Evaluation of English Online Teaching Resources for College Students Based on Grey Correlation Method

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Abstract: Many problems in the evaluation of traditional college English teaching resources have hindered the progress of college English teaching. Under the background of "Internet+", the continuous innovation of college English teaching mode calls for the innovation and perfection of the college English evaluation system. This paper analyzes the evaluation indicators of college students' online teaching resources through the introduction of Grey relational analysis. The correlation between various indicators and the evaluation results of college students' online teaching resources can be obtained. Some unimportant evaluation indexes can be removed, which simplifies the evaluation of college students' online teaching resources. The structure of the model improves the evaluation efficiency of online teaching resources for college students. Therefore, only by strengthening the software and hardware construction of the online teaching platform, updating the teaching concepts of college English teachers, cultivating learners' awareness of autonomous learning, resources in English teaching extensively consult English linguistics and language teaching experts to integrate online teaching resources.

Keywords: college English teaching; grey relation; "Internet+"; online teaching resources

1 INTRODUCTION

With the development of online education, the construction and application of online courses has also set off an upsurge in colleges and universities, and the delays in the opening of colleges and universities caused by the Covid-19 pandemic have directly promoted online teaching [1]. When it comes to the front desk of teaching, how to make the advantages of online smart education fully develop has become an issue that cannot be ignored in current college education. According to the survey, 79.73% of students currently use smartphones to check information on the Internet, 14.2% of students use smartphones for entertainment and other purposes, and 5.88% of students use smartphones for communication. The vast majority of students believe that the development of online smart teaching mode has problems such as lack of independent learning ability, large amount of tasks, high pressure, and technical obstacles to mobile phones and computers. Part of classmates think that the classroom lacks fun, the materials are not perfect, and the teaching content is repetitive. Compared with traditional learning methods, online learning has a certain level of instability [2]. At this stage, online learning mainly relies on students' self-control to achieve their own control. However, the Internet is full of all information. College students will inevitably get distracted when facing all kinds of complex information, and their own learning situation will be greatly affected, and it is difficult to achieve the purpose of learning. First, in order to provide more convenient online teaching services, it is needed to arrange and design various courses more physically to facilitate students' pre-class preparation and after-class review. Secondly, it is needed to provide more online services on the platform.

With the maturity of network technology, people realize that traditional computer-assisted second language teaching methods should be integrated, so that learners can use computers and network multimedia to effectively read and write, to achieve the purpose of real communication and cooperation. Du, (2018) found that, compared to traditional classrooms, online multimedia teaching can give learners a more equal opportunity for effective communication in an environment, and then they can pay attention to the unknown elements in the language input, and build themselves in communication and negotiation with others [3]. Chun & Jiao also believe that the online multimedia teaching environment can reduce learners' anxiety and truly focus on students, thereby enhancing their learning motivation, enhancing their sense of responsibility for learning, enhancing their self-concept, and broadening their cultural horizons [4]. However, the academic circles are controversial about the multimedia network teaching of second language. People who support second language multimedia teaching mainly focus on the concept of computer omnipotence, and it can bring specific results for second language teaching. Li, (2019) even asserted that the use of multimedia teaching methods might lead to the phenomenon of one-step-ahead technology and two-step pedagogy [5]. Scholars discussed the models and methods of foreign language online teaching and evaluation, related technology development, the advantages of online teaching and learning and the quality assurance system, and the abilities that should be possessed when using online teaching and learning. Derdowski, (2020) found that online learning can not only improve learners' listening, reading, and writing abilities, but also promote students' active use of learning strategies [6]. However, not all studies support this positive effect of online learning. Some researchers have also pointed out the problems and shortcomings of this new teaching model. Srinivasan, V. P. et al. (2021) believe that the network equipment is outdated, the channels for students to use the network are not smooth, and the learning resources are single [7]. Debroy et al., pointed out that the main body of online teaching has problems in teaching and learning. As for students, they may use the Internet to carry out activities unrelated to classroom teaching, such as playing games, chatting, etc. [8]. Goto also believes that online communication is only a virtual interaction, not a face-to-face communication between people, and blindly relying on online teaching will fail to achieve the purpose of communication skills development [9]. Yang found that cooperative learning under the network environment can promote learners' academic performance and autonomous

learning ability, but the effect in cultivating their learning autonomy is not significant. This learning mode can also effectively cultivate the learners' ability to use learning strategies and improve their extracurricular learning ability, but it has certain limitations in cultivating learners' planning, self-monitoring ability, and evaluation in reflective learning [10]. Zhang and Zhan also found that the listening module of the "New Vision University English" network system did not improve the listening ability [11]. The main content of this theory is a theoretical system based on grey algebraic systems, grey matrices and grey equations, and it extends some views and methods of general system theory, cybernetics and information theory to abstract systems such as economy, society, and ecology. A new analysis method called the correlation level of the system is proposed, which seeks the correlation level between the subsystems in the system. Since the system correlation analysis is based on the development trend, there are no specific or strict requirements on the sample size and whether the sample is regular, the calculation is simple, and there will be no inconsistencies between the quantitative results of the correlation level and the qualitative analysis.

The communication between teachers and students is still face-to-face communication, the environment of teaching activities is still the classroom, and the network is only a supplementary part of the overall teaching environment. Textbook network resources refer to the publishing of foreign language textbooks while also developing a multimedia resource library with richer information and more diversified functions on this basis, including a demonstration system for textbooks. In addition to text and video presentations, the textbooks also have supplementary readings. The auxiliary resources of course teaching mainly include various aspects of independent learning content, such as film and television appreciation, exercises, and interesting reading. Electronic supplementary resources include teaching plans, courseware and text comprehension, sentence learning, supplementary exercises and other supplementary materials for teaching. Students can combine the textbook network system and these electronic auxiliary resources for post-class preview and review, and teachers can help answer questions on the Internet. The network self-learning resource library can include many modules, such as listening. The contradiction of the effect of online teaching has been affected by many factors, among which the presentation and distribution of online teaching resources should be one of the influencing factors. As Li and Su pointed out, if the resources of the university English online learning platform are single and slow to update, then it cannot meet the needs of students for autonomous learning [12]. Therefore, this article intends to investigate the current integration of foreign language online platform teaching resources, and put forward suggestions for problems, so that online platform teaching resources can better serve college English teaching. This article aims to understand the effects of online teaching resources on college students in detail, and provide a basis for giving full play to the advantages of online teaching and effectively improving the effectiveness and the quality of online course construction.

2 RELATED THEORETICAL RESEARCH

A number of emerging marginal disciplines, such as grey hydrology, grey geology, grey breeding, grey medicine, and regional economic grey system analysis have emerged at the historic moment. The new models and new methods have been enriched more systematically, which improved and summarized the grey system analysis, and further expanded the application scope of grey system analysis. From the point of mathematics, grey system analysis can be applied systematically in three aspects: factor analysis, determination of plans, and comparison of advantages.

The grey relational analysis theory can provide a quantitative measure for the development trend and change trend. The use of grey correlation level to analyze the factors is very effective in practical applications, and it is very suitable for situations where there is no strict law or mathematical relationship between various factors and totals. If you want to conduct a system analysis, you must first sort out the relationships between the various factors, and then clarify the main contradictions, main features, and main relationships.

The basis of resource impact assessment is based on the grey system theory. $\{C^*\} = [C_1^*, C_2^*, ..., C_n^*]$ as a reference sequence. $\{C\} = [C_1^i, C_2^i, ..., C_n^i]$ as the sequence to compare, the correlation analysis method is used to obtain the correlation coefficient between the index k of the evaluated object i and the optimal index of the index k, namely. The authenticity of basic information and data is in Eq. (1).

$$\xi_i(k) = \frac{\min_i \min_k \left|C_k^* - C_k^i\right| + \rho \max_i \max_k \left|C_k^* - C_k^i\right|}{\left|C_k^* - C_k^i\right| + \rho \max_i \max_k \left|C_k^* - C_k^i\right|} \qquad (1)$$

where $\rho \in (0, 1)$, $\rho = 0.5$.

The comprehensive evaluation result is: $R = E * W$.

3 EVALUATION OF ENGLISH ONLINE TEACHING RESOURCES FOR COLLEGE STUDENTS BASED ON GREY CORRELATION
3.1 Research Object and Data Collection

This research takes 30 colleges out of the 180 colleges and universities in the college English teaching reform pilot project of the Ministry of Education in 2020. The software of 45 schools and the 45 schools of the software of "University Experience English" by Higher Education Press (Four sets of college English textbooks are hereinafter referred to as "New Era", "New Idea", "New Vision" and "Experience English"). If sampling is done according to simple random sampling (that is, lottery), there may be errors, so we follow the method of hierarchical sampling and proportional sampling [15]. According to the ratio, 7.5 schools should be selected from the 4 kinds of teaching materials software, but the number of schools should be rounded, so we randomly selected 7 schools from the first two kinds. Eight schools have been randomly selected from the universities that use the latter two software.

Data collection refers to the collection of information on the Internet to check the integration of college English teaching resources by relevant colleges and universities on the spot. Based on the above classification of the college English network interactive teaching resources, we have worked out the various modules of the resources. First, we have divided two major parent modules, which are knowledge resources and functional resources. Knowledge resources include textbook resources, teaching supplementary resources, exercise resources, film and television resources, competition resources, other English language and cultural resources, academic resources and other sub-modules, and then there are small modules under each sub-module. Functional resources include information Management, test papers, correction, score import and export, online recording, interactive Questions & Answers (Q&A), audio and video processing, data upload, search engine and network connection, etc. There are also sub-modules under each sub-module. These modules are made into tables. From October 2019 to October 2020, I searched the Baidu engine for the college

English online teaching platforms, online self-learning centers, or boutique courses of the investigated colleges and universities, and went to these websites to find out whether they provided various mother modules. The author fills in the relevant data after the investigation into the corresponding table.

3.2 Construction of "Online" College English Teaching Mode under the Background of Network Resources

A complete "online" two-way interactive college English teaching model should include the following parts, as shown in Fig. 1. Around this model, we should clarify and optimize the implementation principles and implementation paths.

The rapid development of the Internet and the continuous integration of information technology have brought about a brand-new teaching model. The teaching mode of embedding various teaching resources in college English teaching has gradually become the normal state of college English teaching [16].
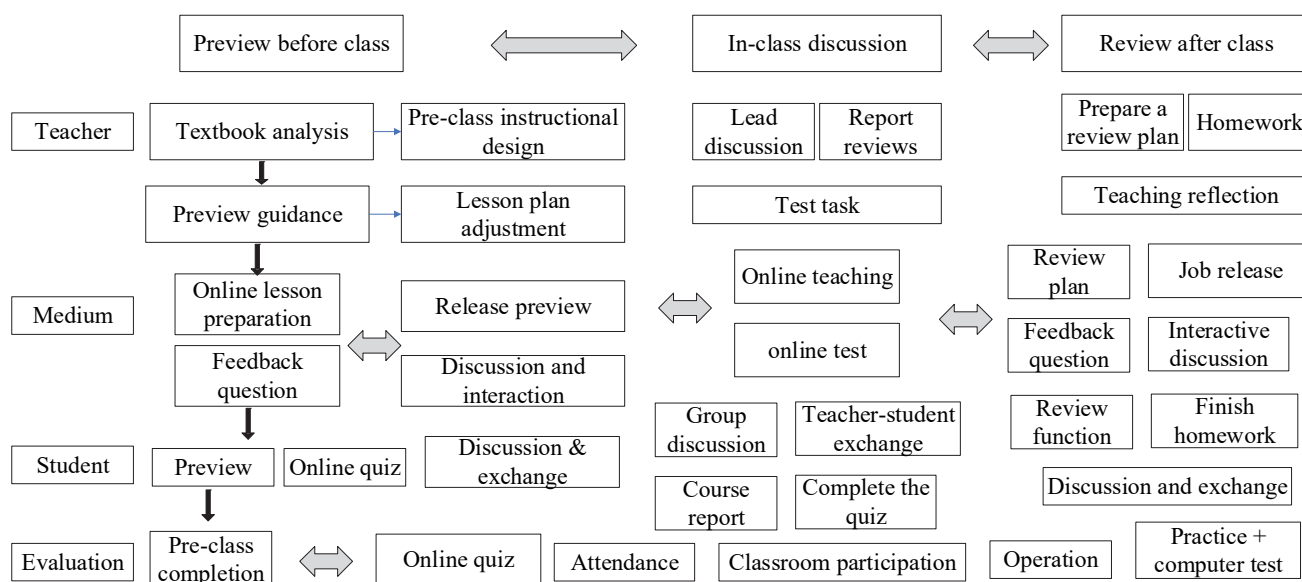

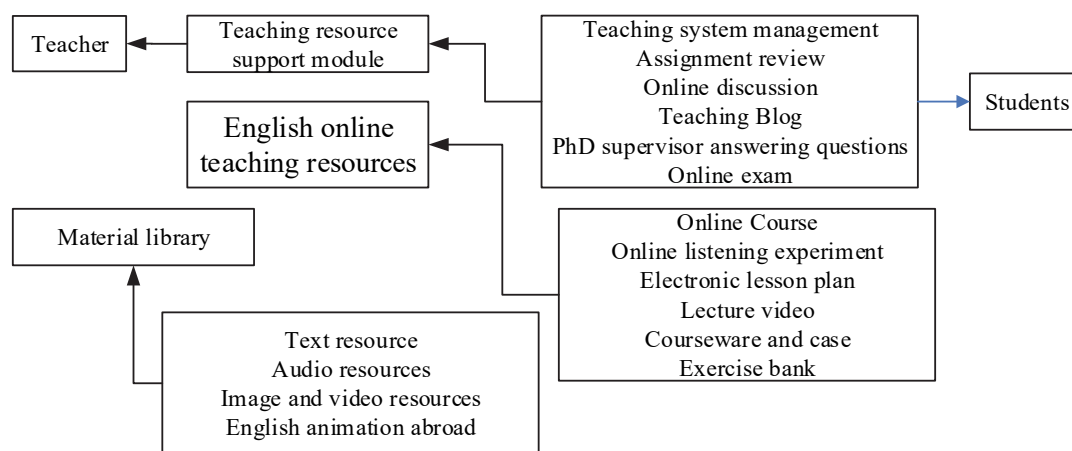**Figure 1** The mode of English online teaching resources evaluation for college students

Figure 2 The structural diagram of English online teaching resources for college students

As a key component of the teaching model, evaluation has largely affected the effectiveness of college English teaching. A good teaching evaluation system is conducive

to optimizing college English learning. Whether it is before, during or after class, timely tracking, and providing evaluation data, allows teachers to reflect on the

unreasonable teaching mode, and then make appropriate adjustments and optimizations to college English teaching. There are many types of online teaching resources for college students, such as quality, teaching content, and supporting modules. The specific structure is shown in Fig. 2.

To evaluate college students' online teaching resources, first establish a corresponding evaluation index system. Based on the principles of science and operability, this article establishes a college student online teaching resource evaluation, as shown in Fig. 2.
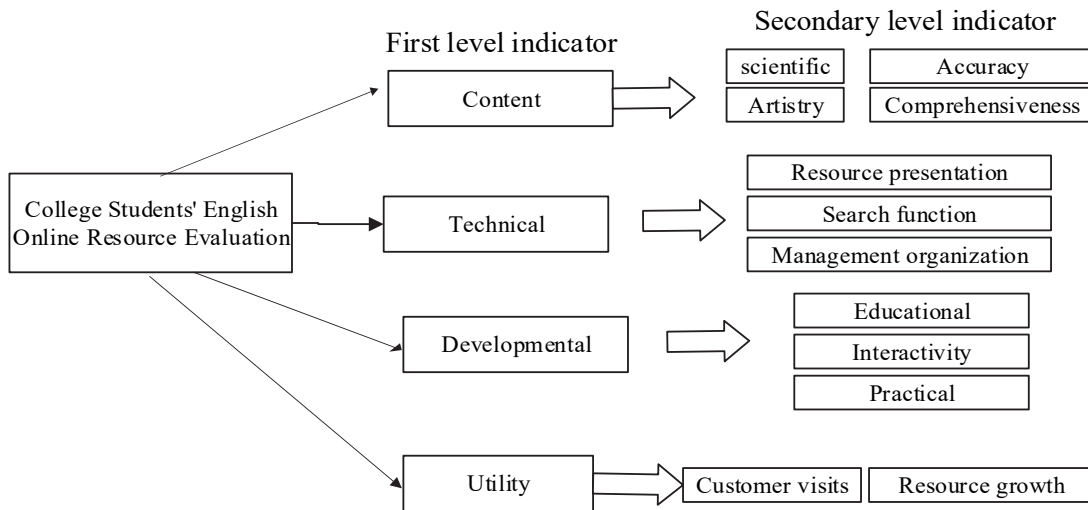

Figure 3 The evaluation indicators of online teaching resources for college students

It can be seen from Fig. 3 that the evaluation indicators of online teaching resources for college students include four types of first-level indicators, and each level of indicators is divided into multiple second-level indicators.

3.3 Grey Relational Analysis Method to Calculate the Relation Level of Evaluation Index

The evaluation index system of online teaching resources for college students includes 12 indicators. For different online courses, their level of influence on the evaluation results of online teaching resources for college students is not the same, so the evaluation indexes are determined by the grey relational analysis method. The level of association with the evaluation results of online teaching resources of college students, and the corresponding important indicators are selected according to the level of association to model the evaluation of college students' on-line teaching resources [11-13]. Y_1, Y_2, …, Y_m denotes the evaluation index of online teaching resources for the college student i. m denotes the number of indexes, and Y_i^k, $i = 1, 2, …, n$ denotes the college student's on-line Teaching resource evaluation sample m. n represents the number of samples, then $Y_i^k = \left\{ Y_i^1, Y_i^2, ..., Y_i^n \right\}$ is the evaluation index of the i college student online teaching resources Comparison sequence, $Y_i^k = \left\{ Y_i^1, Y_i^2, ..., Y_i^n \right\}$ is the reference sequence, that is, the grade sequence of the on-line teaching resources for college students, then the comparison sequence and the reference sequence The correlation coefficient is in Eq. (2).

$$R_{oi}(k) = \frac{\min |Y_0(k) - Y_i(k)| + \xi \max |Y_0(k) - Y_i(k)|}{|Y_0(k) - Y_i(k)| + \xi \max |Y_0(k) - Y_i(k)|} \quad (2)$$

where ξ represents the resolution.

$$R_{oi} = \frac{1}{n} \sum_{k=1}^{n} R_{oi}(k) \quad (3)$$

The correlation between the comparison sequence and the reference sequence is as follows. The relevance value of a certain evaluation index is greater, the level of influence it has on the evaluation results of college students' online teaching resources is higher. In this way, some evaluation indexes with large relevance values can be selected to reduce and simplify the number of evaluation indexes of college students' online teaching resources. The evaluation process of online teaching resources for college students improves the evaluation efficiency of online teaching resources for college students. Tab. 1 shows the results of the Grey correlation analysis method to calculate the correlation level of the evaluation index.

Table 1 The grey correlation analysis method to calculate the correlation level of the evaluation index

Index number	Relevance value	Index number	Relevance value
Y_1	0.84	Y_7	0.13
Y_2	0.24	Y_8	0.87
Y_3	0.83	Y_9	0.88
Y_4	0.79	Y_{10}	0.74
Y_5	0.83	Y_{11}	0.97
Y_6	0.14	Y_{12}	0.18

It can be seen from Tab. 1 that the correlation between different evaluation indicators and the evaluation results of college students' online teaching resources is different. The indicators with a correlation greater than 0.77 are selected to model the evaluation of college students' online teaching resources.

4 RESULTS AND ANALYSIS
4.1 Test Platform Settings

In order to analyze the evaluation effect of the Grey correlation method and the neural network of the on-line

teaching resources for college students, a simulation experiment has been carried out, and the test platform is shown in Tab. 2.

Table 2 Test platform for evaluation of online teaching resources for college students

No.	Name	Value
1	CPU	Intel core i3 10100; 3.6 GHz; NVIDIA Quadro P620
2	RAM	DDR4 2666 MHz; 128 GB
3	Hard disk	256 GB +1 TB; SATA/SSD
4	Operating system	Windows10
5	Operating tools	Eclipse, Notepad++

4.2 Integration of Teaching Materials and Auxiliary Resources

According to the survey, the integration of college English textbooks and auxiliary resources by the online teaching platforms of 30 colleges and universities is shown in Fig. 4. 30 colleges and universities have integrated the resources of online textbooks. This type of textbook is an electronic textbook that integrates pictures, text, and sound. Learners can listen to recordings of texts and exercises through audio, and can complete corresponding tasks on electronic texts and submit results. The platform can record students. This kind of English network teaching materials can be called the network demonstration system of teaching materials [17], which has a high level of integration and modularity, which is convenient for learners to obtain information. Most of the college English textbooks published in recent years are equipped with corresponding network demonstration systems. In terms of teaching aids, most colleges and universities provide online electronic teaching aid resources. Among them, 27 colleges and universities have electronic teaching plans and PPT courseware on their college English learning platforms. In addition to the courseware, there are coursewares from brother colleges. This information can be shared, and students can see the teaching plans and courseware through the platform, which is conducive to improving the effect of preview and review. Teachers can learn from peer demonstration classes to improve their own teaching quality.

The survey found that among the 30 colleges and universities, the following colleges have integrated English exercise resources. On average, more than 70% of schools have classified exercises in the online learning platform, and they are equipped with corresponding detailed answers. Sub-practice refers to non-examination training exercises such as grammar, and translation. Graded exercises refer to simulations and real exercises for each level, such as the three, four, and six exams. The online teaching platform can give students the opportunity to learn independently, and the teacher does not need to take up more classroom time to explain the exercises.
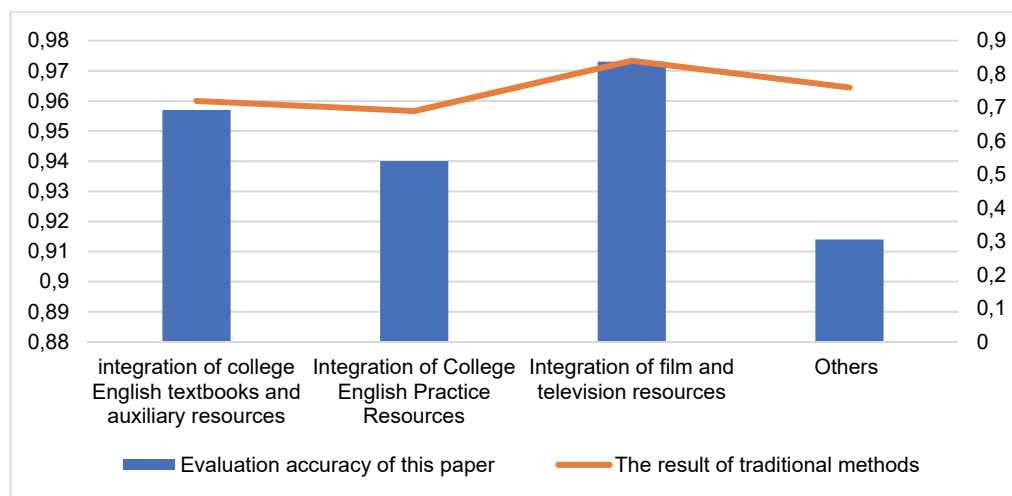

Figure 4 Results of college English resource assessment

In terms of the integration of film and television resources, the online teaching platforms of 23 colleges and universities have integrated high-quality film editing, but only 15 schools provide high-quality editing of TV series. In addition, some important oral English competitions have been provided by half of the schools on the online platform [18]. Some performance English competitions have only been provided by 10 schools. The good news is that these schools have provided corresponding electronic texts.

4.3 Universality Test

In order to test the versatility of the evaluation method of online teaching resources for college students using the Grey correlation method, 20 professional courses were selected as the test objects, and the evaluation accuracy of online teaching resources for college students was counted.

The results are shown in Tab. 3.

Table 3 Online teaching resources for 20 professional courses of college English

No.	Evaluation accuracy	No.	Evaluation accuracy
1	93.6	11	92.3
2	93.4	12	93.1
3	93.1	13	92.4
4	92.2	14	92.4
5	93.2	15	93.9
6	92.5	16	92.4
7	92.2	17	93.4
8	93.3	18	92.8
9	93.7	19	92.2
10	92.6	20	92.4

It can be seen from Tab. 3 that for all 20 professional courses, the evaluation accuracy of the online teaching resources for college students using the Grey correlation

method exceeds 92%. The Grey correlation method has obtained the ideal evaluation results of English online teaching resources for college students, which have been applied to the actual college students and are in the process of recommending and managing English online teaching resources.

5 CONCLUSIONS

Online teaching has better sharing characteristics, which enables students to find what they really need and like online. Because online teaching resources are very rich, it is particularly important for college students to find the online teaching resources they need within an effective time. The evaluation of online teaching resources for college students can analyze the pros and cons of online teaching resources for college students. The evaluation method of college students' online teaching resources based on the Grey correlation method has been proposed. Its advantages are as follows. First, the Grey correlation method is used to select some important evaluation indicators to model the evaluation of college students' online teaching resources. This paper verifies the evaluation method of online teaching resources for college students through simulation and comparison experiments. Judging from the integration of the resources of the college English online teaching platform by the various schools surveyed, online teaching is affected by traditional teaching ideas. It is embodied in the display of knowledge, providing an environment and software for cultivating student skills, especially not paying enough attention to resources related to oral skills. In the display of knowledge, grammar knowledge is emphasized, pragmatic and cultural knowledge is neglected.

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