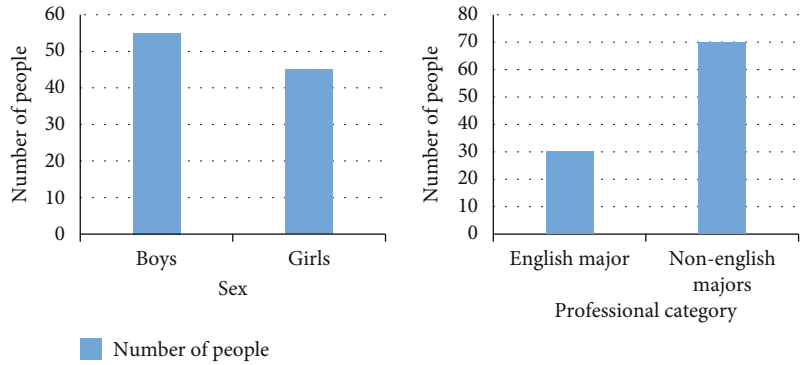

Figure 2: Gender vs. major chart for teaching English courses at college.

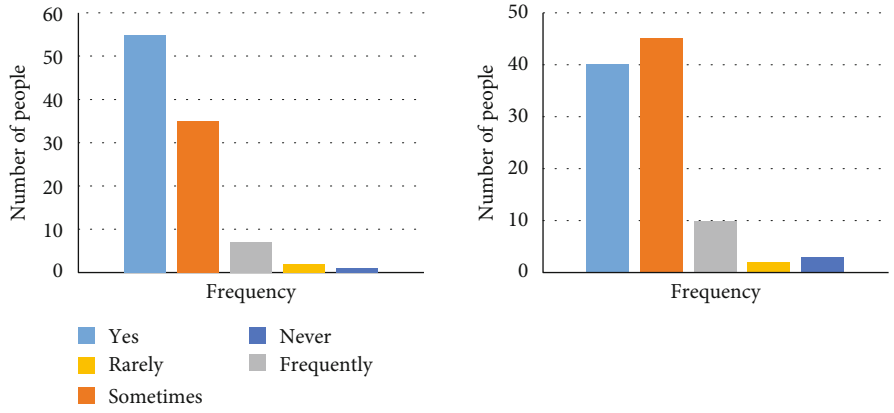

Figure 3: Schematic diagram of the frequency of use of different ELTs and the frequency of their content

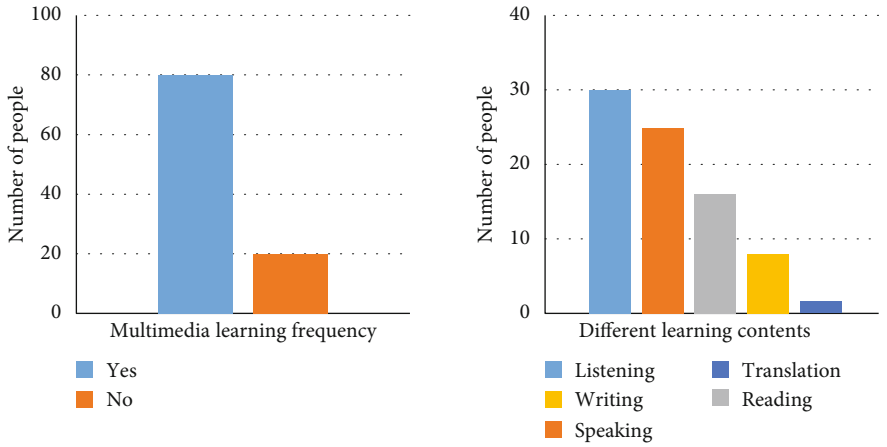

Figure 4: Comparison chart of different students' attitudes and learning contents.

students to cultivate students' language sense behavior. After listening, the knowledge of important and difficult points encountered by students in the materials can be consolidated through smart multimedia in time, thereby improving listening skills. Not only listening skills but also based on the actual English learning situation of students, the Internet of Things technology can be used to perform information perception and other operations on different contents or different skills under the same skill and finally realize the rational allocation of resources. Then, with the help of smart multimedia tools, targeted reinforcement training is carried out on the deficiencies in the English learning process, so that different students' different English course skills can be improved accordingly. In terms of reading comprehension, teachers can collect relevant reading materials through smart multimedia technology and then use video editing software to compile short videos that are easy to understand. The content focuses on the background knowledge of

reading comprehension and important and difficult grammar and vocabulary. In terms of translation ability, teachers use smart multimedia technology to show the translation materials to students in the form of video or animation, so that students can translate language in a real language environment, and guide the construction of a near-real situational state. It is also possible to make the translation materials into courseware through smart multimedia, and the teacher will slowly guide the students to enter a translation scene. In terms of written expression ability, writing is a "bilateral" or "multilateral" behavior. Compared with the traditional writing mode, teachers can use smart multimedia to let students understand writing-related topics and some excellent sentence expressions. Smart multimedia integrated with Internet of Things technology allows students and teachers to train and teach their own shortcomings. It also allows students to truly experience the special situational environment of language, rather than just memorizing them by rote. Let the Internet of Things technology truly realize the diversification of classrooms and information-based teaching.

4. Experiment after Optimization of College English Classroom

The integration of traditional multimedia teaching and IoT technology forms a new smart multimedia teaching. By optimizing the teaching activities of the current college English classroom, individualized teaching behaviors are carried out according to the English learning conditions of different students. By combining the advantages of rich multimedia resources and situational teaching, it is possible to carry out targeted training on listening and reading skills in English classrooms, so as to meet the basic requirements of improving students' English performance. In order to test the optimization effect of smart multimedia based on Internet of Things technology in college English classrooms, the second-year students of the College of Computer Science and Technology of Baotou Medical College were randomly selected, and the changes in their listening and reading skills before and after using the smart multimedia teaching behavior integrated IoT technology to reflect the degree of optimization effect.

4.1. Subject's Relevant Skills and Achievement Data. In order to ensure the authenticity and validity of the data before and after the experiment, the daily English test paper of Baotou Medical College is selected as the test standard sample paper, out of 100 points, and the scores of different question types are shown in Table 1.

10 sophomore students from the College of Computer Science and Technology of Baotou Medical College were randomly selected and named as Student 1-Student 10. First, the data statistics before the test were conducted on the skills of listening comprehension and reading comprehension of the selected 10 students. The final test scores of the five students in the previous semester were taken as the pretest scores, and the scores of different test contents were counted, respectively. The results are shown in Table 2.

It can be seen by combining Tables 1 and 2 that the scores of skills such as listening comprehension ability and translation ability of the 10 students are not high, and the scores of each student's ability are uneven, ranging from high to low. The average score of the 10 students' listening comprehension ability was 19 points, the reading comprehension ability was 22 points, the translation ability was 7.7 points, and the written expression ability was 7.2 points. The average score was only 55.9 points. It is equivalent to the average score of these 10 students being in a state of failing, referring to the standard of the percentile system.

4.2. Students' English Performance after Smart Multimedia Teaching. Then, these 10 students carried out smart multimedia teaching activities integrated with IoT technology. Through the rich resources and diversified teaching of smart multimedia and the reasonable material assignment of IoT technology, targeted training of different skills and abilities of different students was carried out; the training time is 30 days. In order to ensure the reliability of the experimental results, the phenomenon that the test results deviate from the expected due to the superposition of knowledge was not considered. After a period of teaching, the 10 students were given an English test. The test questions are consistent with the above, and the content and difficulty of the questions are roughly the same, so as to ensure the effectiveness of the teaching activities. Then, the English scores after the test are counted, and the results are shown in Table 3.

It can be seen from Table 3 that after a period of teaching activities, the different abilities of each student have been improved to a certain extent. From the average point of view, the average score of the 10 students' listening comprehension ability was 29.2 points, the reading comprehension ability was 27.5 points, the translation ability was 9.1 points, and the written expression ability was 8.3 points. The average score of the whole test paper was 74.1 points, which is much higher than the passing score and belongs to the middle level. In order to better reflect the effect of smart multimedia teaching integrated with IoT technology, an in-depth analysis of the grade data in Tables 2 and 3 was carried out.

(1) Comparison of the average values of different English question types

The average values before and after the test of different question types in Tables 2 and 3 were compared and analyzed by graphing, and the analysis results are shown in Figures 5 and 6.

As can be seen from Figure 5, after a period of smart multimedia teaching, students' English ability has been improved. After the test, the average score of listening comprehension ability increased by 10.2 points, the average score of reading comprehension ability increased by 5.5 points, the average score of translation ability increased by 1.4 points, and the average score of written expression ability increased by 1.1 points. As can be seen from Figure 6, the improvement rates of listening comprehension and reading comprehension are all positive, indicating that the improvement of ability after smart multimedia teaching is positive and has a certain positive effect. Among them, the improvement rate of listening

Table 1: College English paper question type and mark scheme.

English paper question type		
Test paper structure	Test contents	Score
Listening comprehension skills	Short news	7
	Long conversation	8
	Listening chapter	20
Reading comprehension skills	Vocabulary comprehension	5
	Long form understanding	10
	Read carefully	20
Translation skills	Chinese to English translation	15
Written expression skills	Short essay writing	15

Table 2: Performance data sheets that measure different skills of students.

Student's name	Listening comprehension skills	Reading comprehension skills	Translation skills	Written expression skills
Student 1	18	20	5	8
Student 2	25	28	6	9
Student 3	20	21	8	7
Student 4	19	16	10	6
Student 5	15	18	7	6
Student 6	16	21	6	5
Student 7	17	23	9	9
Student 8	19	20	11	8
Student 9	20	26	8	7
Student 10	21	27	7	7
Average value	19	22	7.7	7.2

Table 3: Data table of skill scores of different students after the test.

Student's name	Listening comprehension skills	Reading comprehension skills	Translation skills	Written expression skills
Student 1	28	28	8	9
Student 2	32	30	7	10
Student 3	30	30	9	8
Student 4	30	25	11	7
Student 5	28	26	8	7
Student 6	27	25	7	7
Student 7	28	28	10	10
Student 8	30	25	12	9
Student 9	30	28	9	8
Student 10	29	30	10	8
Average value	29.2	27.5	9.1	8.3

comprehension ability is the largest, which is 53.7%, and the improvement rate of written expression ability is the smallest, which is 15.3%.

(2) Ability scores of different students before and after the test

The changes in English ability of different students before and after the test in Tables 2 and 3 were compared and analyzed, and the analysis results are shown in Figure 7.

It can be seen from Figure 7 that different students' English abilities have improved to varying degrees, which showed that the smart multimedia integrated with IoT technology has a positive feedback effect on students' English abilities. In terms of listening comprehension, student 5 had the largest improvement, 13 points, and student 2 had the smallest improvement, 7 points; in terms of reading comprehension ability, students 3 and 4 had the largest improvement, 9 points, and students 2 and 9 had the smallest improvement, 2 points; in terms of translation ability, the scores of students 1 and 10

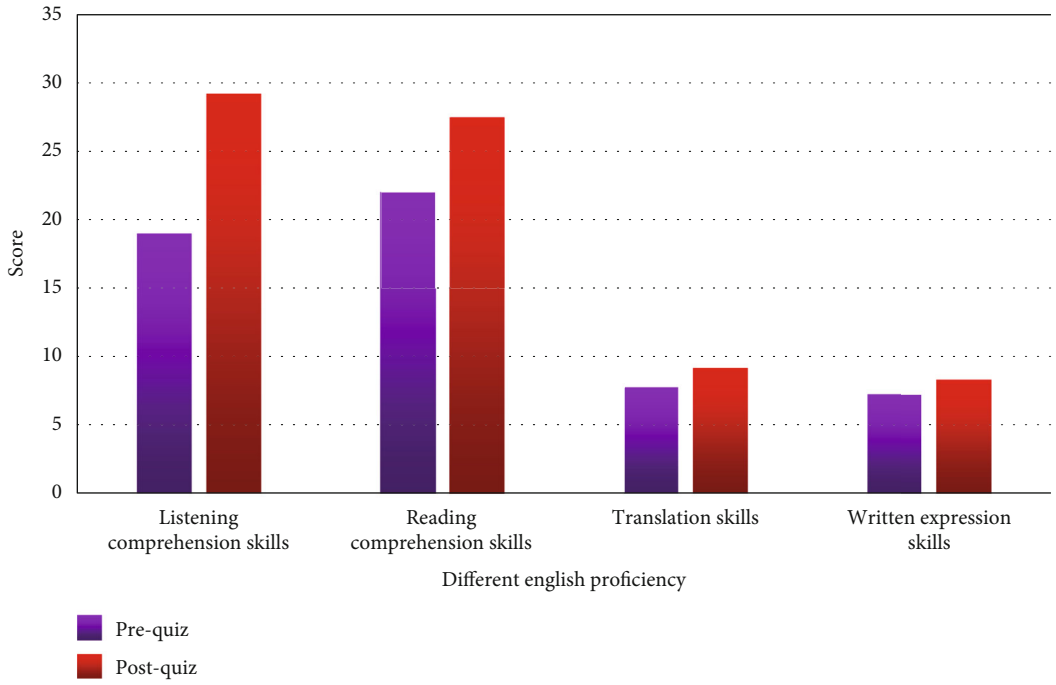

Figure 5: Comparison of different English proficiency scores before and after the test.

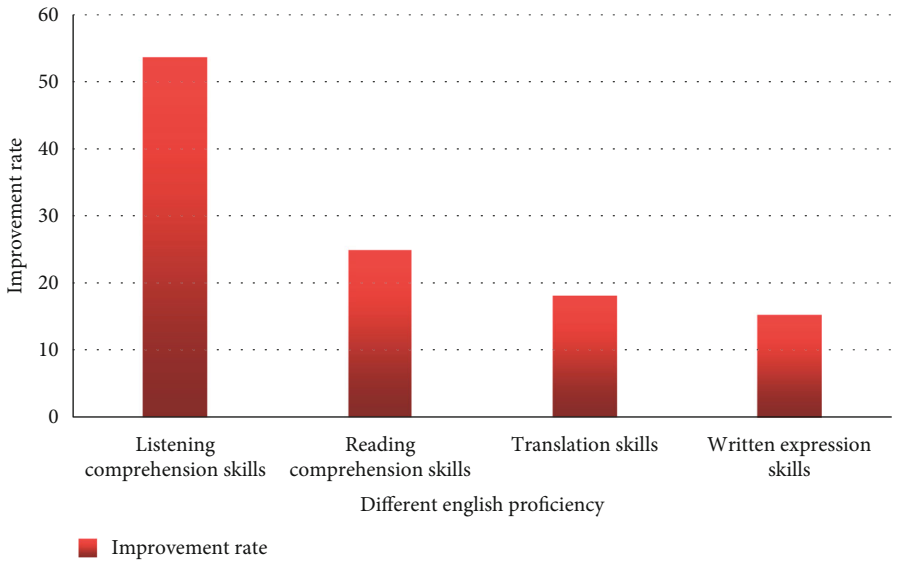

Figure 6: Diagram of the improvement rate after different English proficiency tests.

improved the most, which were 3 points, and the scores of other students were improved by 1 point; in terms of written expression, student 6 had the largest improvement in grades of 2 points, and the rest of the students had an improvement of 1 point. For the sake of better reflecting the improvement effect of various abilities of students, the improvement rate of various abilities of different students was calculated, and the calculation results are shown in Table 4.

In order to intuitively understand the changes in each student's grades, the data in Table 4 was analyzed graphically, and the analysis diagram is shown in Figure 8.

It can be seen from Table 4 that the improvement rates of various abilities of different students are all positive, which indicated that the smart multimedia based on the Internet of Things technology has a positive feedback effect on students' English ability. As can be seen from Figure 8, in terms of listening comprehension ability, student 5 had the largest improvement rate of 86%, and student 2 had the smallest improvement rate of 28%; in terms of reading comprehension ability, student 4 had the largest improvement rate of 56%, and students 2 and 9 had the smallest improvement rate of 7%; in terms of translation ability,

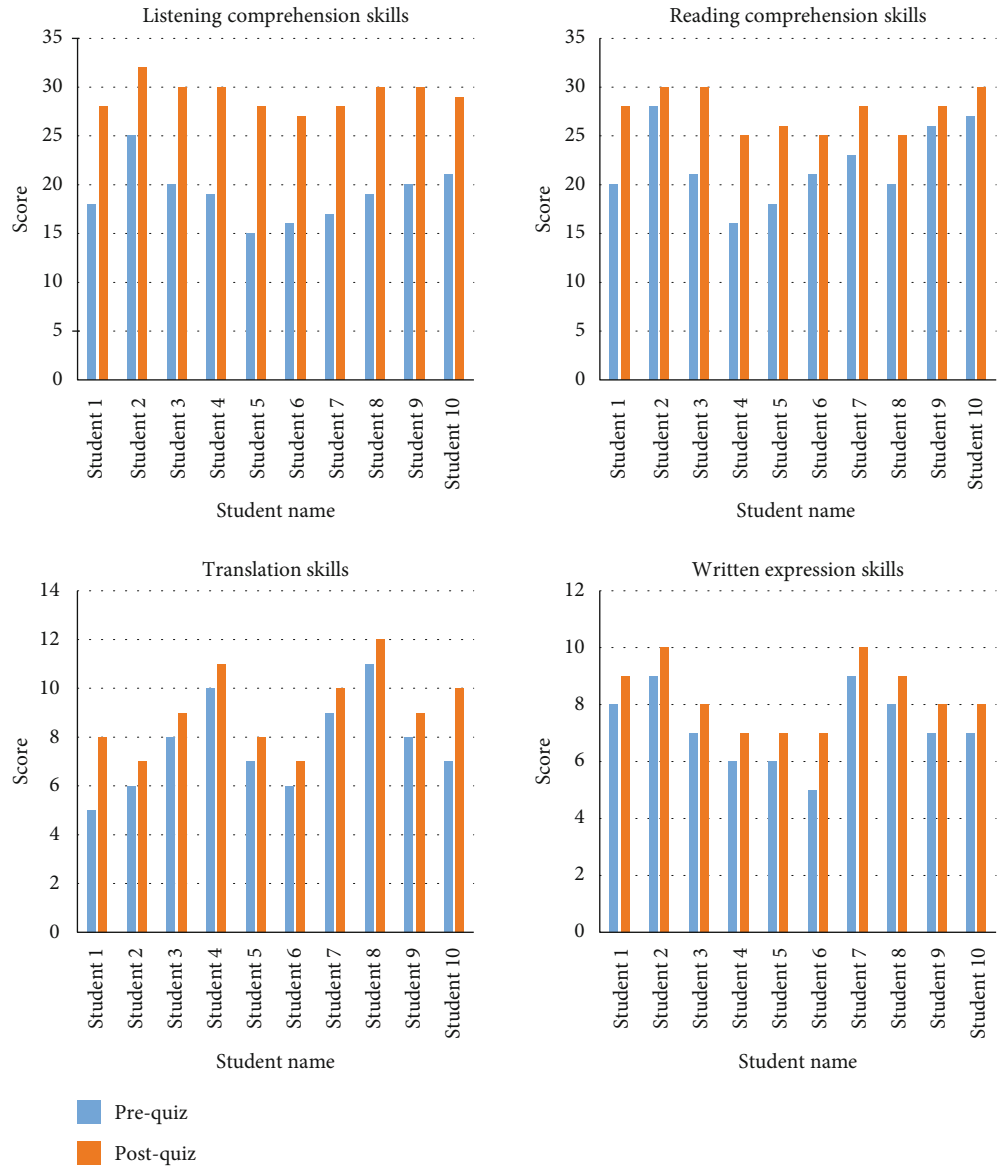

Figure 7: Comparison of English proficiency scores of different students before and after the test.

Table 4: Data on the rate of improvement of English proficiency of different students before and after the test.

Student's name	Listening comprehension skills	Reading comprehension skills	Translation skills	Written expression skills
Student 1	0.56	0.4	0.6	0.12
Student 2	0.28	0.07	0.16	0.11
Student 3	0.5	0.42	0.12	0.14
Student 4	0.57	0.56	0.1	0.16
Student 5	0.86	0.44	0.14	0.16
Student 6	0.68	0.19	0.16	0.4
Student 7	0.64	0.21	0.11	0.11
Student 8	0.57	0.25	0.09	0.12
Student 9	0.5	0.07	0.12	0.14
Student 10	0.38	0.11	0.42	0.14

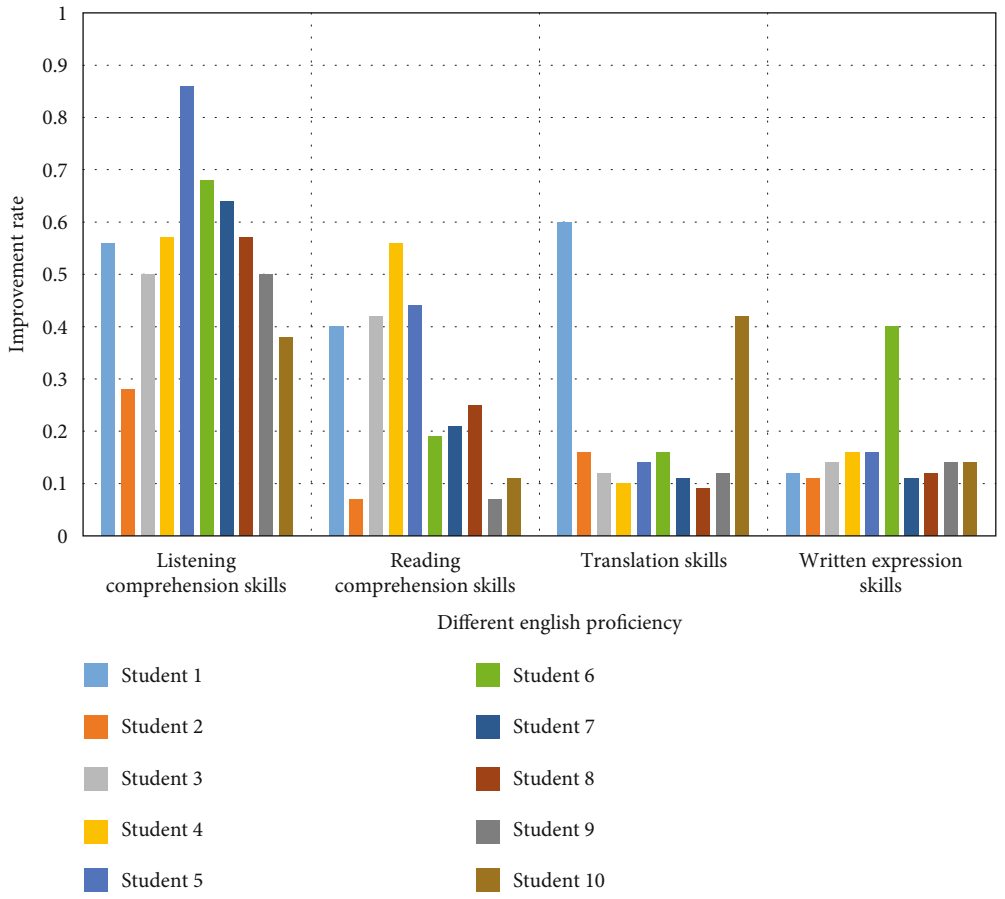

Figure 8: Comparison of the improvement rate of each ability of different students after the test.

student 10 had the highest improvement rate of 42%, and student 8 had the smallest improvement rate of 9%; in terms of written expression, student 6 had the largest improvement at 40%, and students 2 and 7 had the smallest improvement at 11%. To sum up, the smart multimedia under IoT technology has an active contribution on the optimization of English classrooms, and for a short while, it plays a positive role in the improvement of English teaching and improves students' English course performance.

5. Conclusions

In latest several years, with the rise of IoT technology, a large number of research results on the application of the Internet of Things technology have also spewed out. The IoT technology has a series of advantages in agricultural production, smart home, and environmental detection, which brings great convenience to people's lives. In this context, the Internet of Things technology and multimedia are integrated to form a new smart multimedia, creating a new college English classroom teaching mode. This paper mainly analyzed the changes of four different English abilities of 10 students in Baotou Medical College after the smart multimedia college English classroom teaching integrated with the Internet of Things technology to reflect the effect of smart multimedia. The overall average score of 10 students and the different ability scores of each student were compared and analyzed, and it was concluded that the smart multimedia integrating the IoT technology has a significant effect on the college English classroom teaching mode. The main research work of this paper is divided into three points:

(1) Theories related to Internet of Things technology

This part focused on the characteristics of the ubiquitous perception and information aggregation technology of the Internet of Things technology, and in accordance with the distinctive features of its information perception and lean computing, it mined and processed the potential key information and provided a theoretical basis for the follow-up work.

(2) The realities of the undergraduate English classroom teaching and classroom optimization

This part mainly investigated the relevant situation of the sophomore students and teachers in Baotou Medical College on multimedia teaching and learning and then optimized the current college English classroom according to the survey results. First, the information about the different English abilities of different students was acquired and processed, so that teachers can truly understand the needs of

students and then use multimedia to teach students in a diversified and situational manner, so that students can feel the real English.

(3) Experiment after optimization of college English classroom

This part randomly selected 10 sophomore students from Baotou Medical College. Based on the final English test scores of these 10 students in the previous semester, the scores of these 10 students in listening, reading, writing, and translation were calculated. Then, according to their different abilities, implement smart multimedia teaching. After completing 30 days of teaching activities, a comparative analysis of the overall average of different English proficiency and each student's different English proficiency results was conducted. It was concluded that the intelligent multimedia under the integration of Internet of Things technology has a significant effect on college English classroom teaching.

Due to the influence of the experimental environment, the number of questionnaires distributed and recovered in this article is not large enough, which will cause errors in the judgment of the current situation of college English classrooms. The number of students selected for the experiment of the improved college English classroom teaching is relatively small, which may affect the final experimental results. These deficiencies are aimed at this paper; it is also the focus of future work improvement.

Data Availability

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

Conflicts of Interest

There are no potential competing interests in our work.

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