A Corpus Based Method for Evaluating the Teaching Effect of Electronic Engineering English

Yong LIU

LIU Yong， Xi'an MingDe Institute of Technology, Xi'an, 710124,China，E-mail: liuyong_xmdit@163.com

Abstract: The existing evaluation methods have the problem of imperfect teaching effect evaluation model, which leads to the low reliability of the evaluation index. This paper designs a corpus based quantitative analysis method for teaching effect evaluation of Electronic Engineering English. Based on the mathematical principle of radial basis function, this paper uses corpus to analyze the distribution characteristics of Electronic Engineering English courses quantitatively, and uses association rules algorithm to build an English teaching effect evaluation model to comprehensively judge the importance of each factor. Experimental results: the average reliability of the two existing evaluation methods is 1.0751 and 0.5455 respectively, and the average reliability of the evaluation method is 0.7983, which shows that the reliability of the evaluation method is closer to the standard value of 0.8, which proves that the evaluation method of Electronic Engineering English teaching effect integrated with quantitative analysis of corpus has better practical application performance good.

Key word：corpus; quantitative analysis; teaching effect; evaluation method;

Tob Regul Sci.™ 2021;7(5):1222-1229
DOI: doi.org/10.18001/TRS.7.5.39

Teaching effect evaluation refers to the comprehensive, objective and fair evaluation and judgment of teachers' quality, working process and performance by using the theory, method and technology of education evaluation according to the policies, regulations and school's talent training objectives and requirements. Teaching effect evaluation can make the functional departments of colleges and universities more accurately grasp the teaching situation of teachers and the current situation of students' learning, improve teachers' teaching attitude, teaching methods, cultivate high-quality talents, and carry out the construction of teaching staff and teaching reform in a planned way, which is more suitable for the teaching policy of Vocational Colleges [1]. It is particularly important to make the evaluation of teachers' teaching effect fair, just and unified. In the research and practice of educational theory, there are many methods of teaching effect evaluation, but there is no unified method at present. Teachers' work is a complex mental work, and teaching activities are a complex process of teaching and learning. It is also difficult for teachers to show behaviors consistent with educational goals in the teaching process. In terms of theoretical research on teaching evaluation, foreign countries started earlier, especially in the United States. American scholars began to study teaching evaluation system from the 1920s [2]. The emergence of foreign education evaluation theory is to improve the quality of classroom teaching as the principle, to analyze the effectiveness of the teaching process, to improve the timeliness of teaching, and to accurately evaluate teachers' classroom teaching through the discussion of the effectiveness of the teaching process. In terms of theoretical research on teaching evaluation abroad, according to different theories, some scholars put forward different research methods on the evaluation of teachers' teaching effect [3]. Scholars put forward five dimensions, namely, teaching quantity, organizational structure, evaluation of teaching skills, teacher-student relationship. Some scholars put forward four evaluation dimensions: curriculum organization, behavior management, student performance evaluation and teacher-student relationship, and nine evaluation dimensions: sense of learning value, teaching enthusiasm, organizational clarity, group interaction, interpersonal harmony, knowledge width, test score, homework reading materials and homework difficulty. At the beginning of the 20th century, the evaluation of teachers' classroom teaching appeared in western countries. During this period, the evaluation method was mainly based on the rating scale,

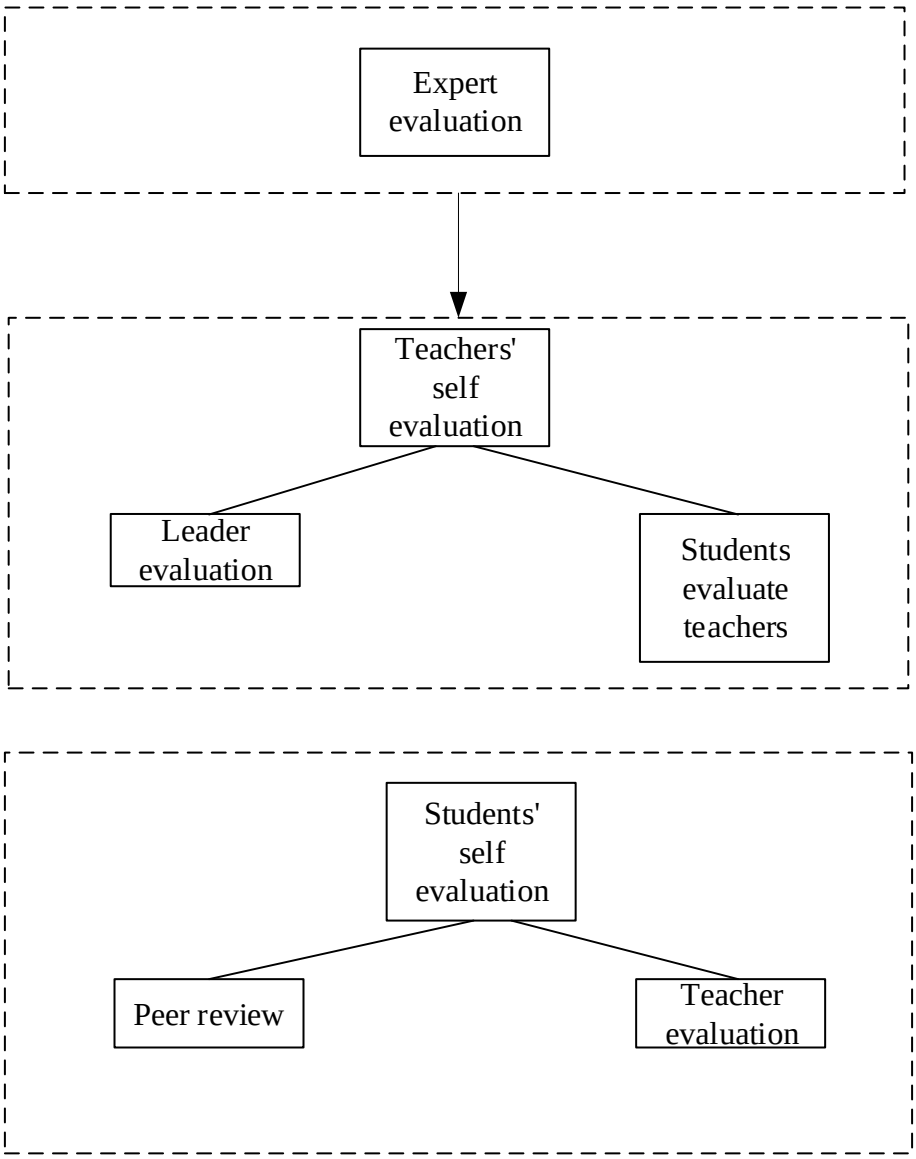
which originated from the educational measurement movement prevailing in Europe and America at the beginning of the 20th century. Due to the lack of research on the content of the scale itself, the reliability and validity of the evaluation results are almost equal to zero. The research on the teaching evaluation method of Electronic Engineering English in China started relatively late, basically from the 1980s [4]. At present, according to the school running policy and characteristics of our college, many schools in China take the development road of combining production with learning, with service as the purpose and employment as the guidance. We should adhere to education oriented, moral education first, attach great importance to students' professional ethics education and legal education, pay attention to the cultivation of students' integrity, professionalism and sense of responsibility, discipline and law-abiding consciousness, educate students to learn communication and teamwork, and improve students' practical ability, creativity, employability and entrepreneurial ability [5]. The evaluation system of teachers' classroom teaching effect has been established, but no school's teaching effect evaluation system has been used nationwide, which shows that the evaluation method of teachers' teaching effect in China still has room for improvement.

A CORPUS BASED METHOD FOR EVALUATING THE TEACHING EFFECT OF ELECTRONIC ENGINEERING ENGLISH

Get the Evaluation Index of Teaching Effect

It is an important step to obtain the evaluation index of teaching evaluation effect and establish the course teaching database. Teaching effect evaluation is a process of making objective measurement and value judgment on the process and effect of teaching and learning based on certain methods and standards. Through the extraction of middle school English classroom teaching evaluation index, the integration of expert evaluation index [6]. In the selection of each index, find out the index with small occupation, and screen out the index to get the expert evaluation index. Classroom teaching is one of the core work of colleges and universities, and teaching quality, as the focus of teaching work, has been paid close attention by colleges and competent teaching departments [7]. The quality of teaching is the lifeline of colleges and universities, and improving the quality of teaching is the eternal theme of college teaching. If a student is interested in the English course and likes the teacher of the course, it is often easier to accept and affirm the teacher's teaching and study the course seriously, so as to give a better evaluation to the teacher's teaching. It is obvious that hard work will help to improve the academic performance of the course. The two variables are related, high interest in the course helps students to study harder, and the improvement of academic performance helps to further improve their learning enthusiasm. Teachers are the implementers of teaching, and their teaching quality is directly related to the quality of higher education. Evaluating the teaching quality of teachers can not only identify the advantages and disadvantages of the quality of teachers' work, but also fully mobilize the enthusiasm of teachers' teaching and improve the overall quality of teachers. The school teaching management department can understand the teaching situation, find problems, summarize experience, and feed back information to teachers, so that teachers can improve their work and ultimately achieve the purpose of improving the teaching quality . Teacher evaluation is the core of teacher teaching evaluation [8]. It can also stimulate and guide teachers to reflect on their teaching behavior, and promote the development and improvement of teachers through analysis and improvement. Practice shows that both reward and punishment come from external pressure, which is difficult to have a substantial impact on Teachers' work performance, and may even have a negative effect on Teachers' work. Teaching evaluation should make it clear that teachers are not only the object of evaluation, but also the subject of evaluation. As the designer and organizer of teaching work, teachers themselves are also the imparter of knowledge. Teachers' self-evaluation and mutual evaluation are the process of teachers' self-awareness and self-education, which not only helps to mobilize teachers' enthusiasm, but also fully embodies the democracy of evaluation [9]. Teachers should directly participate in the evaluation process, strengthen communication with each other, find out each other's advantages and disadvantages, and provide reference for teachers to further formulate corresponding countermeasures and implementation plans. The structure diagram of teaching effect evaluation index composed of expert evaluation index, teacher evaluation index and student evaluation index is shown in Figure 1:

Fig. 1 Evaluation index structure



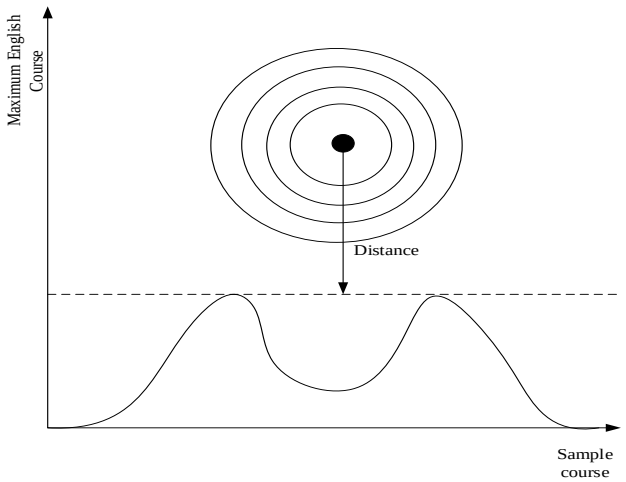
It can be seen from Figure 1 that the evaluation index teachers' teaching evaluation should be based on the plan to achieve the expected teaching objectives. If the classroom atmosphere of a certain class is active and fascinating, the teacher's language is vivid, and the students' response is positive, it seems that it should be a very successful class. However, whether the content mastered by the students of this class is consistent with the teaching objectives needs further verification. Only to achieve the expected teaching objectives, the classroom teaching effect of teachers is good [10]. The consistency of teaching objective and teaching evaluation standard is helpful to evaluate teaching effect objectively, accurately and comprehensively. To implement scientific teaching evaluation, we should not only pay attention to the evaluation itself, but also pay attention to the detailed statistical analysis of the evaluation results. From the perspective of students, the results of teaching evaluation can feed back the information of students' learning situation, so as to further improve students' learning motivation. Students can take advantage of the opportunity of teaching evaluation to understand their own learning situation, what knowledge and ability they have learned, whether they have improved or degenerated, whether their learning gains are less than those of other students, or whether their learning gains are more than those of other students. Students' participation in the teaching quality evaluation system should be considered from the following two basic principles: first, students' learning is the center. If conditions permit, students can be divided into learning groups to strengthen the training of students' team cooperation ability and communication ability, so as to achieve better results [11]. In the classroom effect evaluation of university courses,

we should strengthen the interaction between students and teachers, that is, through the daily course learning to master the relevant professional knowledge, through the flexible use of guiding, heuristic and case teaching methods and means, fully activate the classroom atmosphere, actively mobilize students' learning enthusiasm and initiative, and evaluate the evaluation index Finishing the steps of teaching effect evaluation index.

Corpus Based Quantitative Analysis of the Distribution Characteristics of Electronic Engineering English Courses

Corpus is not only the basic resource of corpus linguistics, but also the main resource of empiricism. The corpus stores the language materials that actually appear in the actual use of the language, so the example sentence database should not be regarded as the corpus. Corpora are the basic resources of language knowledge, but they are not equal to language knowledge. In addition, real corpora need to be processed to become useful resources. In the teaching activities, the distribution characteristics of English courses for electronic engineering majors are analyzed quantitatively with corpus. The subject of learning is students, so students should also be the object and subject of evaluation [12]. The purpose of all evaluation activities is to further promote students' effective learning and avoid unclear direction and low quality evaluation. The second is the principle of fairness and objectivity. It is necessary to evaluate the objectivity and fairness of students in the teaching process. In the system of students' participation in teaching quality evaluation, students are the main demand body of education service. Nowadays, in the process of higher education service, the most basic power is to pursue the maximization of their own knowledge "quality" skills. Students will be one of the biggest beneficiaries of the improvement of teaching quality [13]. In the process of students' participation in teaching quality evaluation, the complete information includes two meanings: one is that students have sufficient evaluation ability and evaluation knowledge; the other is that students can obtain all relevant information of education services, including the basic information of teachers of other courses, the academic status and academic level of the courses. With the continuous advancement of the democratization of teaching, more and more people have recognized the importance of students' evaluation of teaching [14]. In the process of teaching, in order to achieve the established teaching objectives, we should follow the principles of step-by-step, teacher-student interaction and so on. Combining with the mathematical principle of radial basis function, the paper investigates the English course of electronic engineering major in a university, the structure of radial basis function is shown in Figure 2:

Fig. 2 Radial basis function diagram



As can be seen from Figure 2, the value of the distance between any point in the space and the center of the circle has a corresponding value range. When the number of digits in the space is equal to 1, the function expression formula1 is as follows:

$$f(x)=\sum_{i=1}^{y}k(\|y-y_i\|) \quad (1)$$

In formula (1), y is the sample of Electronic Engineering English courses, k is the level of evaluation index, and i is the basic coefficient of sample points. According to the survey data, the

distribution characteristics of English courses in electronic engineering are distributed in a decentralized way. According to the teaching types, they can be divided into two types: online teaching and offline teaching. Before class, English teachers will arrange online learning tasks by using the characteristics of corpus quantitative analysis method, usually watching the beautiful words and sentences of relevant topics, imitation cases of beautiful articles or cultural background behind the composition [15]. Students follow the teacher's instructions to complete online preview, such as answering embedded questions in videos, discussing them below the video, voting on what they like. Teachers can check the correct and wrong frequency of students in the background to grasp the students' easy and wrong points and difficulties in teaching in advance, and flexibly adjust teaching strategies and teaching plans. The online learning evaluation index in the pre class learning evaluation is mainly formulated according to the characteristics of the mixed teaching mode. The teaching between students and teachers is an inseparable whole in teaching. The teacher's teaching and students' learning are complementary and the relationship between teachers and students is interactive [16]. The character of students and teachers is a whole of mutual dependence and integration. The students' academic achievement is the concrete embodiment of teachers' knowledge ability and personality. Teachers should make students realize that the knowledge they learn is valuable and meaningful both in terms of knowledge and students' Outlook on life. It plays an important role in improving students' learning performance. This and the ultimate goal of teaching is to teach and educate people. Teachers can change their learning attitude and passive learning by educating students' personal and value In order to study actively and improve students' academic achievement, it is ultimately to let students master scientific knowledge [17]. So the evaluation of teaching effect is consistent with the goal of improving students' learning achievement. The lively and active teaching methods, teacher-student interaction, humorous ability of language, teaching attitude, knowledge and the proportion of teachers' teaching skills are still relatively high. It shows that to improve students' learning performance, we should rely on the teachers' abilities and characteristics in this multiple aspects to achieve [18]. The learners used the school network learning platform to preview themselves according to the list of learning tasks before class, and discussed the difficult points. The evaluation of pre class learning effect should take into account the learners' learning attitude and activity, frequency of video learning, frequency of online discussion and online test. The main reference of pre class evaluation is the objective data recorded by the school's network platform. Therefore, under the first level indicator item "before class", the activity of students is set; whether video is viewed or not, the viewing time and frequency; online interaction; self-study mastery effect, these five secondary indicators. On this basis, the second level indicators students' activity is divided into three levels: the number of platform login; the completion of video learning; the duration and ruminating; whether to post and reply; online learning test, five three-level indicators. Under the guidance of scientific educational value, the evaluation mechanism of teachers, which combines the self-evaluation of teachers, and the joint participation of leaders, peer teachers, students and supervisors, is implemented. Based on the above description, combined with the employment skills of electronic engineering, the paper makes a quantitative analysis of English curriculum distribution characteristics by corpus.

Using Association Rules Algorithm to Build English Teaching Effect Evaluation Model

The main roles are divided into three parts: expert, student and teacher to evaluate, and the association rule algorithm is used to construct the evaluation model of English classroom teaching effect. One of the most important steps is to make the complex problems organized and hierarchical, and construct a hierarchical structure model. In this model, complex problems are decomposed into elements. These elements form several levels according to their attributes and relationships. The elements of the upper level dominate the relevant elements of the next level as criteria, and they are also dominated by the elements of the upper level [19]. The key of association rule algorithm is to compare the factors that affect the comprehensive evaluation, determine their relative importance, and then comprehensively judge the importance of each factor. There are several problems: first, as far as the two factors are concerned, their relative importance is sometimes difficult to be achieved by subjectivity or experience. Is it the evaluation of students or experts that is more important It has always been difficult to judge; second, its transparency and reproducibility are poor, even if the same group of experts repeatedly carry out the above evaluation, the results are difficult to be the same; third, in the comprehensive investigation, the inconsistency at all levels may accumulate, causing serious inconsistency in the final analysis results, which makes our evaluation meaningless; fourth, we basically ignore the sample This information. The weight set and evaluation set of the three role indicators are determined as follows:

$$\begin{cases} Z=(Z_1,Z_2,\cdots,Z_n) \\ B=(B_1,B_2,\cdots,B_m) \end{cases} \quad (2)$$

In formula (2), Z is the weight set of evaluation index, B is the evaluation set of evaluation index, and n,m is the weight coefficient and evaluation coefficient respectively. After quantifying each evaluation factor according to formula (1), the fuzzy relation matrix is obtained as follows:

$$L=\begin{bmatrix} l_{11} & l_{12} & \cdots & l_{1m} \\ l_{21} & l_{22} & \cdots & l_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ l_{n1} & l_{n2} & \cdots & l_{nm} \end{bmatrix} \quad (3)$$

In formula (3), l represents the number of evaluation indexes after quantification, and n,m represents the weight coefficient and the evaluation coefficient respectively. The users of the scale include teachers, students and administrators. In order to improve the reliability and validity of the teaching assessment scale, we should pay attention to two points in the development and use of the scale:1.The evaluation subject should have direct contact with the evaluation object and long-term understanding.2. The evaluation subject should be able to use the evaluation scale, and accept the guidance of some professionals when necessary, so as to ensure the objectivity of the evaluation and the consistency of the scoring standard. The hierarchical structure of teaching effect is to decompose complex problems into various components of elements, and divide these elements into several groups according to their attributes to form different levels. Elements at the same level, as criteria, dominate some elements at the next level, and at the same time, they are dominated by elements at the upper level. This dominating relationship from top to bottom forms a hierarchical level. The top level usually has only one element, which is usually the predetermined goal or ideal result of the analysis problem. The middle level is generally the criteria and sub criteria level, and the bottom level includes the decision scheme. The dominating relationship of elements between levels is not necessarily complete, that is, there can be such elements, which do not dominate all elements of the next level. Furthermore, the number of layers is related to the complexity of the problem and the detail of the analysis. Generally, there are no more than 9 elements in each level, because there are too many elements in one level, it is difficult to judge by pairwise comparison. A good hierarchical structure is very important for solving problems. The hierarchical structure is based on the comprehensive and in-depth understanding of the problems faced by the decision-makers. If the decision-makers are hesitant about the division of the levels and the determination of the dominant relationship between the levels, it is better to re analyze the problem and clarify the relationship between the various parts of the problem, so as to ensure the establishment of a reasonable hierarchical structure [20-21]. The most basic form of hierarchical structure model is a tree with several nodes connected by a node. In the hierarchical structure, the node of the upper layer is a variable, which is determined by the variable of the lower layer. The evaluation of teaching situation mainly refers to the situation of teachers' teaching. The evaluation factors include whether the syllabus meets the requirements of the curriculum system, and whether the teaching objectives and contents are reasonable. Whether can use Putonghua teaching, according to the situation of our college, compile teaching materials, better for the sustainable development of students and teaching, whether the teaching content is in line with the students' enough, applicable principle. Evaluation of teaching attitude, the main evaluation factors include whether to prepare lessons carefully before teaching, the preparation of teaching aids, serious teaching attitude, clear teaching purpose, teachers should have ethics, can be a model. The evaluation of teaching management and teaching quality mainly includes the management of classroom discipline, strict requirements on students' management and after class guidance. Based on the above description, the construction steps of fuzzy relation matrix are realized.

EXPERIMENTAL TEST

In order to test the effectiveness of the evaluation method, two existing teaching effect evaluation methods are selected and compared with the designed teaching effect evaluation method. According to the data, the closer the reliability is to the standard value of 0.8, the better the practical application performance is.

Calculate the Weight of Evaluation Index

The evaluation indexes are divided into three levels, and the weight values of the three levels are calculated respectively, the calculation formula is as follows:

$$G_{ij}=\frac{W_{ij}}{W} \quad (4)$$

In formula (5), G_{ij} is the evaluation index of three levels, W_{ij} is the weight of the second level index of the i index, and W is the third level evaluation index. According to formula (4), the weights of the three levels of evaluation indexes are obtained, as shown in Table 1:

Table 1 Evaluation index weight table

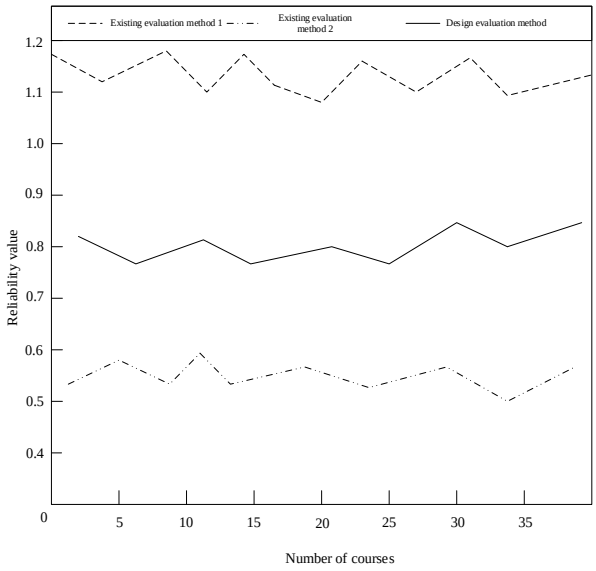
Sample number / weight	First level indicators	Second level indicators	Third level indicators
1	0.0974	0.1023	0.0981
2	0.0985	0.1031	0.1026
3	0.1036	0.0948	0.0982
4	0.9067	0.0988	0.0963
5	0.1022	0.1024	0.1046
6	0.0939	0.1030	0.0977
7	1.0213	0.0936	0.1034
8	0.0948	0.1019	0.0968

Using the weight of the above evaluation index, the reliability of the evaluation index is tested, and the experimental results are obtained.

Experimental Result

The reliability test results of the three evaluation methods are shown in Figure 3:

Fig. 3 Diagram of experimental results



It can be concluded from Figure 3 that the average reliability of the evaluation indexes in the three evaluation methods is shown in Table 2:

Table 2 Average reliability of evaluation indexes

Number of courses	Existing evaluation method 1	Existing evaluation method 2	Design evaluation method
5	1.102	0.554	0.786
10	1.113	0.496	0.811
15	0.987	0.603	0.798
20	1.055	0.587	0.784
25	1.105	0.510	0.802
30	1.112	0.596	0.808
35	1.068	0.551	0.806
40	1.116	0.509	0.799
45	0.984	0.516	0.778
50	1.109	0.533	0.811

According to table 2, the average reliability of the evaluation indexes in the existing evaluation method 1 and the existing evaluation method 2 are 1.0751 and 0.5455 respectively, and the average reliability of the evaluation indexes in the design evaluation method is 0.7983, which proves that the reliability of the evaluation indexes in the evaluation method of Electronic Engineering English Teaching effect integrated with corpus quantitative analysis is closer to the standard value, and the application effect is better.

CONCLUSION

The teaching effect evaluation method designed in this paper has been proved to have better application performance by experimental test, which promotes the development process of the teaching effect evaluation system of the whole university to a certain extent. At the same time, it broadens the application scope of corpus and provides more abundant research materials for the academic circles to carry out related research. Due to my limited ability, the data collection of other courses of electronic engineering is not comprehensive enough, and will continue to improve in the future.

REFERENCE

1. Luyten H , Bazo M . Transformational leadership, professional learning communities, teacher learning and learner centred teaching practices; Evidence on their interrelations in Mozambican primary education[J]. Studies in Educational Evaluation, 2019, 60(12):14-31.
2. Jlgsr A , Ana Railka de Souza Oliveira Kumakura PhD, RN a, Fczmr A , et al. Clinical Simulation for Teaching of Wound Evaluation and Treatment[J]. Clinical Simulation in Nursing, 2020, 38(12):5-13.
3. Boswell S S , Sohr-Preston S L . I checked the prof on ratemyprofessors: effect of anonymous, online student evaluations of professors on students' self-efficacy and expectations[J]. Social Psychology of Education, 2020, 23(4):943-961.
4. Li X . Characteristics and rules of college English education based on cognitive process simulation[J]. Cognitive Systems Research, 2019, 57(OCT.):11-19.
5. Craig T T , Marshall J . Effect of project - based learning on high school students' state - mandated, standardized math and science exam performance[J]. Journal of Research in Science Teaching, 2019, 56(3-4).
6. Gao S , Long H , Li D , et al. The mediation effect of student self-efficacy between teaching approaches and science achievement: findings from 2011 TIMSS US data[J]. Social Psychology of Education, 2020, 23(1):54-56.
7. Barbosa S , Marin H . Web-based simulation- a tool for teaching critical care nursing[J]. Revista Latino-Americana de Enfermagem, 2019, 17(1):7-13.
8. Arnold I , Versluis I . The influence of cultural values and nationality on student evaluation of teaching[J]. International Journal of Educational Research, 2019, 98:13-24.
9. Carianos-Ayala S , Arrue M , Zarandona J , et al. The use of structured debate as a teaching strategy among undergraduate nursing students: A systematic review[J]. Nurse Education Today, 2021, 98(Oct):104766.
10. Coiduras J L , Blanch N , Barbero I . Initial teacher education in a dual-system: Addressing the observation of teaching performance[J]. Studies In Educational Evaluation, 2020, 64(7):100834.
11. Tsay C H , Kofinas A K , Trivedi S K , et al. Overcoming the novelty effect in online gamified learning systems: An empirical evaluation of student engagement and performance[J]. Journal of Computer Assisted Learning, 2020, 36(2):58-64.
12. Sanaie N , Vasli P , Sedighi L , et al. Comparing the effect of lecture and Jigsaw teaching strategies on the nursing students' self-regulated learning and academic motivation: A quasi-experimental study[J]. Nurse Education Today, 2019, 79(8):35-40.
13. Kim J Y , Lim K Y . Promoting learning in online, ill-structured problem solving: The effects of scaffolding type and metacognition level[J]. Computers & Education, 2019, 138(SEP.):116-129.
14. Vilppu H , Sdervik I , Postareff L , et al. The effect of short online pedagogical training on university teachers' interpretations of teaching–learning situations[J]. Instructional Science, 2019, 47(6):679-709.
15. Sfc A , Jsh B , Chl C , et al. Effect of creative problem-solving teaching on the sustainable service innovation literacy of undergraduate hospitality students[J]. Journal of Hospitality, Leisure, Sport & Tourism Education, 2019, 24(7):190-201.
16. Giri V , Paily M U . Effect of Scientific Argumentation on the Development of Critical Thinking[J]. Science & Education, 2020, 29(1):58-61.
17. Liu L , Du X , Zhang Z , et al. Effect of problem-based learning in pharmacology education: A meta-analysis[J]. Studies In Educational Evaluation, 2019, 60:43-58.
18. Bouwmeester R , Kleijn R D , Van D , et al. Flipping the medical classroom: Effect on workload, interactivity, motivation and retention of knowledge[J]. Computers & Education, 2019, 139(OCT.):118-128.
19. Beier M E , Kim M H , Saterbak A , et al. The effect of authentic project-based learning on attitudes and career aspirations in STEM[J]. Journal of research in science teaching, 2019, 56(1):3-23.
20. Lin L , Lam W I , Tse S K . Test takers' strategy use and L2 Chinese reading test performance in mainland China: A structural equation approach[J]. Studies in Educational Evaluation, 2019, 60:189-198.
21. Santoso D, Albaniah S.Development of an Electrical Engineering Module for the Expertise Program of Industrial Electronics Engineering[J]. Journal of Physics: Conference Series, 2020, 1456(1):12060 (7pp).