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Curriculum Design of English Multimedia Network Teaching Assisted by Cloud Computing

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Abstract: *The reform of modern teaching methods is an important content. Through multimedia interaction and real experience and active thinking, it has advantages that traditional teaching methods can't compare. This can greatly improve students' love of learning and enhance their learning initiative. Although the current English multimedia network teaching (MNT for short here) has been quite mature in performance, it has not been able to meet the needs of multimedia education in the campus network, and the allocation of resources is not balanced. The rise of cloud computing (CLOUD) has built an online teaching platform for colleges, integrating teaching resources and realizing the purpose of assisting English multimedia online teaching. At present, the investment in the resource server of the university network is limited, and the user scale of the university network is huge, which requires a lot of network resources. Therefore, how to reasonably and scientifically arrange various resources is the key to improve the overall operation efficiency of the network. This text proposed a resource allocation algorithm using CLOUD. The results of this experiment showed that the average scores of listening, speaking, reading, writing and translating of Class B students before the experiment were 61.3, 62.8, 62.9, 60.6 and 62.2 respectively. After the experiment, the average scores of listening, speaking, reading, writing and translating in Class B were 78.2, 75.1, 80.5, 77.6 and 78.8, respectively. It can be seen that the average score of students in class B has been greatly improved.*

Keywords: *Cloud Computing, Resource Scheduling Algorithm, English Language Teaching, Multimedia Teaching*

1. Introduction

In today's era, with the development of information technology and education integration, integrating multimedia technology into English teaching has become a hot topic. From the practical application of English, multimedia technology plays a dual role in English teaching. It creates a more realistic language learning atmosphere, which is conducive to improving the enthusiasm of learners. However, sometimes due to improper use, some forms of multimedia assistance are more than content, and the expected teaching purpose cannot be achieved. In college English classes, people should fully understand the actual situation of classroom teaching using multimedia technology, and seek appropriate methods to achieve better results.

Based on the advantages of CLOUD, the course design of English MNT is a bold attempt to combine English majors with educational technology. Therefore, it has become an unshirkable responsibility of the educational community to use CLOUD to promote subject teaching reform. Multimedia is a technology that integrates sound, image, information technology and network. It is used in various industries today and has a great impact on science and technology, education, production and other industries. With the rapid development of multimedia technology, people's production mode has also undergone earth-shaking changes. Some scholars have tried to apply CLOUD to English teaching in order to improve the current teaching situation. This can provide good teaching conditions for cultivating students' English ability, so as to achieve efficient English teaching results.

2. Related Work

Today, with the rapid development of science and technology, multimedia has developed rapidly in

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the practice of language teaching reform. English teaching methods and teaching results have always been the focus of attention. Sasan, John Michael Villagorda's research was that multimedia provided learners with unique benefits in English learning. Multimedia not only had a significant impact on students' learning process and progress, but also can help them reduce pressure in the classroom, and can also provide effective teaching process [1]. Li Hui pointed out that the progress from modern teaching technology to multimedia teaching technology was particularly important for improving the level of English education, especially the efficiency of classroom teaching. The easy-to-implement computer-assisted learning media would provide more teaching content and higher teaching satisfaction [2]. Sun, Zhuomin found that AI education is defined as the use of Artificial Intelligence in the field of education. He combined the AI module with knowledge recommendation to develop an online English teaching system, and compared it with the commonly used teaching assistant system. It helped students improve English teaching efficiency according to their knowledge and personality [3]. The scholars found that under the new teaching model reform, English teaching is no longer limited by time and place, and students can develop towards autonomous learning according to their own characteristics.

Colleges are building digital campus, making full use of the research results of network and information technology to further improve English teaching efficiency, enhance teaching effect and improve the digital level of the school. Reinhardt, Jonathon outlined the development of social media and the history of social computer-assisted English language learning research [4]. Burns, Anne believed that oral English teaching was often neglected in English teaching. Teachers may conduct various speech activities in class. This can enable the speaker to handle and produce the core speech skills of the speech, as well as the communication strategies to manage and maintain oral interaction [5]. Utami, Dinda Mei Ayu found that in the field of English teaching, the epidemic has brought challenges to English lecturers. They needed to maintain the continuity of online English teaching through effective use of tools. English instructors use various information and communication technology tools in different ways to improve teaching quality [6]. The scholars found that MNT has been welcomed and loved by people.

As far as the current reality is concerned, the development of English MNT is far from the requirements of real life, and users' needs for multimedia teaching in different universities vary. Therefore, it is very important to study how to allocate resources according to different resource requirements in large-scale multimedia teaching [7-8]. The course design and implementation of English MNT on account of CLOUD provides a new way to improve the quality of MNT. In terms of its main functions, it can fully consider the needs of users and apply it to practical operation scenarios, and can provide flexible services for teachers. This can also provide strong support for students' timely access to required resources, publicity and construction of digital campus.

3. English Multimedia Network Teaching Course Design

With the continuous development of computer technology and multimedia technology, there are more and more reforms in English curriculum in Chinese universities, and the English education model has also changed [9-10]. At the same time, in the context of the new English curriculum, the traditional English teaching method has become an important factor restricting the development of English teaching. Therefore, the combination of computer technology and traditional teaching would be an essential part of the English classroom.

3.1 MNT

Education is the basis of the development of science & technology, and modern multimedia technology has become the key of teaching reform. The characteristics of English MNT are displayed in Figure 1.

As displayed in Figure 1, the characteristics of English MNT include rich content, diverse forms, flexible time, vivid and interesting, and strong interactivity. Through voice, video and other media, students would be presented with information at multiple levels such as language, culture and social interaction. Compared with the traditional English teaching model, it can not only effectively transfer theoretical knowledge, but also effectively carry out effective language preview. At the same time, it can also easily obtain multilingual learning materials, improve the universality of language, and avoid the monotony and dryness of language.

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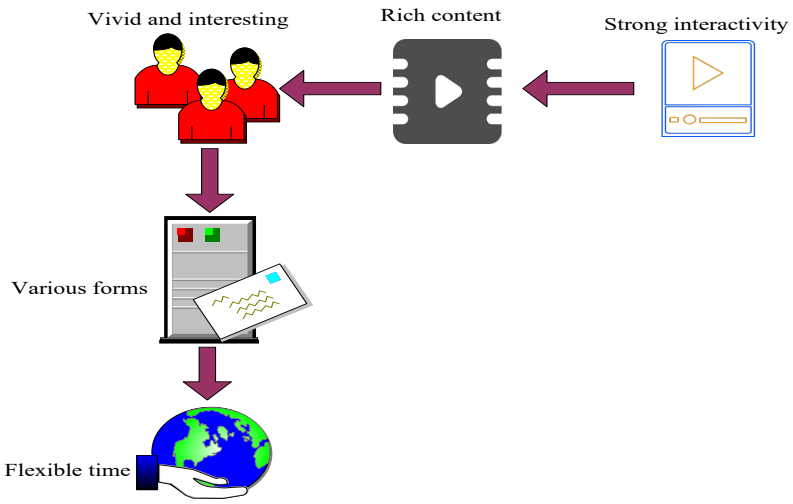

Figure 1: Characteristics of English MNT

3.2 Course Design

At present, most of the English MNT is based on the Internet. At present, the existing network multimedia technology can be used in the campus network, but the campus network itself has certain conditions for use, such as instant visitors, frequent use, etc. So this text proposes CLOUD to assist MNT to achieve the purpose of balancing network resources.

(1) Cloud computing

The CLOUD technology gives full play to the advantages of computer network, integrates and unifies data through the network, and provides better data processing and load balancing functions. Cloud computing integrates hardware network connection, software collaboration, algorithm structure, etc. to realize direct access to the network, thus reducing the difficulty of network access. Cloud computing technology has completely overturned the previous single server architecture, which can meet various user needs. The characteristics of CLOUD are displayed in Figure 2.

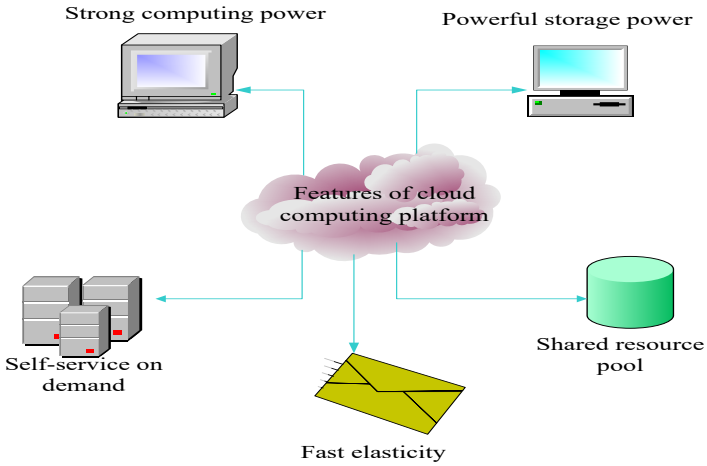

Figure 2: Features of CLOUD

As displayed in Figure 2, CLOUD has powerful computing power, powerful storage capacity, on-demand self-service, shared resource pool, and fast flexibility. Many companies have begun to develop CLOUD software. This allows users to obtain larger and safer data through mobile phone software, web browser and other means. Because cloud services have good load balancing and fault tolerance performance. It can adjust the resource allocation of the network in real time according to different needs, and use its unique fault-tolerant mechanism to protect user information and business processes. Different services can be configured on the application server. Each application server has

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one or more services, so that users can use different services in different locations.

(2) Logical structure of curriculum design

The business logic implemented by each functional module of the English MNT course is on the server. Users can use the network page to interact with the system's functions and data, and transmit the user's operating requirements to the server. It returns the obtained data to the user after completing its processing. The logical structure of curriculum design in the context of CLOUD is displayed in Figure 3:

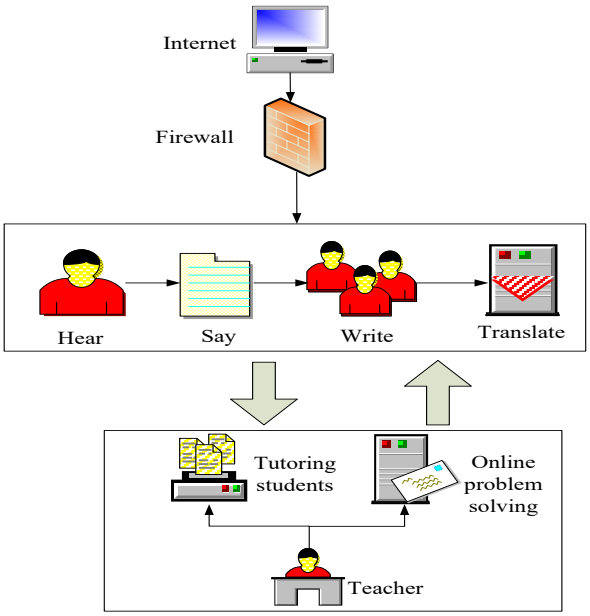

Figure 3: Logical structure of curriculum design

As displayed in Figure 3, students listen, speak, write and translate through the Internet, and teachers guide students on the platform and solve questions online. The platform is mainly composed of master server and database server. When the client uses the browser to complete the function access to the system, it can synchronously query and manage, and complete the data transmission to the client and server. The network server is the core of the whole network, and has the function of allocating the resources of each cluster. It realizes the management of large-scale and highly concurrent multimedia teaching through real-time allocation of traffic resources.

English multimedia teaching is combined with database server, live broadcast server and application server to coordinate the work of various functions and data processing as a whole. Cluster server is the infrastructure of various multimedia teaching, which is also configured with streaming media broadcast service.

(3) Student module function design

After completing the online English registration, the administrator checks the registration requirements in the management module, and the administrator judges whether the permission can be granted according to the information provided by the students. Then people can send the information of this permission to the registered mailbox of the student, and log in with the account and password filled in by the student himself, and carry out the corresponding operation. The function design diagram of student module is displayed in Figure 4.

As displayed in Figure 4, the user in the student management template is a student, who can log in to select courses, enter the main interface of course learning to conduct course learning, course assignments and online tests, and query information through online discussion and course message board.

The online test mainly includes generating electronic test papers, automatic submission of test papers, saving answers, and correcting objective questions. The completed test data can be input into the database, followed by the teacher's correction, and the teacher would correct the subjective question type. Candidates can view their scores on this platform, and teachers can retrieve students' scores according to different conditions.

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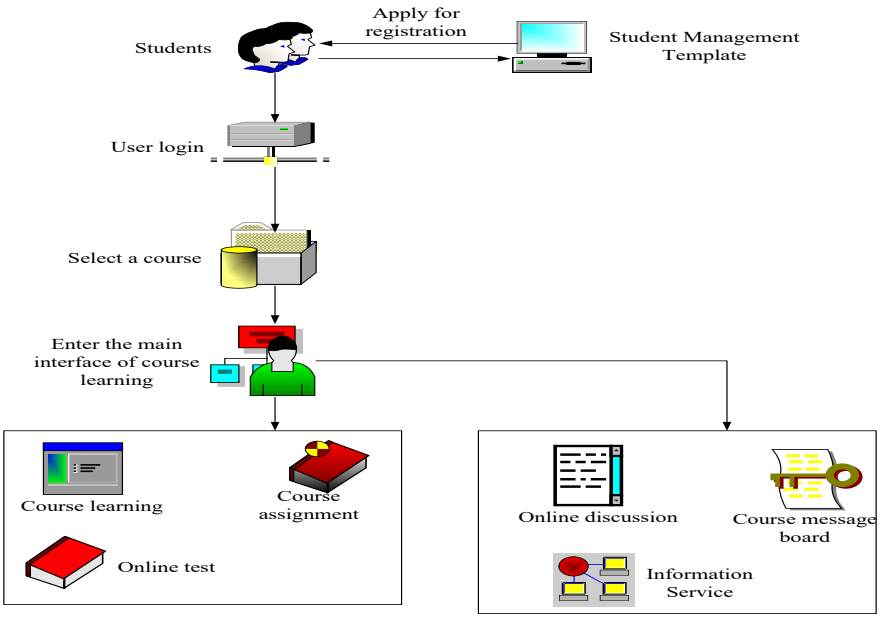

Figure 4: Function design diagram of student module

3.3 Advantages of Cloud Computing Assisted Teaching

The biggest advantages of CLOUD assisted teaching are as follows:

(1) Nothing is more attractive than the endless resources of the Internet. The huge learning resources have brought rich learning resources to learners, and the huge data of CLOUD has also brought more evaluation for students' evaluation.

(2) Under the traditional learning mode, students' learning space is usually limited to classrooms, self-study rooms, etc., but the rise and popularity of CLOUD has led to the development of computer-assisted and distance education. Students can participate in learning at home as long as they have a computer or mobile phone with internet access. However, in a sense, the educational atmosphere of students is still limited. In recent years, with the rapid development of mobile communication technology, the application of smart phones has become more and more widespread, and mobile teaching has gradually entered the public's eyes. With the help of CLOUD, mobile classroom allows students to carry out anywhere.

(3) Under the traditional learning mode, students' learning costs are relatively high, while the Internet provides students with a lot of free information and reduces costs. In CLOUD, because all data storage and processing are completed in the "cloud", students can complete their homework as long as they use mobile phones, thus greatly reducing the configuration cost.

3.4 Resource Scheduling Algorithm Based on Cloud Computing

Based on CLOUD, this text uses virtual technology to dynamically predict the resource load, divides the data in the network into several virtual central processors, and establishes a network resource demand prediction model.

In the operation of resource services, there would be no balanced access to resources, because most of the teaching on-demand programs are aimed at a few data in many cases. Therefore, when the number of service resources is small, it can improve the service efficiency as a whole by putting the greatest effort into more service requirements.

(1) Prediction of CPU utilization in the future

During the implementation process, the implementation of the resource plan is determined based on the prediction in the pretreatment process. During the pretreatment process, the results obtained are compared with the set initial critical point. If this critical point is exceeded, the system would automatically start the resource scheduling mechanism and concentrate the limited resources on the multimedia education service unit to avoid failures caused by excessive load. On this basis, the system

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would enter all the running conditions into the database for relevant personnel to search and trace. Note that the utilization rate of the virtual CPU at time t is $U_{vcpu}(t)$:

$$U_{vcpu}(t)=\frac{t_u+t_s+t_{io}+t_{irq}+t_{si}}{t_{total}} \tag{1}$$

According to the composition of each time slice during the operation of the CPU, it is divided into the CPU consumption time t_s in system mode, the CPU consumption time t_u in user mode and the processing time t_{irq} of external interrupt. The general prediction model can be obtained by using the piecewise interpolation method in mathematics for analysis and processing, as displayed in equation (2):

$$U_{vcpu}(t)=\bigcup_{i=1}^{t-1} w_i(L) \tag{2}$$

w_i is the affine transformation obtained by using the statistical principle, while L is the collection of all previous monitoring data values on the time axis. The weighted average value can be used to calculate the usage of the virtual central processing unit in a short period of time:

$$\bar{U}_{vcpu}(t)=(1-\gamma)\times\bar{U}_{vcpu}(t-1)+\gamma\times U_{vcpu}(t) \tag{3}$$

In the formula, γ is the weight value, and its value range is [0,1], which is used to control the proportion of historical virtual CPU occupancy value in the current occupancy prediction. The value of γ can be dynamically adjusted according to the actual demand. Set the parallelism of Q_{cpu} as the physical CPU as:

$$Q_{cpu}=\frac{l_{vq}}{n_{vcpu}} \tag{4}$$

l_{vq} is the total length of all current processes in the central processors of all virtual nodes, and n_{vcpu} is the number of all current virtual central processors.

(2) Probability prediction of virtual node sending requests for resources with high teaching on-demand times

The database agent technology can be used to obtain the data and ranking of the resource file with the highest education on-demand rate.

The process is modeled and analyzed with Markov chain. Based on the historical data of the virtual node, the transfer probability of the virtual node sending a request for a resource file in two adjacent cycles is recorded as $P(t)P_1^{(k)}$ by using statistical method. Therefore, the probability vector of a user clicking on a resource in the future time interval is:

$$P(t+k)=P(t)P_k=P(t)P_1^{(k)} \tag{5}$$

Based on the given probability vector and the historical data of the user's teaching on-demand station, the user's on-demand behavior in t time is obtained:

$$P(t)=\{P(A_t=a_n)W_n\} \tag{6}$$

$P(t)$ represents the transfer probability matrix. $P(t)$ is related to the resource file with higher frequency of being taught on demand, and meets the following requirements:

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$$\sum_{i=1}^{n} W_i = 1 \tag{7}$$

For the virtual node request probability matrix, each dimension represents the next possibility of a virtual node, and the most likely occurrence is the maximum value. This method is mainly to establish the corresponding probability matrix for the teaching request of each virtual node played at a specific time point, and obtain the request rate of the virtual node at a specific time point, and determine whether to transfer resources according to the critical value set by the system.

In the multimedia teaching system, the relevant teaching on-demand data can be stored in a database, and the data can be easily accessed. This is an important basis for network resource allocation.

4. Current Situation of Traditional English Education and the Effect of Multimedia Network Teaching

4.1 Outdated Courseware Content and Lagging behind Technology Update

In teaching practice, multimedia technology is an important guarantee to achieve teaching quality. Some teachers fail to grasp the real purpose of the classroom and have some wrong understanding when making multimedia courseware, which makes the overall multimedia courseware conflict with the real educational purpose and makes it unable to learn correctly. Some English teachers insert a lot of network information into their teaching. These teaching materials can arouse learners' enthusiasm for learning, but also affect their learning progress and efficiency. In this text, 80 English majors in a university were investigated, and their opinions on the obsolescence of courseware content are displayed in Table 1:

Table 1: Obsolescence of courseware content

Obsolescence	Number of people	Percentage
Very old	32	40%
Relatively old	24	30%
Generally obsolete	16	20%
Novel	4	5%
Very novel	4	5%

As displayed in Table 1, 32 students thought that the content of English courseware was very old, accounting for 40%, and 24 students thought that the content of English courseware was relatively old, accounting for 30%. Sixteen students thought that the content of English courseware was generally outdated, accounting for 20%, and four students thought that the content of English courseware was novel, accounting for 5%. Four students thought that the content of English courseware was very novel, accounting for 5%.

From the current teaching practice, the teacher has not adjusted and optimized the relevant courseware properly according to the students' personality, learning characteristics and the current development of English education. Some teachers use online courseware directly in class for convenience. Due to the over-reliance on the existing courseware, it can not make full use of its functions, resulting in some content different from the teaching requirements, and lack of clear planning.

4.2 Comparison of Effects of Multimedia Network Teaching

(1) Performance comparison

In this text, 80 English majors are divided into two groups. One group uses the traditional English teaching mode for learning (Class A). A group of students used CLOUD assisted English MNT (Class B) for two months, and then analyzed their learning effects. The average scores of listening, speaking, reading, writing (four abilities) and translating before and after the experiment are displayed in Figure 5:

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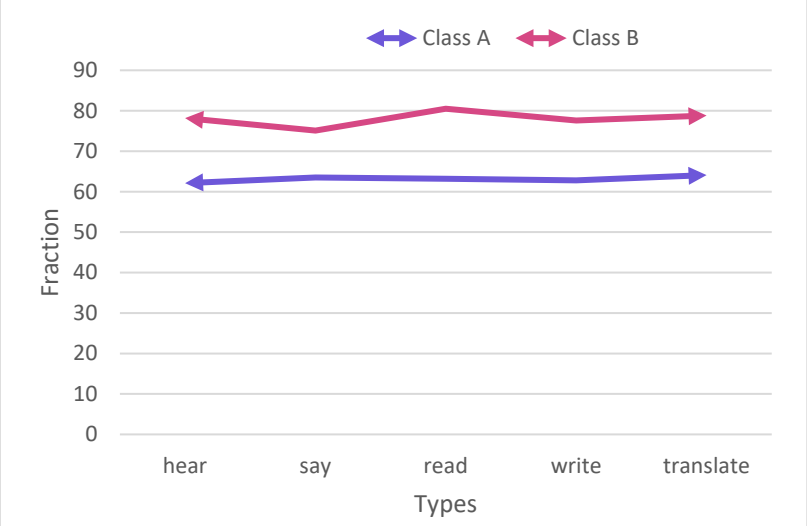
(a) Average score of the four abilities and translating before the experiment



(b) Average score of the four abilities and translating after the experiment

Figure 5: Average score of the four abilities and translating before and after the experiment

As displayed in Figure 5, it can be seen from (a) that the average scores of listening, speaking, reading, writing and translating of middle school students in Class A before the experiment were 61.7, 63.2, 62.5, 60.4 and 62.8 respectively. Before the experiment, the average scores of listening, speaking, reading, writing and translating in class B were 61.3, 62.8, 62.9, 60.6 and 62.2 respectively.

Figure 5 (b) shows that the average scores of listening, speaking, reading, writing and translating of middle school students in Class A after the experiment are 62.1, 63.5, 63.2, 62.8 and 64.1 respectively. After the experiment, the average scores of listening, speaking, reading, writing and translating in Class B were 78.2, 75.1, 80.5, 77.6 and 78.8, respectively.

Under the new curriculum system, the standard of teaching reform has been transformed from the explanation of teaching content and the improvement of curriculum design to the improvement of students' understanding and ability.

(2) Comparison of self-management ability

With the support of CLOUD technology, teachers change from classroom subjectivity to student-centered. Teachers guide their whole learning process, provide students with the best teaching environment, and enable them to learn actively and explosively. The method of thinking and solving problems can be regarded as the core of learning, so that the self-management ability of learning can be improved in an all-round way. Self-management ability before and after the experiment is displayed in Figure 6:

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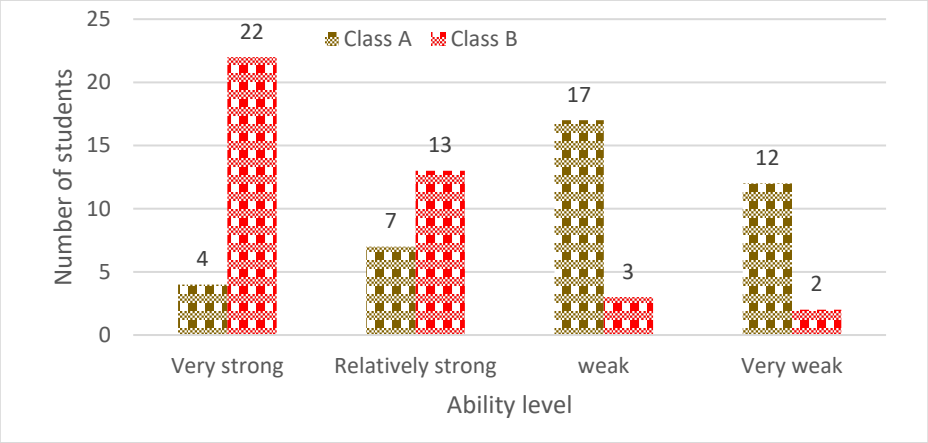
(a) Self-management ability before experiment



(b) Self-management ability after experiment

Figure 6: Self-management ability before and after the experiment

As displayed in Figure 6, according to (a), it can be observed that there were only 2 students with strong self-management ability in class A before the experiment, only 1 student with strong self-management ability, and 19 students with weak self-management ability. There are 18 students with very weak self-management ability. Before the experiment, there were only one student with strong self-management ability in class B, and only three students with strong self-management ability. There are 17 students with weak self-management ability and 19 students with very weak self-management ability.

In Figure 6(b), it was found that there were only 4 students with strong self-management ability, 7 students with strong self-management ability, 17 students with weak self-management ability and 12 students with very weak self-management ability in Class A after the experiment. After the experiment, there are 22 students with strong self-management ability, 13 students with strong self-management ability, 3 students with weak self-management ability and 2 students with very weak self-management ability in Class B.

The students' English level would be greatly improved by creating rich learning experience in and outside the classroom, and using all available time to learn.

(3) Positive degree

The English MNT course assisted by CLOUD enables them to experience the fun of learning and effectively stimulate their enthusiasm for learning. A series of objective evaluations can be carried out for students, and then with the guidance of teachers and personality comments, so that they can continue to reflect on themselves, thus further enhancing their motivation for progress. The degree of enthusiasm before and after the experiment is displayed in Figure 7:

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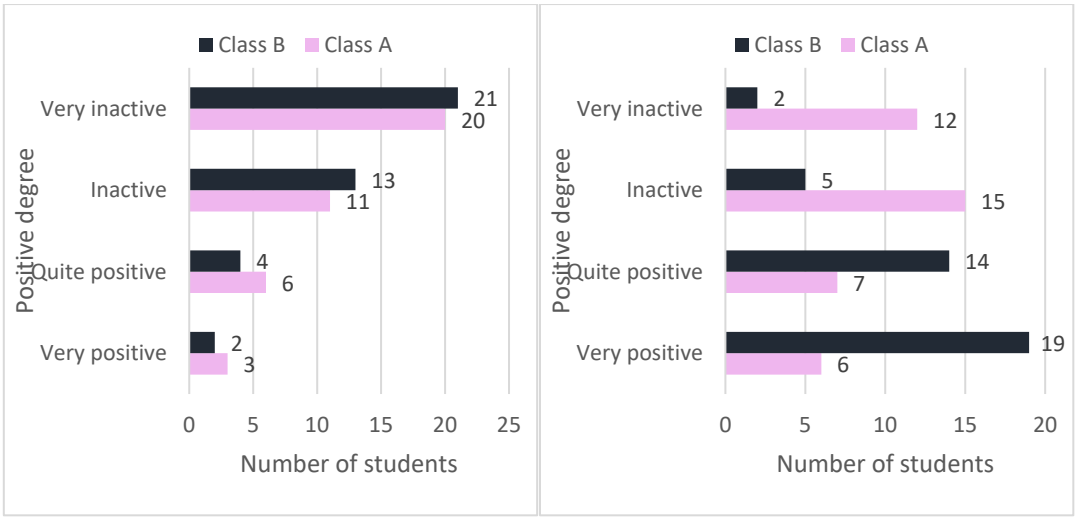

(a) Positive degree before experiment (b) Positive degree after experiment

Figure 7: Positive degree before and after the experiment

As displayed in Figure 7, it can be seen from (a) that there were only 3 and 2 students who were very active in learning in class A and class B before the experiment. There are only 6 and 4 students who are active in learning, 11 and 13 students who are passive in learning, and 20 and 21 students who are very passive in learning.

According to (b), there are 6 and 19 students in class A and class B who are very active in learning after the experiment. There are 7 and 14 students who are active in learning, 15 and 5 students who are passive in learning, and 12 and 2 students who are very passive in learning.

Using multimedia technology can improve their interest in knowledge and improve their understanding of knowledge to a large extent. The study of any subject cannot be separated from theory and practice.

(4) The interaction and exchange between teachers and students enhance the emotion

In the era of the popularization of intelligent information technology, the mobile phones owned by students have become a new learning medium. They are more attributive and close than computers. The integration of CLOUD and mobile phone technology is even more vibrant in the field of education. The degree of interaction between teachers and students is displayed in Table 2:

Table 2: Communication degree

Communication degree	Class A	Class B
A lot	5	24
Commonly	9	13
Very seldom	14	3
Hardly	12	0

As displayed in Table 2, 5 students in Class A said that the communication between teachers and students was very much, and 9 students said that the communication was average. Fourteen students said that there was very little communication, and 12 students said that there was almost no communication. In class B, 24 students said that there was a lot of communication between teachers and students, and 13 students said that the communication was average. Three students said that there was very little communication, and 0 said there was almost no communication.

Cloud computing is just transferring the traditional classroom learning platform to mobile devices such as mobile phones. Students can communicate with teachers anytime and anywhere, thus gradually filling the gap between students and teachers. Communication with teachers can not only improve their knowledge level, but also greatly promote their emotional ability.

5. Conclusions

The integration of English MNT and CLOUD also continues to play an important role. From the earliest text teaching to the current e-learning, it shows the great impact of science and technology on

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education. This text aimed to explore the use of CLOUD to assist English teaching, and compared it with traditional English teaching to prove that CLOUD can promote English. The rise of CLOUD provides a new methods, and CLOUD would play an increasingly important role in the development of education in the future. The network technology' future is also restricted by its own characteristics. When it makes full use of the interconnection characteristics, it would also be limited by its own defects. At the same time, the MNT using CLOUD can also use its own advantages to expand its role on computers through CLOUD technology, which is also a hot topic at present.

References

[1] Sasan, John Michael Villagorda, and Annabelle Rabillas. "Multimedia English Teaching Approach Based on Constructivist Learning Theory." ELTALL: English Language Teaching, Applied Linguistic and Literature 3.2 (2022): 51-65.

[2] Li, Hui. "Improved fuzzy-assisted hierarchical neural network system for design of computer-aided English teaching system." Computational Intelligence 37.3 (2021): 1199-1216.

[3] Sun, Zhuomin, M. Anbarasan, and D. J. C. I. Praveen Kumar. "Design of online intelligent English teaching platform based on artificial intelligence techniques." Computational Intelligence 37.3 (2021): 1166-1180.

[4] Reinhardt, Jonathon. "Social media in second and foreign language teaching and learning: Blogs, wikis, and social networking." Language Teaching 52.1 (2019): 1-39.

[5] Burns, Anne. "Concepts for teaching speaking in the English language classroom." LEARN Journal: Language Education and Acquisition Research Network 12.1 (2019): 1-11.

[6] Utami, Dinda "Empowering ICT potentials in english language teaching." Journal Polingua: Scientific Journal of Linguistics, Literature and Language Education 10.2 (2021): 42-48.

[7] Juan, Lu, and Noraffandy Yahaya. "Model-view-controller based context visualization method for multimedia English teaching system: a case study of multimedia technology teaching." Int. J. Acad. Res. Progress. Educ. Dev 9.2 (2020): 14-34.

[8] Sari, Fatimah Mulya, and Achmad Yudi Wahyudin. "Undergraduate Students' Perceptions Toward Blended Learning through Instagram in English for Business Class." International Journal of Language Education 3.1 (2019): 64-73.

[9] Lamb, Martin, and Fauziah Eka Arisandy. "The impact of online use of English on motivation to learn." Computer Assisted Language Learning 33.1-2 (2020): 85-108.

[10] Wang Huchun, and Weiyu Chen. "Learning English from YouTubers: English L2 learners' self-regulated language learning on YouTube." Innovation in Language Learning and Teaching 14.4 (2020): 333-346.