

## *Retraction*

# **Retracted: Research on Distance Teaching System of English Course Based on Wireless Network Technology**

### **Scientific Programming**

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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) Peer-review manipulation

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.

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] S. Zheng, "Research on Distance Teaching System of English Course Based on Wireless Network Technology," *Scientific Programming*, vol. 2021, Article ID 3275340, 12 pages, 2021.

## Research Article

# Research on Distance Teaching System of English Course Based on Wireless Network Technology

Shuai Zheng 

*School of Foreign Languages and Tourism, Puyang Vocational and Technical College, Henan Puyang 457000, China*

Correspondence should be addressed to Shuai Zheng; zhengshuai666@mail.sdufe.edu.cn

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The development in technology is taking place with an accelerating pace across the globe. The increasing expansion and advancement in the field of information technology and the modern teaching system provide a technical support for the development of a distance teaching system to learn English courses. Multimedia teaching system of English course based on B/S framework (system 1) and English teaching system based on MVC architecture (system 2) were the two most prominent and widely used approaches for the distance teaching system of English learning courses. These systems comprehensively consider the current English teaching needs, develop the existing architectures, discuss the system architecture and functions, and establish the corresponding development environment. However, the mentioned systems have the problem of high proportion of memory resource consumption and high failure rate of the communicating nodes. In order to reduce the proportion of memory resource consumption and node failure rate of distance teaching system and effectively improve the teaching effect, this study designed a distance teaching system of English course based on wireless network technology. In order to analyze the functionality and stability of the wireless network technology in distance teaching of English course, the server-side and client-side modules of the system are designed. The server side is mainly used to maintain and control the overall functions of the system, while the client side is used to access/request the contents from the server. On this basis, the system software module is designed. The memory consumption results are accounted for under 30%, which is significantly lower than the earlier-mentioned systems, and the node failure rate of the system proposed in this paper does not increase significantly and remains below 4% all the time which indeed is a very low amount of failure rate. The experimental results show that the memory resource consumption ratio and node failure rate of the proposed system are very low, and the application feedback effect is significantly better than the other systems.

## 1. Introduction

English language has been a focus and need of every researcher nowadays, in order to accomplish their research. The learning of online English (second or foreign language) courses in China, as well as changes in motivation to learn, has gotten a lot of attention as the information age on the Internet has progressed and distance education products are changed significantly [1]. Furthermore, the study findings on motivation in conventional (second or foreign) language classrooms are difficult to adapt to online English classroom learning settings, and different objectives of the online English language learners have come to an end. The conventional static motivational theories struggle to understand and study the process of dynamic changes that

takes place with the passage of time [2, 3]. As a result, the problem of demotivation among online English course students in distance education is increasingly becoming a new topic in second language study. Because of the widespread use of computer and network technology, the use of online courses is becoming increasingly popular [4]. It allows learners to learn new skills and abilities without regard to space or time constraints [5]. Massive open online courses (MOOCs) have broadened the applicability range of online remote courses by making course materials available to students all over the world. MOOCs offer a lot of high-quality online courses and other learning resources to students all over the world and are considered as the best platform for global education institutions to share and observe high-quality courses [6].

Learning languages is a fundamental and important ability in the current highly competitive international environment. To meet the needs of social globalization and economic development, higher quality individual's language ability is very important. Language learning necessitates long-term and consistent practice, and an increasing number of students are opting for online open source courses to learn languages and to alive themselves in the modern era competition [7]. According to Beltrán et al. [8], online courses have various characteristics; for example, (i) they provide audiovisual teaching tools, (ii) they adopt the Internet and enable language learners with similar proficiency levels to interact online, (iii) they provision cooperative learning, (iv) they allow language learners to conduct personalized learning at their own pace, and (v) they promote learner autonomy and promote learner autonomy. Numerous scholars have investigated the efficiency of language acquisition through the network environment and online platforms, particularly online open course platforms, over the last years [9, 10]. For example, Ashton and Davies [11] have used peer assessment in the creation of MOOCs to improve the students' educational outcomes. To improve the learning effects, Moreno and Traxler [12] explored the barriers of Mobile Assisted Language Learning, stating that instructors need to modify their mindsets and adopt mobile devices as instruction-assisted instruments. Wang et al. [13] demonstrated that, under the flipped classroom model, online preclass learning might improve learners' speech proficiency.

Internationalization has resulted in a significant increase in cross-national interactions and cooperation, as well as an increase in international activities. As an international language, English has also become an important medium of communication [14]. Further, the social background also makes English teaching more important. The development and advancement of information technology (IT) promote the upgrading of new educational models. Education modernization has become an effective mean to improve the quality of education, and the relevant English distance teaching system has emerged at the right moment [15]. The main goal of English course teaching is to improve students' learning ability and quality of education, and the rapidly developing network technology is the basic way to achieve this goal [16]. Scholars have designed a multimedia teaching system for the English course of the college, based on B/S framework [17]. Their proposed system combines a variety of modes, such as YouTube channels, electronic dictionaries, educational movies, and e-books and monitors the students' learning progress through the way of network logs. Some scholars have also designed an English teaching system based on MVC architecture [18]. Their proposed system comprehensively considers the current English teaching needs, develops the existing MVC architecture, discusses the system architecture and functions, and establishes the corresponding development environment.

The development of wireless network technology-based distance teaching system for English courses not only increases students' knowledge and strengthens interactions between teachers and students, but also allows everybody to

communicate with one another and learn from each other without the regard of time or distance. Education curriculum in modern age has had significant ramifications in the field of education. Students' cognitive structure, learning processes, interpersonal interactions, and self-evaluation are all changing in education. The goal of the distance teaching system, which is based on a wireless remote teaching environment, is to allow students to study intelligently. The phrases "loss" and "lost" are similar in Chinese learners of foreign languages. Their linked study is on a smaller scale and occurs less frequently than theirs, and it is still in its infancy in European societies. The research strategy they follow is mostly empirical research. Although their work focuses on contributing variables and the sense of irritation in the EFL learning classroom environment, there are few research approaches that have not yet included motivational elements and learning environments. The earlier-mentioned systems have the problems of high proportion of memory resource consumption and high failure rate of nodes. To solve these problems, a remote English teaching system based on wireless network technology is designed in this study. The main contributions of the proposed work are given as follows:

- (i) The purpose of this study is to establish a communication channel between teachers and students and to ensure that the teachers can monitor students' learning status in real time.
- (ii) The proposed system comprehensively considers the current English teaching needs, develops a wireless network-based architecture, discusses the system architecture and functions, and establishes the corresponding development environment.
- (iii) The proposed system is efficient in terms of both energy and memory and has lesser node failure rate as compared to the existing systems.

The remaining of the paper is structured in the following order: Section 2 represents the related work; Section 3 shows the analysis of application forms of wireless network technology in distance teaching of English courses; Section 4 illustrates the construction and architecture of distance teaching system for English courses; and Section 5 describes the experimental results and analysis. Section 6 concludes the proposed work.

## 2. Related Work

Online courses are facilities and resources available on the Internet for academic purposes, such as providing learning or teaching materials and allowing teachers and students to communicate with each other for the purpose of exchanging information and valuable thoughts [19, 20]. Online, public, and flexible learning has become the norm in the field of education due to the ubiquity of information and communication technologies [21]. MOOCs first appeared in 2008 and immediately gained popularity across the globe. MOOCs are huge learner-centered open educational resources that are typically defined as free and open digital materials for educators, students, and self-learners to use for

teaching, studying, and research [22, 23]. Anybody can engage in MOOCs, get relevant learning tools, communicate with other students, reflect on and share their experiences over the Internet, and share what they have learned with others [24]. According to Comer et al. [25], MOOC and open online courses share the same characteristics; they both are Internet based courses open to all types of learners. Hence, MOOCs are now the newest trend in online learning that facilitates an increasing number of language learners and courses.

Academic researchers claim that, throughout the last few years, technology-assisted language acquisition has emerged as a critical research topic [7, 26]. Because of the advancements in information and network technologies, online language learning has gained popularity. A network environment provides a more individualized learning strategy than the traditional training and methods. For example, Hourigan and Murray [27] stated that learning languages using Blogs enables learners with limited experience to become considerably more confident learners at the early stages. When examining the evolution of technology-based language learning, numerous problems, such as application areas, research aims, and learning methodologies, are vital to consider, according to the Technology-Based Learning model [28, 29]. Research scholars have identified two types of language learning: native language (L1) and nonnative language (L2) learning, in terms of the application area [30]. Some research scholars have looked into online L1 learning in recent years. For example, Phi et al. [31] studied a group of English instructors who took part in teacher training courses and investigated their perceptions of using MOOCs. Huang [32] investigated the academic writing MOOCs and discovered that writing can be considered as a kind of skill development to improve the grammar and surface structure of an article. Similarly, a growing number of scholars have looked into L2 learning in MOOCs, with English as a second language receiving the most interest as compared to the other languages [33, 34]. For instance, Comer et al. [25] looked into the grading of MOOC writing. Their study discovered that a well-structured and effective peer assessment is particularly beneficial in writing MOOCs using quantitative and qualitative analyses.

Some research studies have undertaken reviews of mobile language learning studies as well as digital game-based language learning studies in the recent years [35]. The earlier-mentioned approaches and models have the problem of high proportion of memory resource consumption and high failure rate of nodes which indeed is a serious issue. To overcome the issues in the earlier models and approaches this study mainly focuses on the development of a remote English teaching system based on wireless network technology. The proposed system is considered to be of a great help for the online English learners and academics.

### 3. Analysis of the Application Forms of Wireless Network Technology in Distance Teaching of English Courses

This section represents the analysis of application forms of wireless network technology-based distance teaching system of English courses. This system is divided into various submodules and is discussed briefly as follows.

*3.1. Implementation of Curriculum Teaching.* Distance education institutions upload English course learning resources to the learning website, and students can use mobile devices to visit and access the teaching website for learning anytime and anywhere according to their own learning requirements [36]. At the same time, the learning website also provide English course content and learning resources for students to download the resources to assist students in offline learning. When students encounter difficult problems in the learning process, they can choose to use e-mail or submit the problems to the communication platform provided by the learning website and wait for the teacher to answer the questions; at the same time the students can continue their study without any interrupt. The students can also communicate through Tencent QQ and other real-time interaction platforms, by accomplishing real-time communication with other students or teachers.

*3.2. Dynamic Release of All Kinds of Educational Information.* A variety of dynamic educational information is published on the website for students to browse, including English learning lectures, professional forums, teaching plans, test information, online Q&A time, and so on. In this way, students can learn relevant learning information immediately and get ready to participate in relevant teaching activities [37].

*3.3. Online Tests and Quizzes.* When students complete a particular level of English learning, they login to the website to take a course test. The test date of English course can be freely chosen by the student, but the test time must be uniform. For objective test questions, the website can directly provide correct answers to the students to check after they make an attempt, while for subjective test questions, the students can only get the evaluation results after the teachers review them, and it is a kind of non-real-time result feedback [38]. In this way, both the teacher and student can master the specific learning situation and provide corresponding learning strategies for the next stage of English course learning.

*3.4. Collaborative Learning.* In the distance teaching of English courses, it is necessary to provide a cooperative communication platform for students' learning, in order to

help students to achieve better results. For difficulty of the problems encountered in the process of learning, the students can submit to the collaborative learning platform through mobile device. Further, the collaborative learning platform uses push technology, the problem to the teachers and the students' mobile devices, the other students and teachers, after receipt of the information that can be aimed at the problem of real-time discussion or solutions. In this way, communication can be effective in real time. Because of this way of learning the students and teachers at the same time in different places on one or more problems can do a detailed discussion, and it is beneficial for both the teachers and students. They can express their own opinions and views, so it truly realizes that the distance education time and space separation, anytime and anywhere learning characteristics, make the distance teaching system as the first priority which is difficult to achieve via the traditional teaching methods [39].

#### 4. Construction of Distance Teaching System for English Courses

This section of the paper represents the methodology followed for the construction of distance teaching system for English courses. The construction process of the distance teaching system consists of various submodules and is discussed briefly in the following subsections.

##### 4.1. Server-Side Architecture of the Proposed System

**4.1.1. Working Frequency of Wireless Network and Data Transmission Analysis.** Wireless network has a variety of structures, including star-like, tree-like, and mesh topology [40]. The different wireless network topologies are shown in Figure 1. In this study, the tree wireless network topology has been used for the accomplishment of the proposed system.

In the tree network topology, two physical layer standards, 2.4GH and 868/915 MHz, are used, defined by IEEE 802.15.4 standard. Hence, there are three operating frequencies in the system. Both of the physical layers use a unified data format based on the DSSS (Direct Sequence Spread Spectrum). Different operating frequencies are used in different areas, and their modulation means and transmission speed both are different. In the tree wireless network, the 4 GHz band is applied. The 4 GHz frequency band is the global unified frequency band. The use of this frequency band in this paper can reduce the production cost and avoid mutual interference with other wireless communication equipment.

**4.1.2. Network Routing Address Assignment Mechanism.** There are two kinds of address assignment mechanisms in wireless network topology, such as distributed and high-level address assignment. This paper uses a distributed allocation mechanism [41]. In a wireless network, each device has a relative depth that represents the minimum number of hops required for the device to reach the coordinator. Assume that the coordinator depth is 0, and the first-level child

node depth is 1. Nodes can be represented by the maximum depth of cluster tree  $T_{\max}$ , the maximum number of child nodes  $C_{\max}$ , and the maximum number of routing nodes per node  $N_{\max}$ . The calculation formula to determine the address size of  $Cskip(d)$  for all routing child nodes of depth  $D$  is given as follows:

$$Cskip(D) = \begin{cases} 1 + C_{\max} \times (T_{\max} - D - 1), & N_{\max} = 1, \\ \frac{1 + C_{\max} - N_{\max} - C_{\max} \times N_{\max}^{T_{\max} - D - 1}}{1 - N_{\max}}, & N_{\max} \neq 1. \end{cases} \quad (1)$$

In formula (1),  $Cskip(D)$  represents the degree of address offset between parent nodes of  $D + 1$  layer.

If  $Cskip(D) = 0$ , then this device belongs to the terminal node in the wireless network and cannot continue to add child nodes. For the terminal node, the address allocation method depends on the network entry order. The calculation formula of the network address of the child node is given as follows:

$$An = \begin{cases} Cskip(D) \times (n - 1) + 1, & 1 \leq n \leq N_{\max}, \quad Router, \\ Cskip(D) \times N_{\max} + n, & 1 \leq n \leq (C_{\max} - N_{\max}), \quad EndDevice. \end{cases} \quad (2)$$

In formula (2),  $n$  represents the number of terminal nodes.

**4.1.3. Design of Server and English Curriculum Resource Database.** The main work in the process of designing English course resource database is to construct an E-R model, also known as Entity Relationship Diagram. The E-R model provides the information about entity types, attributes, and the relationship between entities, etc. [42]. Rectangles are used to represent entities, ellipses are used to represent the attributes, rhombus is used to describe the relationship between entities, and lines are used to connect related entities together. The E-R model diagram is shown in Figure 2.

The business logic of the system server is used to deal with user requests. Combined with the user needs, the server functions are divided into user management, course management, information management, and some other useful modules.

Browser, data block service, and Web services are used to construct the Web server. The client sends the request for a particular service, the Web server receives the HTTP request sent by the client browser, and after receiving the request it queries the database for further processing. When the browser receives the query result, it will automatically parse JS, CSS, and other files. The function of database server is to store data, and the function of Web server is to access the data and forward the information to the client.

Integrated SSH framework composed of spring, Struts2, and Hibernate technology is integrated into the Web server. Among them, the business logic layer deals with business planning, data access, legitimacy verification, and other tasks. Further, the client completes its interaction with the database after connecting this layer with the components.

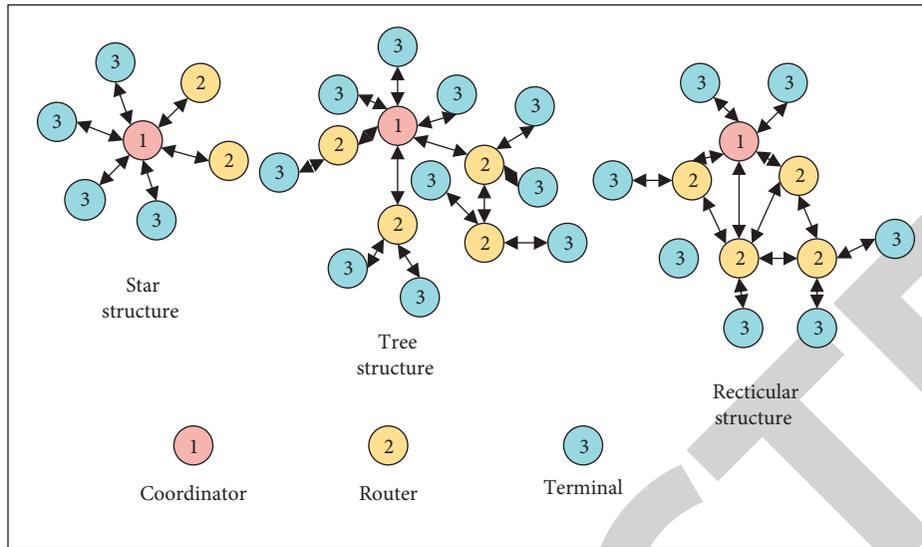


FIGURE 1: Wireless network topology diagram.

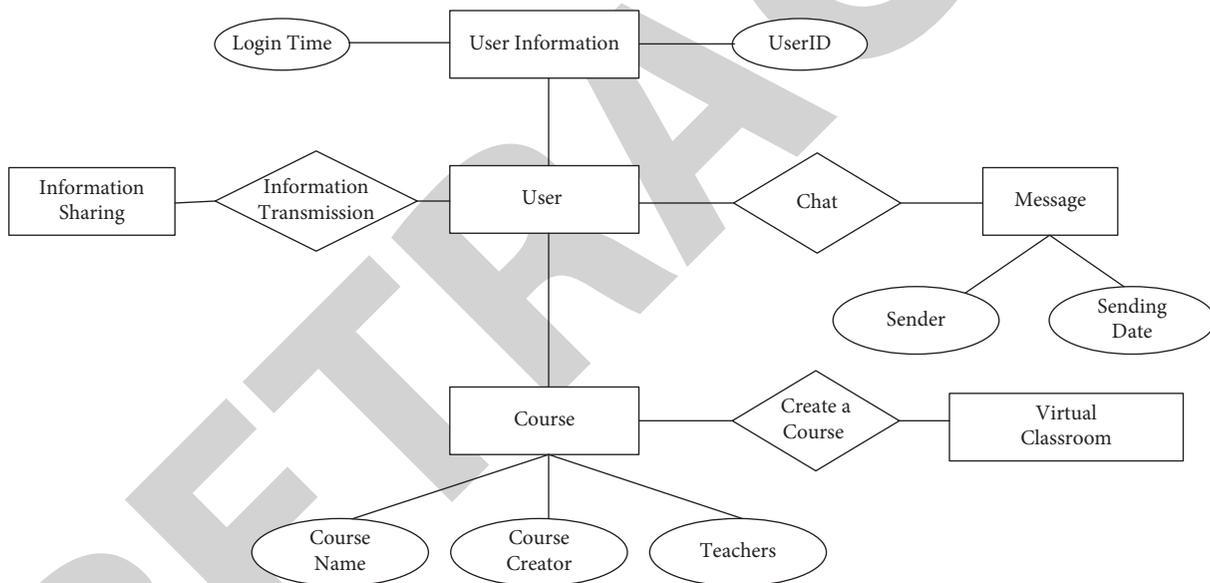


FIGURE 2: E-R model and relation structure diagram.

On this basis, the interactive Intranet server side and the learning Intranet server side are used to enrich the Web server. Learning modules provide different functions for various targeted groups. In order to reduce the storage space and facilitate network transmission, the system uses FFmpeg multimedia codec framework to automatically convert the video encoding uploaded by the teacher. However, due to the limitations of the format supported by the framework, it is necessary to verify the format.

The Bootstrap front-end development framework based on CSS, HTML, and JavaScript is used in the coding design process to facilitate students to access the teaching module. This framework is a Web front-end CSS framework developed with the help of HTML5 and CSS3 and is compatible with most JQuery plug-ins.

#### 4.2. Client-Side Architecture of the Proposed System

**4.2.1. Teaching Module.** In the proposed wireless network technology-based distance teaching system for English courses, the teaching mode plays an important role [43]. As a guide, teachers must formulate learning objectives in a planned and systematic way and provide scientific teaching methods to different students. The teaching mode of the English course distance teaching system based on wireless network technology is shown in Figure 3.

The essence of the teaching mode shown in Figure 3 is to introduce wireless network technology into English teaching, emphasizing on the combination of independent learning and classroom teaching. The teaching content includes listening, speaking, reading, writing, and translation,

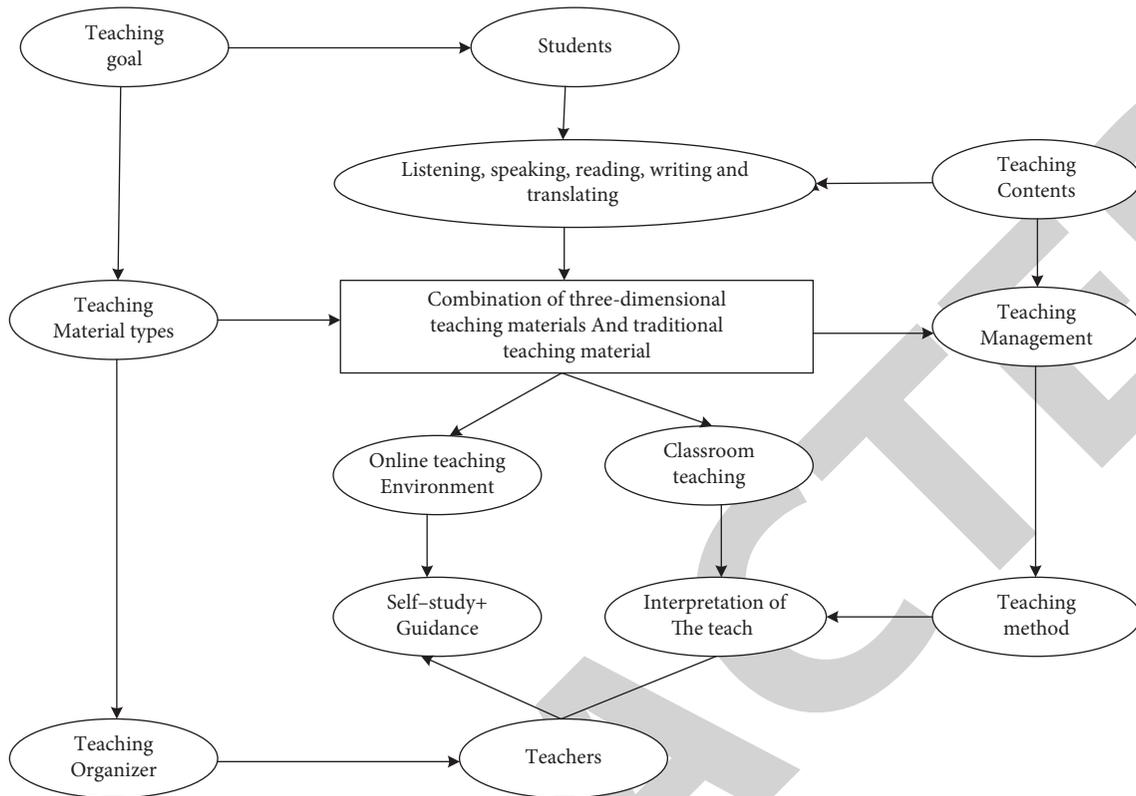


FIGURE 3: English course schematic diagram based on distance teaching system.

which can be organized separately or integrated together. This new teaching mode takes three-dimensional teaching materials as the carrier, which not only highlights the advantages of Internet based distance teaching, but also highlights the main position of students. Under the above teaching mode, the teaching strategy maximizes the efficiency of English learning, enhances the learning effect, ensures the comprehensive and balanced development of all kinds of skills, cultivates students' independent learning ability, and at the same time does not give up the advantages of traditional classroom teaching in order to realize the teacher-oriented teaching process management.

**4.2.2. Teaching Effect Detection and Evaluation Module.** As a tester of learning outcomes, teachers should guide students to pay attention to autonomous learning [44]. Through the evaluation and record of students' achievement and performance in the teaching process, the students are comprehensively evaluated to reflect the real level and stimulate the enthusiasm of students in learning.

**(1) Classification of Assessment Information.** Achievement detection and evaluation in the wireless network environment not only obtain students achievement comprehensively, but also carry out multidimensional and multigranularity diversified analysis on students' achievement. The relevant data to be used for online teaching testing and evaluation mainly include English teaching basic information and student achievement data.

(a) Basic information

*Basic Information of Teachers:* Teachers are represented by  $T$  and are expressed as follows:

$$T = \left\{ t \mid t \in \prod_{i=1}^N \text{dom}(a) \right\}. \quad (3)$$

In formula (3),  $a$  is the attribute set of basic information of teachers, including name, ID number, teacher's service number, gender, professional title, and educational background, where  $\text{dom}(A)$  is the domain of attribute components.

*Basic Information of Students:* The student set is described by  $S$ , and its expression is given as follows:

$$S = \left\{ s \mid s \in \prod_{i=1}^N \text{dom}(b) \right\}. \quad (4)$$

In formula (4),  $b$  is the set of basic information attributes of students, including name, ID number, gender, contact phone number, and e-mail address.

*Course Information:* Course set is expressed by  $C$ , and its expression is given as follows:

$$C = \left\{ c \mid c \in \prod_{i=1}^N \text{dom}(m) \right\}. \quad (5)$$

In (5),  $m$  includes both course number and course name.

## (b) Student achievement information

*Types of Achievement Information:* The student achievement information is expressed by  $G$ , and its expression is given as follows:

$$G = \left\{ g \mid g \in \prod_{i=1}^N \text{dom}(d) \right\}. \quad (6)$$

In formula (6),  $d$  is the set of information attributes related to grade type, including number, subject, test name, weight, and remarks information.

*Score Information:* The score information set is expressed as  $E$ , and its expression is given as follows:

$$E = \left\{ e \mid e \in \prod_{i=1}^N \text{dom}(i) \right\}. \quad (7)$$

In equation (7),  $i$  includes student number, name, total score, and time.

## (c) Assessment information acquisition

There are many ways to obtain students' English scores. This paper mainly obtains data from the following aspects and then evaluates them.

*Classroom Performance Information:* Students' classroom performance refers to the performance of emotion, psychology, and attitude brought by teaching in class [45]. In the process of distance teaching, teachers can evaluate students according to their participation, English course preview, and teamwork ability, save the data, and present it to students, which not only are convenient and fast, but also can ensure that the data will be safe and secure and will not be omitted.

*Homework Information:* Homework information is considered as one of the most intuitive data types for students to evaluate their English scores. In the wireless network environment, the speed of students' finishing English homework and the situation of wrong questions can be recorded, so as to show students' mastery of knowledge points more comprehensively. When it comes to the evaluation of homework of the students, the objective questions can be corrected and evaluated automatically by the system, while the subjective questions will be checked by the teachers. The scores will be saved in the database, which can be checked by the teachers and students at any time when required.

*English Test Information:* English test information and homework information both are similar; it is an intuitive data and can play a good role in feedback assessment. Students use the detection system to complete the English test, after the teacher's correction records in the database.

All evaluation data of English course teaching based on wireless network can be obtained by using the above methods, and the detection and evaluation of students'

English scores can be completed through the system processing method as shown in Figure 4.

*4.3. Design of the System Software.* Communication and interconnection between various parts of the system is done by using the software designed for this study, which not only realizes the communication with the mobile terminal, but also is combined with the teacher client setup. The most important thing in the system software design is to formulate the communication protocol of each part.

*4.3.1. Communication with the Mobile Terminals.* The format of the mobile terminal sending to the touchpad is shown in Table 1. In Table 1, computer name and user name represent device name and user name, respectively, which are used to identify the sender of information. Action1~Action4 represent four-point touch action, including two types of press and bounce; Point1~Point4 are four-point coordinates.

An integrator is set in the system, and the client transmits the touch signal to the integrator. The touch points include horizontal and vertical coordinates and other information. As long as the synchronous touch of four points is handled, communication with the mobile terminal can be realized.

*4.3.2. Communication with the Teacher Client.* The purpose of communication between the integrator and the teacher end includes informing the teacher end of IP address and receiving split screen information set by the client end. For example, when teachers assign tasks and ask two students to answer at the same time, students can directly give answers on their own mobile terminals and display them on the big screen. One student's answer will be in the left half, while the other student's answer will be on the right half, and the two categories will not interfere with each other. The realization process of this function is as follows:

*Step 1.* Unify coordinates: The resolution of different terminals is inconsistent with the coordinate range, so it needs to be normalized. According to the touch range of the touch screen of  $1920 \times 1080$ , this paper maps all the touch coordinates of mobile terminals to this range, and the calculation formula is as follows:

$$\begin{aligned} x1 &= \frac{\text{Input} \cdot x \times 1920}{\text{Screen X}}, \\ y1 &= \frac{\text{Input} \cdot y \times 1080}{\text{Screen Y}}. \end{aligned} \quad (8)$$

In the above formulas, Screen X and Screen Y represent the maximum values of horizontal and vertical coordinates, and Input.x and Input.y are the initial touch coordinates.

*Step 2.* User number:

$$\text{Loc} = \text{hash}(\text{UserName}). \quad (9)$$

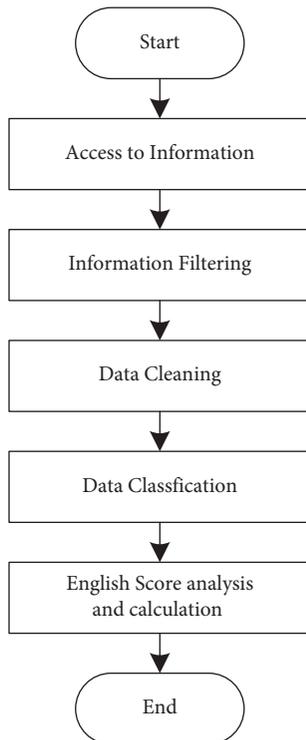


FIGURE 4: Flowchart of students' English score detection and assessment.

TABLE 1: Touch data format information.

Data types	Field names	On behalf of the meaning
String	Computer name	Device name
String	User name	User name
Action	Action 1	Action 1
Action	Action 2	Action 2
Action	Action 3	Movement 3
Action	Action 4	Action 4
Point	Point 1	Coordinates 1
Point	Point 2	Coordinate with 2
Point	Point 3	Coordinates of 3
Point	Point 4	Coordinate 4
Int	Point C	Total number

The data sent by the mobile terminal to the integrator contains the user name, which is unique and can be used to accurately determine the number of the coordinate mapping region in the touch data by Hach voting.

*Step 3: Coordinate mapping:* If the split screen is not set by the teacher, multiple students will share the same touch area. After the split screen setting is completed, the students' touch area can be mapped to a part of the PC's touch screen, so that there will be no interference when multiple students touch at the same time. Its calculation formula is given as follows:

$$fX = f\%W,$$

$$fY = \frac{f}{W},$$

$$TC \cdot x = 1920 \times \frac{fX}{W} + \frac{x1}{W}, \quad (10)$$

$$TC \cdot y = 1080 \times \frac{fY}{H} + \frac{y1}{H}.$$

Among the above formulas,  $f$  represents the screen sequence number,  $W$  and  $H$  represent the number of columns and rows in the divided area,  $fX$  and  $fY$  represent the number of rows and columns in the student's touch control area,  $x1$  and  $y1$  represent the normalized horizontal and vertical coordinates, and  $TC \cdot x$  and  $TC \cdot y$  represent the finally calculated touch coordinates.

After completing the above steps, the software module design of the system will be completed, thus realizing the interactive teaching between teachers and students in the distance teaching department of English courses.

## 5. Experimental Results and Analysis

This section of the paper represents the experimental results carried out via different experiments and the analysis of those results. In order to verify the practical application effect of the wireless network technology-based English course distance teaching system designed above, different experiments are conducted.

The test tool selected to carry out the experimental and simulation results is the Mercury Load Runner 6.0 to simulate user access, keeping the parameter settings unchanged from the actual operating environment. In order to avoid the uniformity of the experimental results, the traditional B/S frame-based multimedia English teaching system in colleges (system 1) and universities and the MVC frame-based English teaching system (system 2) are compared with the system designed in this study (proposed system).

Firstly, the memory resource consumption performance of different systems is compared, and the results are shown in Figure 5.

According to the experimental results shown in Figure 5 one can clearly see that the system proposed in this study, i.e., the design of English course of remote teaching system based on wireless network technology showed good results in terms of memory resource consumption. The memory consumption results are accounted for under 30%, which is significantly lower than the other two systems used in the literature, i.e., B/S framework of college English multimedia teaching system (system 1) and English teaching system based on MVC architecture (system 2). Performance of the proposed system was superior in terms of memory resource consumption as compared to the other two systems. Among the two other systems the performance of system 1 was

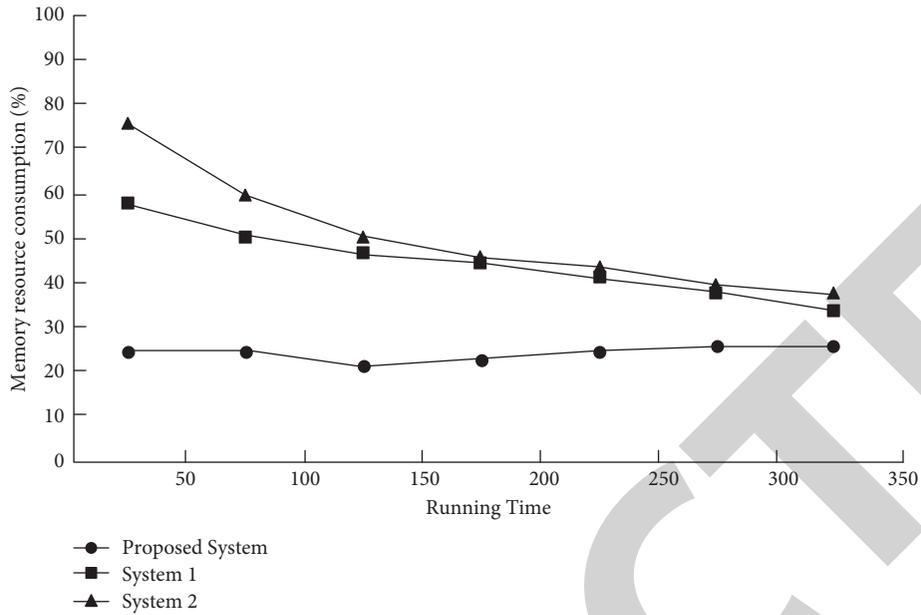


FIGURE 5: Comparison of memory resource consumption of different systems.

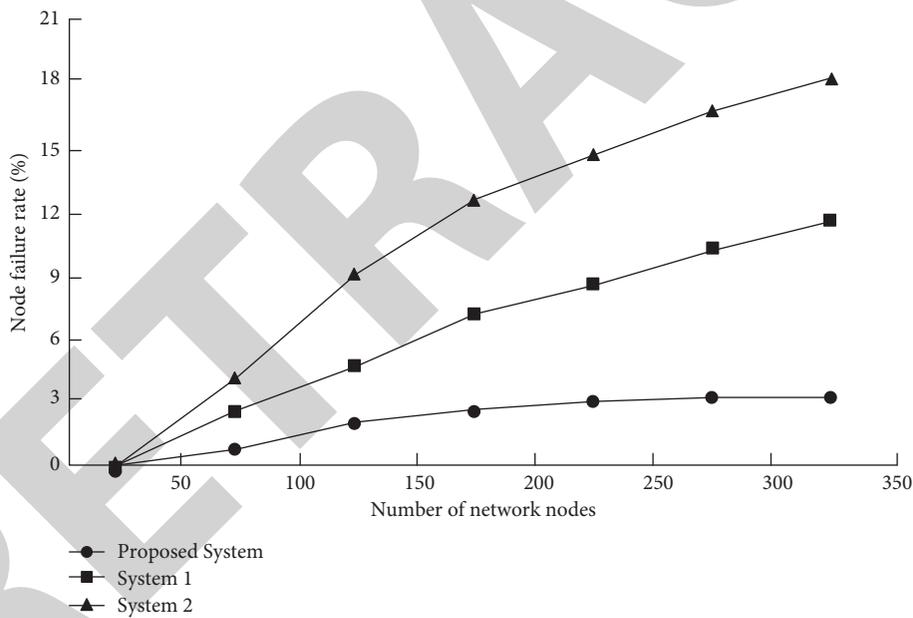


FIGURE 6: Node failure rate diagrams of different systems.

better than that of system 2 in terms of memory resources consumption. System 2 consumes more memory resources and stood last in the performance competition.

In another experiment a PC connection module is used as a network coordinator to add 350 student nodes. In the process of issuing the transmission command, the state of each student node is presented on the software. The stability of the network is observed through the state of student nodes. The node failure rate was used as an indicator to verify the network stability of different systems. Figure 6 shows a comparison of system 1 and system 2 with the proposed system.

It can be seen from Figure 6 that, with the continuous addition of 350 student nodes, the node failure rate of the system proposed in this paper does not increase significantly and remains below 4% all the time which indeed is a very low amount of failure rate. The performance results indicate that the proposed system is stable and efficient as compared to the other two systems used in the literature.

According to the students' learning interest, memory of words and grammar, degree, interaction between teachers and students, user satisfaction and degree of system operation, questionnaire survey of 100 students, and the questionnaire results used in this study are shown in Table 2.

TABLE 2: Experimental class questionnaire statistical table.

		Number (person)	Proportion (%)
Students' interest in learning	Commonly	5	5
	Very good	95	95
Memory of words and grammar	Commonly	3	3
	Very good	97	97
Teacher student interaction	Commonly	6	6
	Very good	94	94
Customer satisfaction	Commonly	2	2
	Very good	98	98
System operation simplicity	Commonly	2	2
	Very good	98	98

By analyzing the data shown in Table 2, one can see that the distance teaching of English course based on wireless network technology designed in this study showed good performance in terms of all the mentioned characteristics, i.e., student interest in learning, memory of words and grammar, teacher student interaction, customer satisfaction, and system operation simplicity. At the same time, after the application of this system, the interaction between teachers and students was noticed and was considerably good as compared to the other systems, and most of the students were satisfied with the teaching effect and think that the system is convenient to operate. It is anticipated that the proposed system will be of a great help for the academic and educational societies in learning the English courses remotely with an ease.

## 6. Conclusion

With the growing popularity of online learning and the strengthening of online learning activities, a considerable amount of semistructured data has been gathered on different learning platforms. There are several forms of data. People can analyze and categorize the underlying stats behind it, which helps in the improvement of teaching strategies. Different systems have been developed in the past for the distance teaching learning courses. Among the developed systems the two most widely used systems are (1) multimedia teaching system of English course based on B/S framework (system 1) and (2) English teaching system based on MVC architecture (system 2). This system performed well in terms of the recent English teaching needs, developing the existing architectures, discussing system functions, and establishing the corresponding development environment. These systems were posed to some major problems, i.e., high memory resource consumption and higher failure rate of the communication nodes. In order to overcome the limitation of the earlier approaches and to optimize the online teaching effect of English course, this paper designs a distance teaching system of English course based on wireless network technology and achieves good application effect. The proposed system showed good results in terms of memory consumption, i.e., below 30%, and nodes failure rate which is below 4%. The experimental results show that the memory resource consumption ratio and node failure rate of the proposed system are very low, and the application feedback

effect is significantly better than the other systems. In the next step of research, we will continue to collect feedback, obtain the latest needs of users, upgrade the teaching resource database of the system, and further improve the quality of English distance education. In addition, the connection of more clients at a time to the distance teaching system is also one of the future works of this study.

## Data Availability

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

## Conflicts of Interest

There are no conflicts of interest concerning this work.

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