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The Development Strategy of E-Learning in Online English Teaching Amidst Big Data

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Abstract: Compared with traditional classroom teaching, online teaching is a new method using network information technology, network teaching platforms, and campus network learning spaces to carry out distance teaching or live teaching. Under this unique situation, online teaching has become a way for schools to carry out education and teaching. English subjects with strong practicality and applicability undoubtedly face significant teaching challenges. Relevant educators have started in-depth research on these issues to find effective ways to optimize the effect of online English teaching to supply solid theoretical support for future innovative English teaching development. This shows that the English learning platform has played a positive role in helping students learn English. Through online autonomous learning, learners can provide practical knowledge that teachers do not have in the traditional classroom so that teachers can transform teaching activities into more efficient and meaningful activities. As a better means of English teaching, English teaching research has specific research value and positive significance. In the era of big data, the development of online English teaching methods will significantly improve the motivation and efficiency of students' learning. At the same time, it will also play a specific role in supervising teachers' professionalism and ability. It is an indispensable way of teaching English in today's era.

Keywords: Big data; online English; teaching; development strategies; E-Learning.
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1 INTRODUCTION

Large-scale online education is in full swing, and there is an educational revolution based on the Internet and mobile Internet. Mobile learning has become an accepted learning way. How to make better use of the online platform has become a problem worth pondering and exploring [12]. Online English teaching adopts the teaching form of combining school-based teaching with online teaching of specialized English. It integrates the new Internet teaching organization method with the traditional education system to meet the demands of students' autonomous learning [18]. Compared with conventional in-school classroom teaching, online teaching is not limited by time and space.

Students can use the Internet to learn online anytime, anywhere, which is a simple, direct, and convenient teaching method. At present, most English online teaching platforms use the form of teachers' online live broadcasts, which is closer to the learning characteristics of students [6]. Students can better communicate and interact with teachers on the Internet, and teachers can better grasp and understand the student's learning situation. However, online teaching will also encounter some difficulties, such as network equipment problems, network congestion, etc., which affect teachers and students to enter the classroom to communicate and interact in learning [2].

In the era of big data, we are entering a stage of "multimedia learning." In the new stage, we will have a variety of new technologies and new software that can be applied to the process of English teaching. Online education creates a highly integrated shared resource environment that supports educational decision-making [10]. Change the traditional classroom teaching methods, and finally complete the realization of "Internet + education" through various teaching methods and online education that are not limited by time and region at the same time. With the continuous application of Internet technology, online teaching has changed the connotation of College English courses, shifted its orientation from basic English to subject English, and shifted the traditional teaching means to the combination of network technology and high-quality teaching. This will not only make the curriculum meet the needs of society again but also create opportunities for self-innovation and long-term development of English teaching [4]. This paper uses the Radial Basis Function (RBF) algorithm, the constructive English teaching way, and Python's big data visualization analysis technology to build a data analysis and visualization platform at a small cost. Overall, online teaching has brought an excellent learning experience to students, and most students are satisfied with the online teaching method. However, there are still some difficulties in the learning process. Online teaching is affected by factors such as the environment and students' self-discipline. Teachers cannot accurately control the teaching rhythm and cannot urge students to complete learning tasks and understand students' learning conditions in real time. Therefore, the online teaching method still needs to be continuously improved to improve the quality of teaching.

At the same time, this teaching method can cultivate students' independent exploration ability and help improve students' ability to use information technology. The construction method of network teaching mainly takes students as the main body and teachers as guidance and assistance. It combines the views of teaching and learning, uses advanced teaching concepts, and combines information technology and multimedia technology to improve students' English levels. Learning ---- listening, speaking, reading, and writing skills. Many online English learning platform courses adopt scientific and general standards to divide grades, which is very scientific [3]. However, the platform needs a straightforward way to realize which course level learners belong to and what standards should be used to determine. The way of division is that online teachers divide the scores of learners' proficiency tests into various course grades artificially according to their teaching experience. For example, those below the grade belong to the entry level. Such a division standard is unscientific and cannot truly reflect the English level of learners. Only by analyzing the data generated by the online platform, continually following the dynamics of learners, constantly feeding back to teachers, and teachers continuously providing feedback to learners for self-personalized learning that repeated and timely feedback can make up for defects in time and optimize the learning effect. This paper differs from other studies in that:

Using emotion recognition algorithm technology and face recognition fatigue technology can monitor students' emotional changes and fatigue degrees in English classrooms and make timely adjustments to carry out better geography teaching.

2 RELATED WORK

Online learning is developing rapidly, and the number of online learners is increasing. Through online learning, we can solve many problems in life and work, and our knowledge and abilities have been

greatly improved. Relevant research includes "Innovating high school English teaching from the perspective of massive data," published by Xiao Qi G, which can innovate high school English teaching mainly from the perspective of massive data [17]. From the accuracy and diversity of teaching evaluation, this paper analyzes the realization of scientific teaching decision-making, teaching methods diversification, and teaching objectives. "On English Teaching in the Context of Massive Data" mainly reflects that the progress of massive data technology will change students' learning process, teachers' teaching process, and teaching evaluation system [13].

The task-based language teaching method (TBLT) proposed by Zhang Q is a teaching method that combines the traditional teaching method with the communicative way. This teaching way also makes up for some defects of multimedia teaching [20]. With the rapid popularization of mobile Internet, traditional teaching methods have been significantly impacted. Lou h discussed the transformation of the education method in the context of big data technology and summarized and included the data of learners' learning behavior, learning activities, learning process, and learning environment interacting with them in the learning process with learners' learning experience data [7]. Liao T X believes that while big data changes the way of education and learning, he puts forward his views on the objective analysis of the essential characteristics and components of human thinking and the scientific understanding of the basic types of thinking and thinking processing ways [5]. Ma X proposes that English teaching will enrich English course resources. These English course resources are not resources in the traditional sense but, more importantly, resources that pay more attention to students' individuality or growth records [8]. Su B believes that various application platforms under big data are also conducive to enriching and updating teaching methods when we study geography [11]. New ideas in geography teaching will focus on utilizing data resources under big data. Wen G analysis: For English teaching, the arrangement, analysis, induction, and utilization of course resources can be realized with the application of big data and the popularization of mobile terminals [15]. Wang X showed that big data contains huge information assets, and it brings hope and challenges to the field of education [14]. Yan W envisages the future of English teaching. Big data will collect and analyze data records in English teaching, covering teachers' pre-class material preparation, classroom teaching interaction, students' classroom performance, and students' after-class learning conditions. English teachers can learn from it. Deriving scientific English teaching with a data-driven basis.

3 BIG DATA AND ONLINE EDUCATION

Information technology's rapid development has profoundly influenced many aspects of our lives. Using electronic devices, we can record various behaviors in our daily lives and scientific research worldwide. The recorded data can be uploaded to multiple cloud platforms through the Internet. If things go on like this, there will be more and more data, and when a particular scale is reached, the term "big data" is achieved [19]. In this context, mobile online learning will become a fashion trend, no matter what identity teachers or students have, and they are learning and communicating on a particular mobile terminal. This virtually eases the fear barrier in the traditional communication between teachers and students and makes it easier for teachers and students to understand and master knowledge with a harmonious state of mind so that it is easier to achieve the ideal state of teaching and learning in the post-industrialized information world [1]. Of course, the development of online education is inseparable from the support and progress of big data technology. As shown in Figure 1, the practical standard of effectively using big data for geography teaching is to accurately point the data to online learners when giving formative feedback.

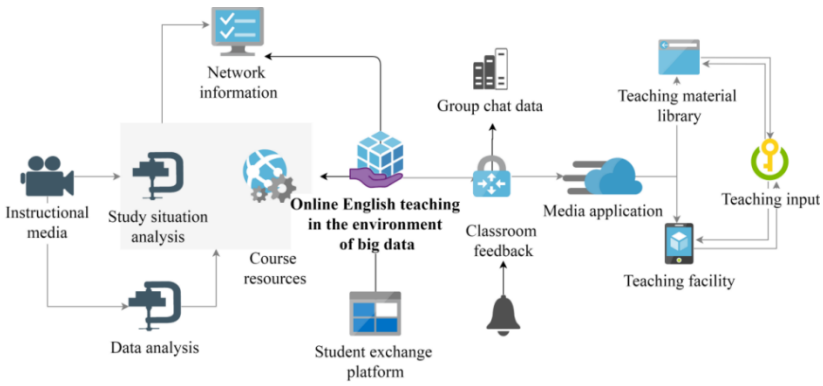

Figure 1: The practical standard of effectively using big data.

Every student must take the course on the online learning of data platform. Of course, not only these retrospective questions, there should be more meaningful practice questions, but also feedback to all students on those questions. The functional framework of the online education system (Figure 2) summarizes the specific applicable requirements of the online education system. The teaching resource management module integrates the attributes of labels to help personalized teaching. Teachers accurately classify different teaching resources. According to the label classification results, it is convenient for students to accurately search and learn teaching resources to organize their needs to achieve their rational use, better carry out personalized teaching, and improve teaching quality [16]. The background can feed the data results to the instructors to help them accurately grasp the learning situation. Through these functions, we can cooperate with using the main functional modules of the online teaching system [9].

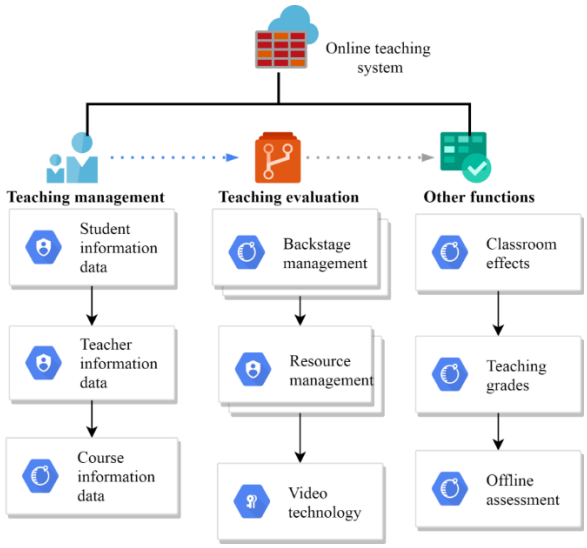

Figure 2: Online teaching system.

Different user roles in this system have additional operating rights to the system. For example, students can study courses and online exams in the system, teachers can manage classes and

exams, and administrators can manage network logs. The specific business process is shown in Figure 3 below:

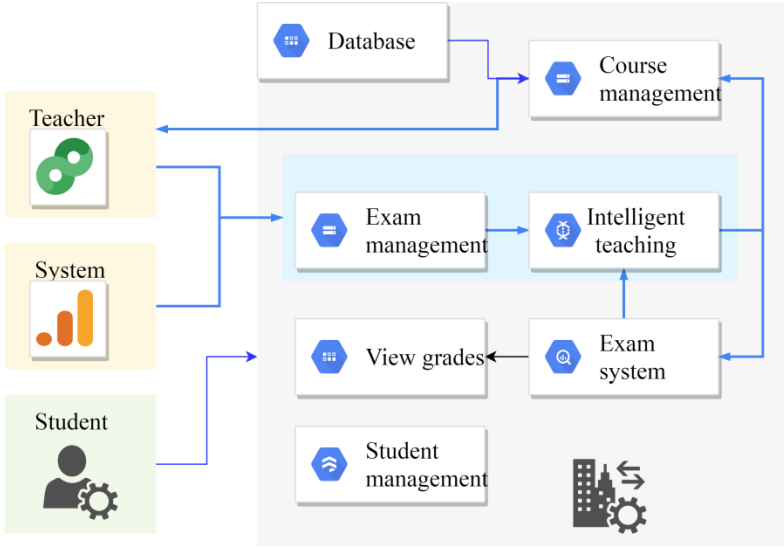

Figure 3: Flowchart of the online education system.

It can be seen from the process in Figure 3 that user registration and login are the essential functions of the online teaching system. According to the different user roles, this paper divides the system users into three roles: students, teachers, and system administrators: different roles have additional operation rights. New students and teachers need to register in the system before logging in. When logging in, they must enter the correct username and password. Monitor and display the students' learning of course resources, examination, and class registration in the background, and feedback on the data results to the instructors in the form of information prompts to help the instructors accurately grasp the learning situation. The primary users of this module are students, and the focus is to realize online test paper generation. Students log in to the system. After completing the corresponding courses, they can take the test paper according to the teacher's requirements. After completing the test, students can check the test paper and score.

Based on understanding the primary process and structural functions of the network teaching system, it is applied to network English teaching. First, using the intermediary method of cluster analysis, learners are gathered on the online English learning platform to determine their English level scientifically. Then, appropriate teaching content is arranged for them. Before learning, students must have an ability test divided into five parts: listening, speaking, reading, writing, and total score.

4 CONSTRUCTION TECHNOLOGY OF ENGLISH ONLINE LEARNING PLATFORM

4.1 Algorithm-Based OnRbf Neural Network

Through the theoretical research of RBF-based neural network algorithms, this work explores the practical idea of building an English learning platform to immerse students in English learning. Deeply dig into the results of teaching data analysis, give feedback to subsequent teaching links, dynamically adjust teaching strategies, focus on strengthening the teaching proportion of students' weak links in English learning, enrich online teaching ways, and improve the effect of online English

learning. At present, the teaching content of the online English learning system is provided in the form of exercises. Students learn English through different exercises, which is also a process. Study for the exam. After creating a content library, you can extract the specified content through content organization constraints. English learning content is not randomly accumulated to meet the needs of learners. In offline practical courses, students' movements, language, expressions, and tone can be displayed intuitively, which is relatively easy to evaluate. In online professional practice courses, students' on-site performances are challenging to consider, and large-scale intelligent evaluation cannot be carried out like multiple-choice questions. Use the online teaching platform to carry out English teaching, conduct an overall analysis of the learning data of all online students, and grasp the learning characteristics of the general students. At the same time, the continuous learning data of each student is analyzed to understand the learning situation of each student. The algorithm formula of the five-layer neural network method is as follows:

$$\prod_{i=1} = \frac{\phi_j}{\sum_{i=1}^{n} \beta_f} \left| x - c_{ij} \right|^2 \tag{1}$$

$$y(x) = \sum_{i=1}^{m} k_e \cdot \eta_e \tag{2}$$

$$p(x) = exp \frac{x_i - c_j}{\delta^2} \tag{3}$$

$$\lambda_i = exp \frac{\sum_{i=1}^{f} (x_i - c_j)^2}{\varpi^2} \tag{4}$$

The characteristic of the RBF neural network is that the closer the neuron is to the center, the higher its activation degree is, which is closely related to the teaching method factors that affect the structure of English learning. Finally, we get an output layer, which outputs different levels of English listening, speaking, reading, and writing skills. It mainly depends on the TS fuzzy method in the RBF algorithm. Its output is the formula:

$$y(x) = \frac{\sum_{i=1}^{j} (a_i x_0 + a_i x_1 + \cdots + a_i x_i) \left(\frac{x-b}{\beta^2} \right)}{\exp\left(\frac{x-c}{\delta^2} \right)} \tag{5}$$

Using the distributed network topology supports different identities and permissions. The corresponding services are slightly different according to the specific level of users, teachers, students, and administrators. The constructive English learning platform mainly comprises extracurricular training, autonomous learning, audio-visual training, and other modules. The demonstration construction schedule is as follows in Table 1.

Time		*Transformation function*		*Score*
Spoken language	*11%*	*Vocabulary*	*0.32*	*88*
Writing	*47%*	*Knowledge point*	*0.2*	*84*
Hearing	*45%*	*Grammar*	*0.15*	*77*
Reading	*50%*	*Comprehension*	*0.31*	*72*
Translate	*49%*	*Tense*	*0.25*	*86*

Table 1 The demonstration construction schedule.

The edit distance algorithm can calculate the edit distance between two abstract grammars. The similarity between two abstract grammars can be obtained by formula.

$$sim(A,B) = 1 - \sum_{i=1}(i,j)\frac{P(A,B)}{\max(a,b)} \quad (6)$$

Among them, $A\ and\ B$ represent the root nodes of the two abstract grammars (i,j), respectively, and present the minimum edit distance between the first i root nodes and the first j root nodes.

There are two kinds of clustering performance measures. One is to compare the clustering results with the recognized external reference standards, which are external indicators; The other is to measure only according to the clustering results without external reference standards, called internal indicators. The internal index DB index of clustering performance measurement is used to measure the similarity.

To find the average dispersion within the class, the formula is as follows:

$$L = \frac{1}{S}\sum_{x\in(i,j)}|x - c_i| \quad (7)$$

Among them, c_i is the center of class S, and (i,j) is the number of S.

Calculate the distance between classes, such as the formula:

$$D_{i,j} = |(c_i - c_j)|^2 - x_{i,j} \quad (8)$$

The inter-class distance is expressed using the distance between the center points of the clusters:

$$DB = \frac{1}{k}\sum_{i=1}^{k}\phi_i(i,j)^2 \quad (9)$$

Among them, k is the number.

Finally, the DB value of the running result of the compiled clustering template program is used as a reference to judge the scores for the students. Let the DB value of the clustering effect run result be S, and the expected outcome is p. Compare the sizes of the two and get the student score prediction:

If,

$$S \geq {}^{p}/_{2} \quad (10)$$

Then, the student's learning score prediction on the platform is good.

If,

$$S\langle {}^{p}/_{2} \quad (11)$$

Then, the student's learning score on the platform is predicted to be poor.

The primary function of the platform database design is the English learning courseware question bank, which includes listening to multiple-choice, single-choice, judgment, reading comprehension, cloze, error correction, and blank-filling questions. The information list of the database contains test question type information, test question knowledge point information, test question field information, test question grammar information, multimedia file information, test question answer information, and so on. The data types and field contents of these information lists are shown in Table 2.

Field Name	*Field content*	*Type of data*	*Category Restrictions*
Type__id	*Type number*	*Number（4）*	*Not Null*
Type__name	*Type name*	*Varchar2（20）*	*Not Null*
Knowledge__id	*Knowledge point number*	*Number（2）*	*Not Null*
Knowledge__name	*Knowledge point name*	*Varchar2（100）*	*Not Null*
Grammar__id	*Grammar number*	*Number（2）*	*Not Null*
Grammar__name	*Syntax name*	*Varchar2（400）*	*Not Null*
Diff__Quot	*Degree of difficulty*	*Number（2）*	*Not Null*
Book__No	*Test question source*	*Varchar2（200）*	*Not Null*

Table 2: Database information table.

The locally adapted RBF algorithm will be targeted, and the training methods and construction of the RBF neural network will simulate the learning rules of excellent online English learners. In this way, the impact of the English learning platform can be better realized, and the English learning platform can play a supporting role in the student's learning process. By evaluating the design, the software design can be improved better.

4.2 Online Education Survey and Analysis

After establishing the teaching and training method, the author surveyed 40 students of a particular platform on the effect of online English teaching. To obtain more comprehensive survey results, the questionnaires were set up with questions about the number of platform users, pre-class self-study tests, method selection, post-class acceptance, and overall teaching situation. The questionnaire survey was distributed on a questionnaire survey platform, with a recovery rate of 100% and 31 valid questionnaires. Statistical analysis was carried out on the questionnaire results, and face-to-face interviews were conducted with individual students based on the specific analysis results. The details are shown in Figures 4-8 below.

First, three knowledge task points are set in the online teaching video to examine students' learning of English parts of speech. Several students in a class of 40 answered the task test questions incorrectly and correctly (see Figure 4). Only one person answered task A incorrectly, meaning that the students in this class have mastered the noun parts of speech in English words. There are 13 wrong and 27 correct answers in Task B, which shows that the students in this class understand the usage of adverbs, but it still needs to be strengthened. Task C has ten wrong and 30 correct answers, which shows that students in this class have some knowledge of preposition recognition, but it needs to be more accurate.

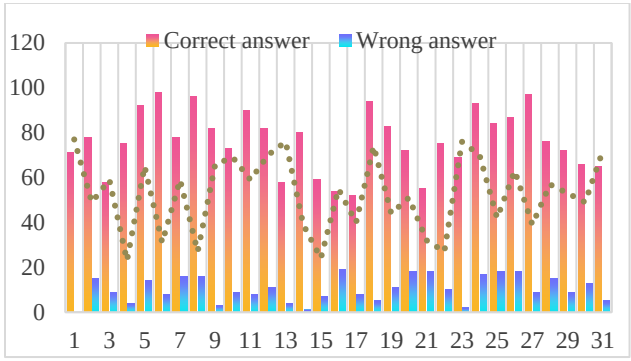

Figure 4: Task point test statistics.

According to the above data analysis results, in the subsequent online learning of the class, it is necessary to strengthen the training of vocabulary usage of various parts of speech. According to the trend graph of students' study times (see Figure 5), it can be found that the chapters taught in February and September are the most frequently studied in a year, which is the peak of the overall trend of study times. The chapters taught in other months are slightly lower. According to the preliminary analysis, the content introduced in February and September is the part students must focus on.

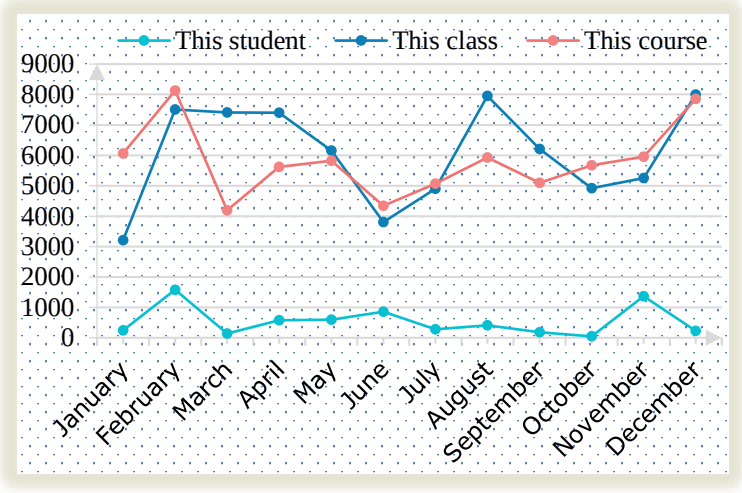

Figure 5: Trend of annual study times of students.

According to the survey questionnaire, the problems of online teaching are less interaction between teachers and students, more homework, inconvenient submission, and video lag. With a lack of teacher supervision, the learning efficiency of some courses could be higher. The lecture time is long, and I want to shorten the lecture time. Therefore, students can implement the "student-centered" teaching philosophy using the online English learning platform. Choose the teaching method independently (as shown in Figure 6). Whether online or offline, as long as it is a teaching process, students must be the main body of teaching activities. Students can achieve teaching goals

only by exerting their subjective initiative, consciously constructing subject knowledge and skills, and forming thinking and values corresponding to what they have learned.

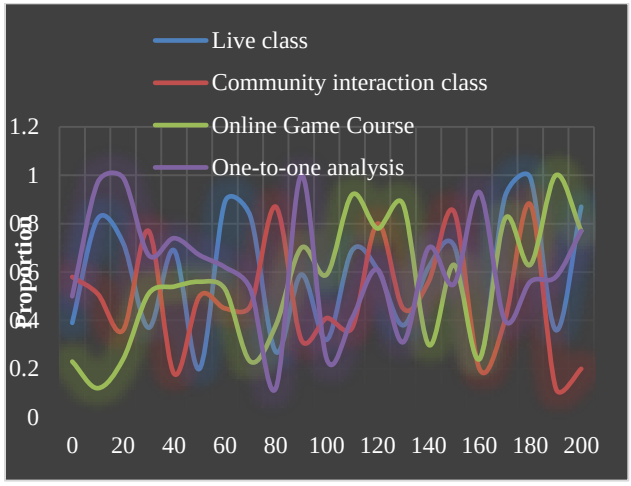

Figure 6: Proportion of online teaching method selection.

Online teaching increases the possibility and scientificity of single tutoring. Single tutoring can compensate for students' weaknesses and develop students' advantages. Both are the concrete embodiment of the "student-centered" teaching concept, which should be implemented in other online teaching designs. By analyzing students' learning acceptance (as shown in Figure 7), teachers can change teaching strategies in the next stage of teaching and adopt teaching methods and means more suitable for students' levels in vocabulary and other aspects. With the help of data analysis, teachers and students can find problems more accurately and adjust teaching strategies in time. Students' performance in each stage is tiny fragmented data. Still, teachers collect and integrate all fragmented data in the course implementation, and the course assessment runs through the whole teaching process. Through big data analysis technology, students' learning status database can be obtained, which has a guiding role. It can not only grasp the general problems of students but also track each student's learning situation in time to teach students by their aptitude.

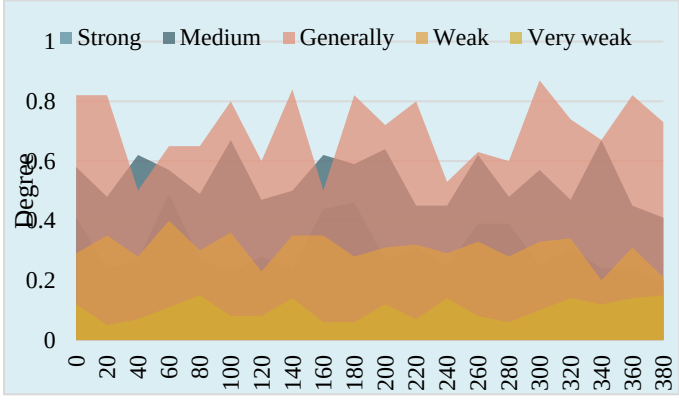

Figure 7: Students' acceptance of online teaching.

Teachers can use advanced extensive data analysis technology when designing online English teaching but must be able to follow this technology. Although data analysis is objective, it also discards many subtle factors. When using data analysis results to adjust teaching strategies, teachers should combine their teaching experience, scientifically and rationally use data analysis results, and organically combine objective data analysis results with teachers' subjective initiative. According to the analysis of the usefulness of learning resources in Figure 8 below, a more scientific teaching strategy is formed. The integrated online teaching method based on big data, guided by the concept of openness and integration, and adopted platform support, supports the transformation of online English practical courses to online. In this process, each teaching role has value.

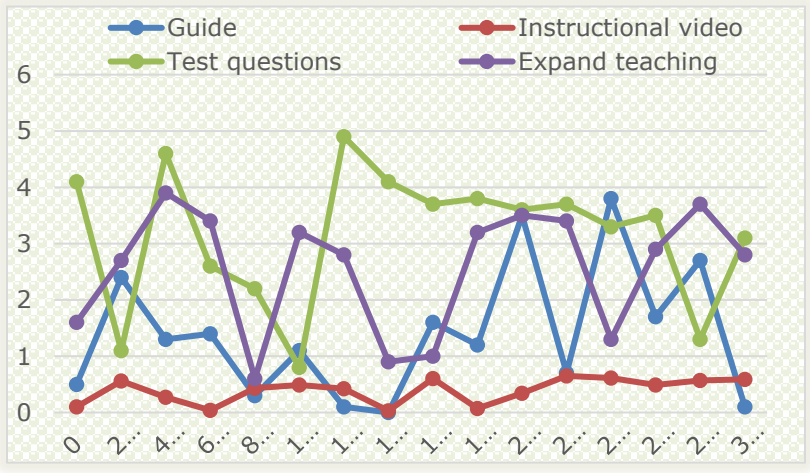

Figure 8: Analysis of the usefulness of online self-study resources.

5 ANALYSIS OF EFFECTIVE STRATEGIES FOR ENGLISH ONLINE TEACHING

Compared with traditional classroom teaching, online teaching has more prominent advantages. However, because online teaching relies on the network information platform, teachers and students face the electronic screen to teach or learn, which needs more face-to-face interaction like traditional teaching. Therefore, it is necessary to improve the online education method effectively. The strategies are as follows.

As the organizer of teaching, English teachers should first take the initiative to learn and be familiar with the operation process of the webcast platform. Only by mastering and applying information technology and network platform operation can online teaching be effectively carried out. Secondly, teachers should make a good curriculum plan for online teaching according to the learning situation and teaching content.

In online teaching, teachers need to check in with students by roll call before, during, and after class, and they can also make interactive speeches during the teaching process and conduct English dialogue and online communication. Teachers can use the network information platform to monitor students' learning status anytime.

English online teaching can be based on the most advanced method of information technology, using multimedia teaching means. Provide external stimulation with pictures, pictures, audio, and video so that the classroom becomes more realistic and substantial and more visualized and

attractive at the same time. With the help of multimedia and the Internet, students can practice language situations, and their language ability can be improved.

Through online education, teachers and students can break through the limitations of time and space, share learning resources at a high level, and conduct two-way interactive and autonomous learning. Students work on online learning independently and use repeated video learning for crucial and difficult points until they are fully mastered. After completing online learning, teachers divide discussion groups into mixed groups, and students internalize the learning content by completing tasks assigned within the group. Students participate in community discussions, build learning communities through collaborative communication with peers, acquire new knowledge and skills, and create new perspectives. Then, teachers use face-to-face classroom teaching to help students master the online learning content, and teachers and students carry out various forms of interaction. As a result, students' language, information literacy, and autonomous learning abilities have been exercised and improved.

6 CONCLUSIONS

This paper uses massive data mining algorithms, constructivist English teaching methods, and Python-based visual analysis technology to build a low-cost data analysis visualization platform that improves teaching efficiency. Online English teaching accounts for 20.33%. The English learning platform plays a good auxiliary and positive role in students' English learning. As a better English teaching method, it has specific research value and positive significance for English teaching research. With the continuous application of Internet technology, online education should pay attention to the potential value and role of educational data, find teaching methods combined with big data analysis technology, and learn and apply big data. According to online education's application trend and development rules, complete personalized learning and teaching. Under the guidance of big data, tap its great potential and expand the achievements of online education. The development strategy for e-learning in online English teaching, shaped by significant data insights, revolutionizes educational methodologies and empowers educators and learners alike. This data-driven paradigm promises to foster a dynamic and inclusive learning environment where personalized experiences, continuous enhancements, and ethical practices converge to propel online English education toward unparalleled effectiveness and accessibility.

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