Research Article

Construction and Application of a Cloud Platform for English Teaching Supported by Computer Network Technology

Congying Zhang

1 School of History and Culture, Shandong University, Jinan, Shandong 250101, China
2 School of Foreign Languages, Shandong Jianzhu University, Jinan, Shandong 250101, China

Correspondence should be addressed to Congying Zhang: 201620190@mail.sdu.edu.cn

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With the rapid development of network technology, network users have higher and higher requirements for understanding and using the network. At present, the wide application of cloud technology provides the best solution for people. Network is the main carrier of information exchange and interpersonal communication and a new way for human beings to obtain information. The education community, like other industries, is increasingly recognizing the importance of cloud computing and constantly using these new capabilities in education and instruction. Cloud service group and WeChat group are the new mobile applications. This article introduces cloud computing technology into college English classroom, aiming to explore new methods of college English by using the new Internet technology. At the same time, it also discusses some problems existing in the current college English classroom, providing new ideas for the reform of college English classroom. This paper adopts J2EE technology in college English classroom teaching cloud platform application. Based on B/S model, a cloud university English teaching platform is established. The cloud platform English classroom teaching system covers three modules of English listening, English reading, and English writing, covering various fields of education and management. It has laid a solid foundation for the development of education informatization and network.

1. Introduction

The overall goal of English curriculum standards is to cultivate students’ comprehensive application ability, intellectual development, and comprehensive improvement of cultural level based on English. English teaching norms include five parts: language skills, language knowledge, emotional attitude, learning strategies, and learning culture. Students’ language skills and knowledge are an important basis for their comprehensive use of foreign languages. Cultivating students’ cultural self-awareness helps to improve their learning efficiency and develop their self-learning ability. Positive emotion plays an important role in improving students’ learning ability and sustainable development. It can be seen from the course objective structure chart that in English courses, English teachers put forward special requirements on the ability cultivation of English listening, speaking, reading, and writing. To master English as a whole, attention should be paid to the integration of pronunciation, vocabulary, grammar, function, and topic, so as to lay a solid foundation for foreign language learning[1].

Cloud computing technology can improve the comprehensive quality of listening [2], speaking, reading, and writing in English learning, thus promoting the comprehensive development of English learning. Cloud group subscription of cloud network brings abundant video materials to teachers and students. Teachers can expand classroom resources by means of recommendation and giving full play to their advantages for multimedia teaching [3], so that learners can master English knowledge and improve English listening level. Chai Yangli analyzed the demand of “cloud” English listening teaching for non-English majors and proposed a cloud-based oral English teaching model. Zhang Jing believes that using cloud computing technology for English listening teaching can promote communication between teachers and students,
save class time, and improve English listening level through online English corner. However, PC and online teaching also have some disadvantages, as well as the problem of student management. English teaching, through the cloud computing can change the present teaching methods, make it be supplement to traditional teaching methods, so as to improve the traditional teaching methods and improve the learner’s independent consciousness, as well as teachers and students provides an interactive exchange platform [4], realize the online Q&A, and improve the classroom teaching effect [5].

2. Introduction to Related Technologies

2.1. Introduction to the Development Model. At present, English application system is divided into B/S and C/S, and each module has its own application field. The B/S structure is easy to maintain, while, the C/S mode needs to be completed by users themselves. Although, it is difficult to develop, its advantage is its good stability [6]. B/S structure is based on the network and the user is the client, so, there is no need to develop the client, while, C/S structure is mostly used in the local network, so, a separate client needs to be developed, and the workload is heavy [7].

There are differences between the B/S and C/S architectures in terms of their areas of application and their respective characteristics, and the results of the comparison are as follows [8]:

1) The B/S architecture offers greater flexibility and ease of service than the C/S architecture. Systems built under the B/S architecture are easier to use, do not require additional clients, and can be served directly through a browser [9].

2) On the basis of the B/S architecture, services to clients are realised using the Internet. Any user can access and perform business operations on the Internet without the need for an additional client, which greatly reduces the work pressure on users. Compared to the B/S architecture, the C/S architecture has certain advantages, i.e., it has a lower computing rate and a higher stability [10], which allows for better management of the clients. But the disadvantages are also obvious, that is, high research and development costs, high maintenance costs, and high maintenance costs at a later stage [11].

In the case of the cloud English platform, the campus has a good network environment, all courses on campus are delivered online via the LAN, and students are provided with education and management services via the Internet. The cloud English platform is based on a B/S architecture, which has a positive impact on the quality of school education [12].

2.2. Mobile Learning Theory. In recent years, mobile education has attracted extensive attention from experts and scholars around the world. Students can study with smart phones and PDAs and choose the time and place of study, which has increased their popularity. Desmond Keegan is now Ireland’s leading pedagogical technologist and the best-known researcher on mobile learning. Ding Xingfu, well-known in China, translated this article as “From distance learning to e-learning to mobile learning [13].”

Keegan divides the mobile phone learning process into three stages, according to how and what learning takes place, such as distance learning, e-learning, and mobile learning. In distance learning [14], teachers and students can be separated from each other in time and space, and the act of teaching and learning can be inconsistent [15].

Learning allows for a more intuitive and clearer learning process for students. Currently, with the development and application of communication technology, mobile phone education has entered a new period of development [16], which is mobile phone education. Students can study freely at any time and any place. In China, Huang Ronghui divides the concept of mobile phone education into three categories: a technical level, one from the various technical perspectives of mobile phone applications, such as mobile phone communication technology. Mobile phone-based concepts: one defines the concept of mobile phones in terms of terminal devices, such as mobile phones and tablets. The concept of mobile phone teaching is defined on the basis of the concepts of e-learning and M learning, comparing them with the link to digital teaching [17].

In short, English education on cloud platform is a kind of education carried out anytime and anywhere with the help of cloud network [18]. Through mobile learning, students and teachers can realize a whole process of learning through wireless information exchange, and also enhance the communication between two people, which is a higher level of learning. In each development period, the development of mobile phone teaching has played a great role in promoting education. As the transfer of knowledge, teachers must adapt to the development of information technology, modern information technology, and education technology closely linked together, in order to adapt to the new “microera.” At the same time, this paper also plays a certain guiding role in the application of multimodal network teaching in college English teaching [18].

2.3. Contextual Cognition and Learning Theory. Situational cognition and learning is an important topic in today’s world. According to the Encyclopedia of Cognitive Science [19], situational cognition and learning are cognitive activities that take place in natural environments. According to this theory, the individual mind is often produced under the condition of constitution, guidance, and support, and its essence depends on the situation, and the situation is the cornerstone of all cognitive behavior. And this communication between the mind and its surroundings is not only evident in demanding tasks, but also in many everyday tasks. Therefore, it needs to emphasize human’s understanding of nature, and it is in the natural environment that it can truly describe human’s cognitive behavior and its limitations [20].

The basic principle of situated cognition and learning is that the external learning environment has a strong
influence on the learner. At the same time, it highlights the subjectivity of the students themselves. Therefore, teaching should be carried out with specific teaching objectives in mind, providing students with realistic contextual material and effective learning through a combination of design and practice. Students should be allowed to experience and use what they have learned in real-life scenarios, and then digest and comprehend them before finally becoming truly proficient. This article argues that the basic principles of situational awareness and learning provide a solid foundation for implementing English classroom teaching and developing a good English teaching and learning environment for students [21].

On the basis of situational awareness and learning, by using WeChat for the junior high school English classroom, you can make full use of the rich resources of the English curriculum, obtain more reality-related learning materials, create more English contexts, and make them fully aware of the applications of English by designing a variety of forms of classroom teaching. Firstly, the vast amount of information available in English not only provides teachers and students with a wealth of learning material, but also helps students to better adapt to the new learning atmosphere through original audio and visual material. In addition, WeChat groups, circles of friends, and WeChat public websites provide teachers and students with many forms of educational and practical activities. For example, learners can organise an oral practice group for dialogue or pronunciation practice; they can study teaching videos and audio materials on their own; they can exchange topics in the group; they can watch some audio works on WeChat. The virtual learning environment not only meets many of the learning needs of an actual classroom but also saves a great deal of money on education and allows for recycling and use of the Internet in a way that takes the development of educational resources to a new level [22].

3. Application Design

3.1. Analysis of Business Problems. At present, the education and business activities of China’s colleges and universities are generally managed manually, and their drawbacks include resource sharing, inefficient Q&A, and inability of teachers and students to interact. The following are the shortcomings in the current approach to education.

(1) Processing of English classroom teaching resources: the current teaching resources are kept by the teachers themselves, and teachers and students cannot analyze and share the teaching content, only send the resources to students and teachers in the form of e-mail.

(2) Handling of English classroom homework: the current teaching method is that the teacher assigns homework in the classroom, waits for the next class to be handed in, and then evaluates after the class, re-evaluates, and then sends the homework back after the evaluation, so that there is no effect.

(3) English classroom assessment method: the current assessment method requires teachers to group the paper according to their own knowledge and experience, after the end of the paper, the paper should be printed out, and then tested, and then manually graded, after the correction is completed, the candidate’s score information is entered.

(4) Q&A processing: if there is a question, you can ask the teacher in the classroom; if the teacher cannot answer in the classroom, it can only wait until the next lesson, so that the answer cannot be given.

From the above research results, it can be seen that the current education model still has many shortcomings and needs to be further improved. Therefore, in order to better meet the needs of English education in colleges and universities, it must be improved and reconstructed.

3.2. Analysis of User Roles. The system consists of four roles: students, teachers, staff, and administration, each role playing its drawbacks including resources differently. The analysis of its system roles is shown in Table 1.

3.3. Functional Design of the Application. The modularisation of the system is a key task in the development of the whole system. The function of the teaching management module is to establish a teaching resource library for resource sharing and online learning; the assignment management module is to publish assignments, correct assignments, complete assignments, process assignments, manage assignments, and manage examinations. The function of the solution-based teaching is to provide a communication platform for teachers and students to communicate and help learners with problems they encounter in their studies, while, the management of basic information is closely related to the operability of the system. The management module of the system is mainly to ensure the security and stability of the system, so as to provide continuous service to teachers and students. Based on the findings of this thesis, a framework structure for a cloud-based English teaching system can be derived. The system architecture diagram is shown in Figure 1.

3.3.1. Database Design. This database design is mainly divided into 11 tables for articulation design, each table will contain different data, the main party cloud platform system design and research. The model structure diagram is shown in Figure 2.

3.4. Security Design. This section is mainly designed for the application of English classrooms in a cloud computing environment.

3.4.1. Software Confidentiality. From a code point of view, the English cloud platform is protected from unscrupulous users taking advantage of the vulnerabilities of teaching English in the cloud by proposing a method based on
Table 1: System role analysis.

<table>
<thead>
<tr>
<th>Roles</th>
<th>Duties or functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>Key participants, who can study resources, take exams, submit questions, and complete assignments</td>
</tr>
<tr>
<td>Teachers</td>
<td>Key participants, who publish resources, post assignments, complete group papers, and answer questions</td>
</tr>
<tr>
<td>Teaching service staff</td>
<td>System participants, who plan exams</td>
</tr>
<tr>
<td>Administrators</td>
<td>System participants, who manage basic information and system security</td>
</tr>
</tbody>
</table>

Figure 1: Functional structure diagram.

Figure 2: Data structure diagram.
authentication and session timeout. If the user is not in the user database of the cloud-based ELT, the user’s login request must be denied. In addition, if the user does not teach English for more than 30 hours, he/she will be forced to log out, thus preventing other users from using the computer for English teaching related functions, thus improving the security of English teaching in the cloud computing environment.

3.4.2. Security of Data Transfer. In the English cloud platform, all materials are transmitted via the Internet, while, the cloud English teaching system is based on the B/S model. Therefore, the risk of theft and destruction must be taken into account, so some processing must be carried out in the transmission process to avoid information leakage. The current main practice of the English cloud platform is to encrypt personal privacy, using MD5 encryption technology, and when carrying out network transmission, things like user accounts and credit ratings. need to be encrypted.

3.4.3. Security of Data Storage. In the English cloud platform, there is a large amount of personal privacy in students’ learning and study process, such as scores. If the data is lost, it will have a great impact on students. To improve the security of the English cloud platform and to avoid theft of private files, password technology has been used to keep private data in the database confidential, so that even if data is leaked, it will not be discovered by unscrupulous users. It was also necessary to create an administrative database that would not allow direct access by others.

4. Analysis of the Application Results

4.1. Application Implementation. Implementation functions are as follows:

(1) Resource Management Unit. Web resources are an important part of online education. Teachers share web resources with students, so that they can download and browse through the web, providing more information for students and improving teaching in the classroom.

(2) Work Management Module. Teacher users can post assignment information online for students to fill in. When posting assignments, the class should be clearly designated for easy access by students.

(3) Question and Answer Management Module. In order to improve teaching and learning and to be able to solve problems in teaching, it is necessary to provide a communication platform to solve the communication needs of teachers and students, and the question-and-answer management can achieve the above functions, when asking questions, you can access the answers at any time.

(4) Basic Information Processing Unit. The basic data processing is the effective management of the basic data required by the system, so that the data can be selected from the list without having to add it manually.

(5) System Management. The system management module includes login, rights management, data backup, data recovery, and password update.

The key implementation code is as follows:

```java
public String mylogin(String username, String password, Map<String, Object> map) {
    Subject subject = SecurityUtils.getSubject();
    UsernamePasswordToken token = new UsernamePasswordToken(username, password);
    try {
        subject.login(token);
    } catch (AuthenticationException e) {
        String simpleName = e.getClass().getSimpleName();
        if ("UnknownAccountException".equals(simpleName)) {
            Map.put("MSG", "user does not exist");
        } else if ("IncorrectCredentialsException".equals(simpleName)) {
            Map.put("MSG", "password incorrect");
        }
    }
    boolean authenticated = subject.isAuthenticated();
    if (authenticated) {
        return "redirect:/admin/index. HTML;";
    }
    return "redirect:/admin/login. HTML;";
}
```

4.2. Application Performance Testing. Performance is a very critical aspect of performance testing, and there are appropriate performance criteria in place, when it comes to requirements. If the test scores are not up to the standard, online education cannot be used for the relevant work on campus. The performance test is carried out, so that it meets the required indicators before it is used for online education. During the testing phase, we used Loadrunner software to conduct simulation tests and the data according to the performance requirements shown in Table 2.

4.3. Analysis of Preapplication Results. To verify that the students in both classes were in the same class; the authors administered a test to both classes before the experiment began. The questions were all from the joint senior secondary midterm test and included listening, single choice, completion, reading comprehension, vocabulary, translation
of sentences, and writing. The subjective questions were reviewed by the school’s English teachers and were all administered in the same way, while, the objective questions were scanned by computer. After the tests were completed, the authors statistically analyzed the learning of the two classes and tested the experimental and control groups separately using the \( t \)-test method. The analysis of the results of the previous test is shown in Table 3.

Prior to the trial, the English performance of the two classes was tested and it was found that the difference in scores between the two classes was only 0.13 and that the distribution of scores was similar between the two classes. A \( t \)-test using \( T \) on the English scores of the two classes showed that there was no significant difference between the two classes (sig = 0.969 > 0.05). The results show that there is no significant difference between the English proficiency of the students in the experimental group and the control group, and that the two classes are parallel classes to ensure the implementation of the experiment.

4.4. Analysis of Application Comparison Results. The learning effects of the two classes were tested, and we adopted the cloud-based English learning model with the traditional learning of students in class two (2). After one and a half years of learning practice, the authors tested the learning of the two classes to see whether the cloud-based English teaching approach could improve English learning. The test questions were selected from the Suzhou standard survey test, including listening, single choice, completion, reading comprehension, vocabulary, translation of sentences, and writing. All the examination papers were marked and counted by the Municipal Education Bureau. In the experimental and control groups, a separate \( t \)-test was also used to detect any significant differences in the post-test scores of the two classes. The analysis of the results of the subsequent test is shown in Table 4.

In the post-test, we can see that, after a period of English learning, the score of the experimental group is very different from that of the ordinary class, which was only 0.13, but now it is 6.59. The whole class performs very well. After \( T \)-test, the English scores of the two classes are very different (SIG = 0.024 < 0.05). The results showed that after the trial of cloud English teaching, the experimental group performed significantly better than the control group. Therefore, cloud English was superior to traditional English teaching in our English classroom.

Conclusion: the experimental class adopts Yuntai English teaching method, the English score of the control class is obviously improved compared with the control class, but the English teaching method of the control class has no obvious change.

5. Conclusion

The use of IT as a method for effective work and also the application of IT in various industries has gradually transformed the current mode of work and teaching. The current method of teaching English in the classroom is single and it is difficult to motivate students to learn. At the same time, cloud computing technology can also be used for teaching, so that what teachers do not learn in the classroom can be reinforced and strengthened in the classroom using a cloud computing platform, thus improving the effectiveness of teaching.
Data Availability

The dataset used in this paper is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding this work.

Acknowledgments

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