

Research Article

Quantitative Analysis of the Teaching Effect of College English Courses Based on Multivariate Matrix Evaluation Model

Xiaojing Wang 

Zhengzhou Railway Vocational & Technical College, Zhengzhou, Henan Province 450000, China

Correspondence should be addressed to Xiaojing Wang; 10965@zzrvtc.edu.cn

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In order to carry out a quantitative analysis of the teaching effect of college English courses based on multivariate matrix evaluation model, this paper takes as research objects 87-year 2020-enrolled undergraduate students from a university in Zhengzhou City, Henan Province, central China. On the basis of summarizing and analyzing previous research works, this study expounded the research status and significance of quantitative analysis of the teaching effect of college English courses, elaborated the development background, current status, and future challenges of multivariate matrix evaluation model, introduced the data source and the subjects, contents, and means of teaching effect quantification in this research, analyzed the feedback and guiding function of the teaching effect quantification result of college English courses, discussed the motivation and diagnosis function of the teaching effect quantification result of college English courses, conducted analyses of factors affecting the teaching effect quantification of college English courses, constructed the quantitative dimension of teaching effect of college English courses based on the multivariate matrix evaluation model, and finally designed the quantification system of teaching effect of college English courses based on the multivariate matrix evaluation model. The research results show that the quantitative analysis process of the teaching effect of college English courses has the characteristics of complex structure and many hierarchies, and there are also mutual influences and functions between its subsystems. In order to ensure the rationality and effectiveness of comprehensive quantification, the index system construction of the multivariate matrix evaluation model follows scientific, systematic, and focused principles. The teaching effect quantification process combines four influencing factors of perspective, content, mode, and method with the quantification standard, and constructs a hierarchical quantification structure with target layer, restriction factor layer, and restriction sub-factor layer. The tools it uses usually include observations, interviews, self-evaluation, mutual evaluation, student files, reading notes, project presentations, etc. Teachers adjust teaching goals and plans in time by observing the quantification results of students at all levels, which will help improve students' enthusiasm for learning and give full play to students' autonomy and initiative in English courses.

1. Introduction

A comprehensive, objective, scientific, and accurate quantitative system is essential to achieve the teaching goals of college English courses. Teaching effect quantification is not only an important basis for teachers to obtain teaching feedback information, improve teaching management, and ensure teaching quality, but also an effective means for students to adjust learning strategies, improve learning methods, improve learning efficiency, and achieve good learning effects [1]. A scientific and perfect quantification system can comprehensively and objectively quantify

students' learning situation, better assist teaching, and also allow students to understand their own shortcomings and adjust their learning strategies in a timely manner. The traditional English teaching effect quantification is mainly the quantification of the students' learning situation by teachers, and there is less quantification between students and students themselves [2]. Limited by teaching time and teaching resources, the content of college English quantification is mainly the knowledge in textbooks, and less attention is paid to students' autonomous learning of extracurricular materials. In addition, the quantified content is mostly written or listening, with little or no evaluation of

oral or true cross-cultural communication skills, and less attention is paid to students' cooperative learning ability [3]. Traditional quantitative methods are often equivalent to exams; they do not form a good incentive mechanism and are not conducive to cultivating students' habit of continuous self-study, and even condone students' negativity and slack in learning to a certain extent [4].

In the educational process, in addition to evaluating students' knowledge mastery, the multivariate matrix evaluation model also emphasizes the evaluation of learning performance, academic performance, emotion, attitude, and learning strategies in the process of learning, so that students can have opportunities to learn from experience, perception, practice, participation, and communication [5]. The multivariate matrix evaluation model combines the four influencing factors of quantification perspective, quantification content, quantification mode, and quantification method with quantification standard, and constructs a hierarchical structure with target layer, constraint factor layer, and constraint sub-factor layer, which can stimulate students' learning potential by confirming their performance in the learning process [6]. The pluralistic matrix evaluation model also emphasizes the humanistic nature of teaching evaluation methods and focuses on cultivating students' innovative consciousness and scientific values, which can lay a solid foundation for students to receive lifelong education [7]. The multi-dimensional matrix evaluation model is quantified according to students' oral scores, listening scores, and written test scores, while traditional quantitative teaching is mainly based on students' written test scores, which has been difficult to meet the social requirements for college students' comprehensive quality [8].

In order to carry out a quantitative analysis of the teaching effect of college English courses based on multivariate matrix evaluation model, this paper takes as research objects 87-year 2020-enrolled undergraduate students from a university in Zhengzhou City, Henan Province, central China. On the basis of summarizing and analyzing previous research works, this study expounded the research status and significance of quantitative analysis of the teaching effect of college English courses, elaborated the development background, current status, and future challenges of multivariate matrix evaluation model, introduced the data source and the subjects, contents, and means of teaching effect quantification in this research, analyzed the feedback and guiding function of the teaching effect quantification result of college English courses, discussed the motivation and diagnosis function of the teaching effect quantification result of college English courses, conducted analyses of factors affecting the teaching effect quantification of college English courses, constructed the quantitative dimension of teaching effect of college English courses based on the multivariate matrix evaluation model, and finally designed the quantification system of teaching effect of college English courses based on the multivariate matrix evaluation model. The detailed chapter is as follows: Section 2 introduces the research data, principles, and methods; Section 3 is the results and analysis; Section 4 is the discussion; Section 5 is the conclusion.

2. Data, Principles, and Methods

2.1. Data Sources. This paper takes as research objects 87-year 2020-enrolled undergraduate students from a university in Zhengzhou City, Henan Province, central China. In order to ensure the rationality and effectiveness of the comprehensive quantification, the construction of the index system should follow scientific, systematic, and focused principles. The multivariate matrix evaluation model is mainly based on qualitative evaluation, pays attention to the multivariate of evaluation subjects, and emphasizes the process and development of evaluation. Therefore, it can be considered that the multivariate matrix evaluation model is an evaluation of students' learning process. The selection of quantitative indicators should meet the effective teaching quantification of college English courses and further improve the deficiencies in traditional teaching quantification. From a quantitative perspective, the multivariate matrix evaluation model adopts various methods to comprehensively reflect the development of students' college English quality, promote students' development, and improve college English quality. Teachers of college English courses should quantify students in terms of the methods and ways of acquiring knowledge, their attitudes toward certain college English problems, and their thinking directions, angles, positions, and habits of college English learning in the face of practical problems. The multivariate matrix evaluation model cultivates students' self-monitoring ability in the learning process from the aspects of cognition, emotion, communication, self-management, etc., so that students become strategic learners.

The main contents of quantifying the teaching effect of college English courses include teachers' teaching attitude, teaching ability, teaching organization, teaching content, teaching method, and teaching effect, as well as teaching conditions, course difficulty, learning effect, and other links. The interaction of these factors is the main reason for the current controversy about the quantification of teachers' teaching effect. Therefore, establishing a set of practical, scientific, and perfect teaching effect quantification system will play a vital role in motivating teachers to do a good job in teaching and improving teaching effect. The quantification of the teaching effect of college English courses involves many factors such as teaching facilities, managers, teaching supervisors, teachers, and students [9]. A reasonably designed quantitative index system of teaching effect is crucial to the reasonable quantification of teaching effect. In the selection of the quantitative index system, it is necessary to consider both the comprehensiveness and the rationality of the weight distribution of each index. More importantly, the quantitative system must be simple and easy to operate. Due to a series of problems such as the complexity of quantitative factors, the level of quantitative objects, the ambiguity in quantitative standards, the ambiguity or uncertainty of quantitative influencing factors, and the difficulty in quantifying qualitative indicators, it is difficult to scientifically quantify teaching effects.

2.2. Multivariate Matrix Evaluation Model. Multivariate matrix evaluation model refers to the multivariate of higher education reflected in the evaluation system of students'

learning according to the training objectives, course nature, teaching objectives, and requirements and the needs of students' personality development. The multi-level learning evaluation system is a multi-level system for comprehensive evaluation of students' knowledge, ability, and quality, which is reflected in the multivariate of evaluation content, process, method, means, and management. Teachers use a variety of perspectives, methods, and approaches when grading students' learning outcomes, pay attention to individual differences of students, and focus on examining individual learning outcomes or deficiencies. The weight value finally makes a comprehensive evaluation on the quantification of the teaching effect of college English courses according to the value of each index and its weight. This quantitative method makes college English learners no longer blindly follow various exams, but combine the acceptance of knowledge with the practical application and efficiency improvement. For teachers, this allows teachers to understand the effectiveness of teaching so that there is a basis for improvement, which can help to adjust teaching and implement remedial teaching measures. On the one hand, students can understand their own learning situation and propose learning mistakes that need to be corrected. Multivariate evaluation also emphasizes other knowledge related to the subject, including students' learning attitudes, learning strategies, and learning skills. Figure 1 shows the multivariate matrix evaluation model in the quantitative analysis of the teaching effect of college English courses based on multivariate matrix evaluation model.

Matrix model is an analysis technique that uses digital matrix to display the characteristics of course teaching effect. Through the matrix model, the number of codes of each behavior and the interaction between each behavior can be clearly observed. Category analysis and structural analysis are relatively common percentage statistics techniques, and the analysis results can show the structure of the classroom or the style and tendencies of teachers. Finally, the multi-dimensional matrix evaluation model can choose to establish a two-dimensional curve graph to display the classroom behaviors of teachers and students in various time periods. The multivariate matrix evaluation model digitally encodes classroom events and uses numbers for statistics, laying a solid foundation for further quantitative analysis [10]. A good matrix evaluation model should be classroom observation applicable to various subjects and educational stages. At present, some observation tools focus on language learning classrooms, and some observation tools are suitable for primary school classrooms, which have great limitations. The observation dimensions of the multivariate matrix evaluation model should be as simple and mutually exclusive as possible, so that observers can make reasonable judgments and record them in a short period of time. Of course, it does not mean that the fewer the observation dimensions, the better. This should not only consider the characteristics of short-term memory in psychology, but also try to cover various classroom factors that may occur in the classroom.

2.3. Subjects, Contents, and Means of Teaching Effect Quantification. The mobility of students creates an emotional void in the teacher-student relationship, and even

students become indifferent due to unfamiliarity. This phenomenon can be improved through the setting and quantification of learning activities. The development of instant classroom quantification allows teachers to give timely feedback and quantification to students' every language behavior, which not only increases classroom interaction, but also makes teachers and students more familiar and intimate with each other. For learning activities, a combination of teacher quantification and peer evaluation can be adopted, which not only considers objectivity, but also allows students to pay more attention to the learning process and reflect on the quality of their own learning results. In order to avoid the decisive drawbacks of the final exam, the multivariate matrix evaluation model uses language learning platforms, course group assignments, micro-teaching assistants, and other technical means to organize staged tests and quantification, which can objectively quantify the learning effect of the course and effectively promote the quality of teaching. Open inquiry learning activities will run throughout the semester: submission of course papers, group discussion presentations, course video production, campus cultural activity presentations, and out-of-campus research reports are all possible quantitative evaluation methods. The multi-dimensional matrix evaluation model thus supporting should also be multi-dimensional: students' analysis and discussion of the subject, the whole-process monitoring and quantification of the learning process, and the effect and quality of the activity display should all be in terms of evaluation.

Because college English classroom teaching and learning happen in a long period of time, each long period can be regarded as several small periods, and each small period can be regarded as a time point. In the multivariate matrix evaluation model, the learning achievements of students at each time point are regarded as a subset of the state space, and the formation of each state is random. The changes of students' learning status can reflect what role teacher plays in students' learning in this process, that is, what kind of teaching effects are produced. Assuming that teachers do not make major changes in teaching during this period, and that the influencing factors work for a long time, the students' learning state under the influence of these factors has a stable transition trend [11]. Based on this, the results formed after each state transition of students are only related to the current state and have no direct or extremely significant correlation with previous states, so the influence of students' basic differences on the evaluation results can be excluded. The quantification of the teaching effect of college English courses based on the multivariate matrix evaluation model is convenient for observers to record, thereby reducing time waste or omission of vision caused by a large amount of writing. It is worth noting that quantification is not the pursuit of absolute digitization, and the auxiliary supplement of some other image symbols is also of great benefit.

3. Results and Analysis

3.1. Feedback and Guiding Functions of the Quantitative Results of Teaching Effect of College English Courses. The first half of the classroom interaction in these college English

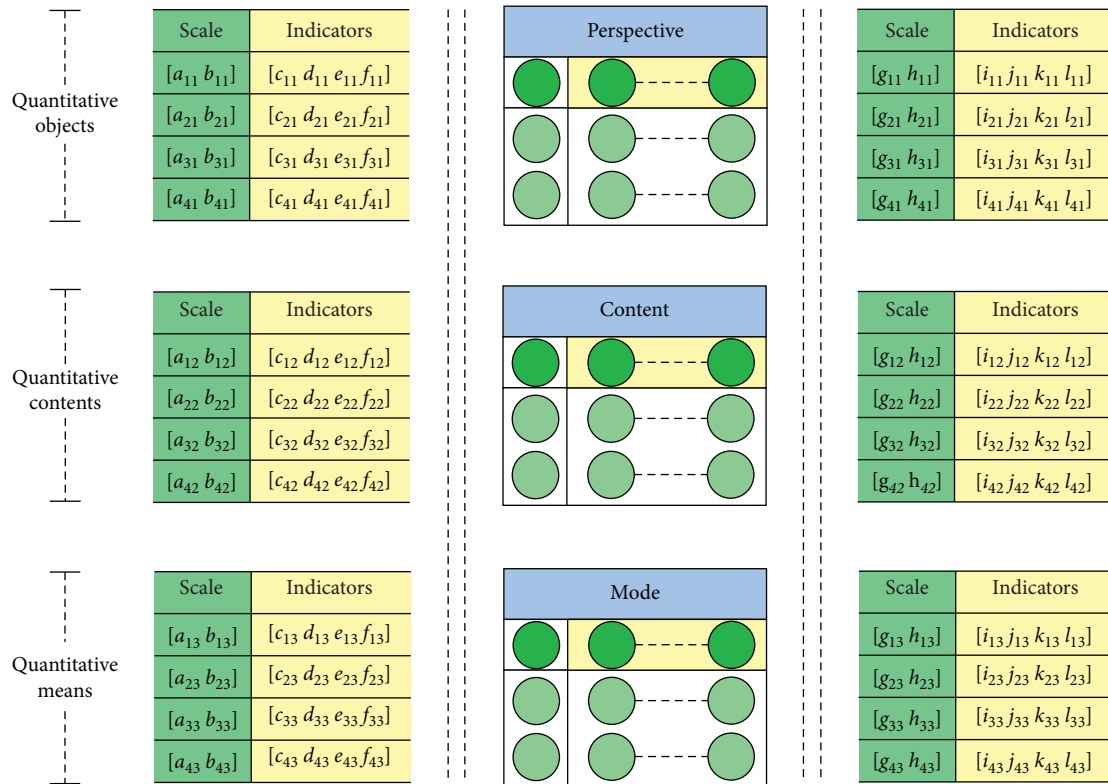


FIGURE 1: Multivariate matrix evaluation model in the quantitative analysis of the teaching effect of college English courses based on multivariate matrix evaluation model.

courses was mainly taught by teachers, which lasted the longest, followed by the time spent by teachers to manipulate technology, indicating that multimedia played an important role in presenting difficult problems or content. However, the multi-dimensional matrix evaluation model has not become dominant in the classroom, and teachers have not relied too much on multimedia and have not put all teaching content into multimedia courseware. Afterward, students responded actively, passively, thinking about problems, and students manipulating technology, indicating that teachers can use lectures or multimedia to stimulate students' thinking, response, and interaction, reflecting the relationship between teachers, students, and multimedia technology. As shown in Figure 2, the categories of the multivariate matrix evaluation model belong to the indirect teaching style, which is a relatively open behavior; this teaching style can cause students to actively express their ideas, reflecting the teaching concept that students are the main body and teachers are the leading teachers in the new course standard. The last two lines belong to the direct teaching style, and this teaching style will restrict students from expressing their own ideas. In general multimedia teaching, the basic concepts and basic theories are narrated, and the theoretical difficulties are repeatedly narrated [12].

In the traditional multivariate matrix evaluation model, teachers usually quantify the teaching effect through the comprehensive scores of students; there are also certain differences in the requirements of students in the three classes, and on this basis, more finely divided. After quantifying the teaching effect, in order to better control the students, the

teacher should quantify the teaching effect of the students according to the students' performance in the teaching process and can also conduct a thorough examination. Secondly, the multivariate matrix evaluation model is to stratify students according to their written test scores, listening scores, and oral scores. In the past multivariate matrix evaluation mode, students' written test scores were used as an important quantitative basis for teaching effect; obviously, this method can hardly meet today's development needs. In the process of teaching and evaluation, the proportion of English listening and speaking test scores should be properly adjusted, and at the same time, grouping should be based on this. The multivariate matrix evaluation model is to quantify the teaching effect of students according to their own English level. In the process of college English teaching, we must pay attention to students' English application ability; that is to say, in this process, we must pay more attention to listening, translation, and reading and other skills.

The multivariate quantification method of listening training effect in college English course teaching uses knowledge map to analyze the process of English listening training and selects the quantitative index of English listening training effect. According to the characteristics of English listening practice, the indicators are selected from four aspects: teaching attitude, teaching method, teaching content, and teaching level. Teaching attitude can reflect the quality of work of teachers in the process of English listening practice; teachers with good teaching enthusiasm and good attitude in all aspects can stimulate students' enthusiasm for learning English listening skills in the teaching process.

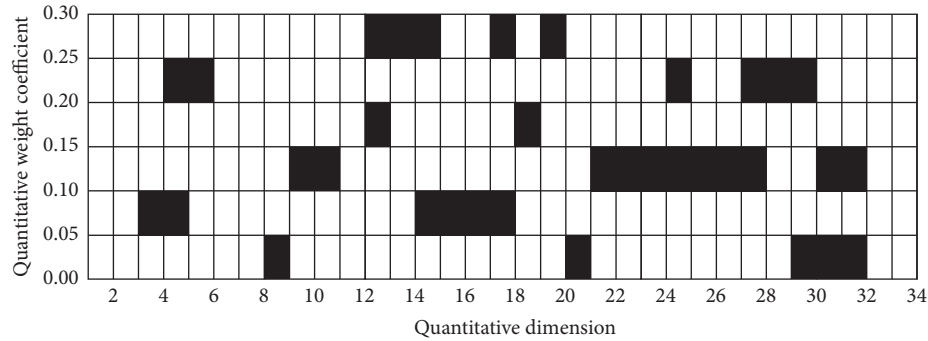


FIGURE 2: Feedback and guiding functions of the quantitative results of teaching effect of college English courses based on multivariate matrix evaluation model.

Teaching method is an important means of cultivating students' English listening ability and imparting knowledge. It is the sum of learning method and teaching method. Teaching methods include promoting students' participation and interaction, closely linking classroom knowledge with classroom knowledge, and focusing on students' needs in the process of English listening practice [13]. The basis and guarantee of organizing teaching activities and realizing teaching objectives are teaching contents. The teaching content is determined according to the teaching objectives and content, and usually includes the accurate teaching of language knowledge, helping students accumulate learning experience, teaching students learning skills and methods, and improving students' English listening level. Teaching level can reflect the level of teachers in the process of English listening practice, including rich knowledge and content, and can reflect the new dynamics and new achievements of the subject.

3.2. Motivation and Diagnosis Functions of the Quantitative Results of Teaching Effect of College English Courses. Behavioral performance quantification involves higher levels of thinking and problem-solving skills. In this process, students can use higher-level thinking skills, such as students' ability to create, reflect, collect, and use information, discuss and communicate with each other, solve problems, clarify problems, etc., try different completion methods, seek cooperation with others, and fully demonstrate your knowledge and skills in English. Behavioral performance quantification can not only understand students' mastery of the knowledge they have learned in their actual life and learning, but also build a testing and quantification platform for these mastered knowledge, such as allowing students to role-play according to the theme of the text. Such ongoing assessments can provide useful information about the student's learning process, and quantification of behavioral performance can lead to real-world language applications. The feedback of this information not only helps students know their own learning status, but also is the key for teachers to formulate teaching goals and adjust teaching methods and forms (Figure 3). The tools it uses usually include observations, interviews, self-evaluation, mutual evaluation, student files, reading notes, project presentations, etc. Teachers adjust

teaching goals and plans in a timely manner by observing the learning situation of students at all levels, which will help improve students' enthusiasm for learning and give full play to students' autonomy and initiative in learning.

The teaching content of the college English resource bank should achieve clear basic theoretical concepts, prominent key points, well-solved difficult points, and appropriate content; and standard teaching materials, standard teaching behavior, and its own characteristics in design. In the process of college English teaching, the multivariate matrix evaluation model can absorb new achievements and pay attention to literacy education and the cultivation of innovation and entrepreneurship ability; it is guided by advanced educational ideas and teaching concepts, and aims to achieve the best effect of learners' autonomous learning. Taking this as an example, the multivariate matrix evaluation model can make targeted corrections during the second round of resource addition and rectification in the course according to relevant data feedback [14]. At the same time, the correlation matrix can also be dynamically adjusted in various coefficients such as evaluation indicators, evaluation scales, and weight coefficients, to determine that it can not only meet the quantitative needs of teaching effects, but also meet the needs of teaching requirements and technical support for resource construction. Constructing an index evaluation system based on a multivariate matrix can basically distinguish the satisfaction degree of each resource library in the minds of users. The correlation matrix method can also comprehensively compare multiple resource libraries, give the comprehensive evaluation value of each resource library, and analyze the outstanding characteristics of the resource libraries that are popular with users and the deficiencies of the resource library resources that users are not satisfied with improvements.

The multivariate matrix evaluation model can organize the various factors contained in a complex system by dividing the interconnected orderly levels and give a quantitative description of the relative importance of elements at the same level. This mode can use mathematical methods to determine the relative importance of each level element, determine the judgment matrix between the same levels, and use the component of the eigenvector corresponding to the largest parts of the corresponding judgment matrix as the corresponding coefficient [15]. Formative evaluation, which is carried out in the teaching process, measures students'

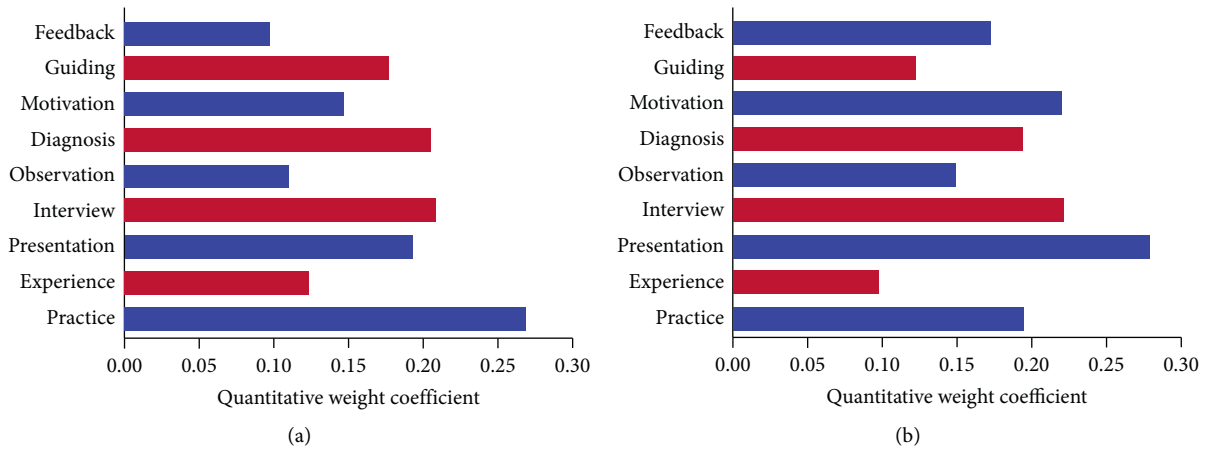


FIGURE 3: Distribution of quantitative weight coefficients of key elements in the motivation (a) and diagnosis (b) functions of the teaching effect of college English courses based on multivariate matrix evaluation model.

learning process and results in order to improve and perfect teaching activities, and provides students and teachers with feedback on learning. The teacher helps students analyze and evaluate their learning and formulate improvement plans based on the results of the measurement. Due to the emphasis on objectively quantifying individual development from a developmental perspective, some studies have shown that the multivariate matrix evaluation model can significantly improve teaching effects, increase students' learning gains, and be more helpful to students who had difficulties in learning. The multivariate matrix evaluation model cultivates students' self-monitoring ability and self-quantification ability in the learning process from the aspects of cognition, emotion, communication, self-management, etc., so that students become strategic learners.

4. Discussion

4.1. Analysis of Factors Affecting the Teaching Effect Quantification of College English Courses. Under the traditional quantitative teaching method, it is generally quantified according to the student's performance. The formulation of this goal ignores the multivariate division of teaching evaluation methods and goals for students at the same level and different learning stages. The quantification of the teaching effect by the multivariate matrix evaluation mode is to improve the students' initiative and enthusiasm in learning English, but the quantification of the teaching effect should be constantly changing. To conduct a comprehensive evaluation of students based on their final exam results and their usual performance, the results of the comprehensive evaluation should be used as the quantitative basis for the next semester, which can effectively stimulate the motivation and potential of students in each class to learn English [16]. The multivariate matrix evaluation model quantifies whether the media resources used by teachers in classroom teaching are appropriate, and whether the presented materials are rich in content and diverse in form (Table 1). Multivariate matrix evaluation model highlights students' subject status, pays attention to their learning process, and tries to improve

learning results by helping students to effectively regulate their own learning process, while teachers are only organizers, guides, and evaluation monitors. Therefore, whether it is in teaching process or in evaluation of class teaching, the evaluation of oral and listening scores should be increased, and this should be used as a basis.

For the multivariate matrix evaluation model, it is required to satisfy the order consistency; that is, the order of the relationship between the factors can be transferred, and self-contradictory results should not be derived. If there are many factors involved in the quantification problem, due to the complexity of objective things, the multivariate and limitations of cognition, the matrix initially constructed often does not meet the requirements of order consistency and needs to be determined by consistency test. If it fails to pass the test, it is necessary to adjust the estimates of some elements in the matrix. When the order of the matrix is high, adjusting the estimation of some elements often requires repeated attempts, and the computational workload is huge and complicated, which is very inconvenient. As shown in Table 2, the multivariate matrix evaluation model quantifies teachers' grasp of the logical relationship of teaching content and whether it reflects the cognitive law from individual to general or general to individual. In classroom teaching, students can quantify their own learning status and classroom performance. They can effectively adjust their learning status, and on the other hand, they can urge themselves to participate more actively in classroom teaching and improve their learning efficiency. When promoting the classroom, teachers can create appropriate classroom blanks to remind students to think about their own learning effects and create oral communication links to guide students to express.

In the traditional quantification of the teaching effect of college English courses, students are the object of evaluation, and they do not understand the evaluation content and evaluation standards. Humanism advocates that teaching should aim at students' overall development, not only to develop students' intelligence, but also to develop students' emotions, self-esteem, interests, needs, and other nonintellectual factors. The quantification of the teaching effect of

TABLE 1: Statistics of quantitative parameters of teaching effect of college English courses based on multivariate matrix evaluation model.

Factors of teaching effect	Quantitative weight coefficient	Multivariate matrix dimension	Quantification efficiency	Quantification accuracy
Quantitative objective	0.1923	4	0.7496	0.4343
Quantitative content	0.1372	5	0.7428	0.6498
Quantitative mean	0.2663	12	0.5553	0.9709
Quantitative feedback	0.0932	16	0.6323	0.4343
Quantitative guidance	0.2086	8	0.9558	0.6554
Quantitative motivation	0.1153	4	0.5306	0.9776
Quantitative diagnosis	0.0754	20	0.4356	0.4322
Quantitative dimension	0.0965	14	0.664	0.8645
Quantitative perspective	0.1271	2	0.3208	0.3514
Quantitative process	0.2674	8	0.6476	0.8752
Quantitative indicator	0.0992	24	0.3234	0.8606
Quantitative model	0.1362	34	0.2164	0.4345

TABLE 2: Quantitative results of teaching effect of college English courses based on multivariate matrix evaluation model.

College English courses	Quantitative weight coefficient	Multivariate matrix dimension	Quantification efficiency	Quantification accuracy
Listening	0.2743	14	0.6746	0.8733
Speaking	0.0523	3	0.5324	0.6407
Reading	0.1414	27	0.7988	0.7367
Writing	0.2534	15	0.8036	0.5122
Translation	0.1754	20	0.5927	0.8846
Cognition	0.2997	16	0.7733	0.7574
Communication	0.2353	6	0.6866	0.6846
Self-management	0.1346	30	0.8754	0.6648
Interaction	0.0645	8	0.6367	0.5874
Guidance	0.2754	14	0.7438	0.7826
Practice	0.2084	28	0.7846	0.8226
Observation	0.2346	16	0.8131	0.6975

college English courses should also comprehensively evaluate students' learning process and results, and at the same time improve their autonomy through self-evaluation. Some exams have defects in reliability, validity, etc., and it is impossible to assess students' learning by the exam results alone. The quantification of the teaching effect of college English courses using the multivariate matrix evaluation model is based on the evaluation theory, based on the multivariate matrix evaluation model and the characteristics of college English teaching, and at the same time uses a variety of methods to make value judgments on the teaching effect of college English. As a result, some students do not study hard at ordinary times, but pass the final exam easily with the focus before the exam. The evaluation of learning in class includes the evaluation of all behaviors of students participating in English activities in class, including independent behaviors such as question answering, commenting, dictation, etc., as well as performance in group discussions, dialogue performances, debates, and other activities [17].

4.2. Quantitative Dimension Establishment of Teaching Effect of College English Course Based on Multivariate Matrix Evaluation Model. The quantification of teaching effect is the key to measure the quality of course teaching, which belongs to the category of teaching evaluation. The quantitative dimensions should cover the following aspects:

course construction, teaching implementation, and student learning effects. In terms of course construction, the multivariate matrix evaluation model should pay attention to not only whether the target positioning of the courses is accurate, whether the teaching content is complete, whether the teaching resources are sufficient, but also whether the construction of the question bank is complete (Figure 4). For example, the final exam questions of some colleges and universities are put together by one or several teachers when the exam is approaching, and the difficulty, discrimination, reliability, and validity of the exam questions have not been tested. In order to allow more students to pass the final exam smoothly, some teachers have to delineate the key points of the exam. In terms of teaching implementation, the multivariate matrix evaluation model should pay attention to whether the teaching process arrangement is reasonable, whether the after-class discussions and homework arrangements are appropriate, whether the communication between teachers and students and between students and students is smooth, and whether the processing of students' feedback after class is timely [18]. In terms of students' learning effect, the multivariate matrix evaluation model should consider students' attendance rate, course completion rate, as well as whether the after-school homework is completed, whether the mid-term and final exams are passed, etc. In addition, different evaluation subjects also need to have different quantitative dimensions.

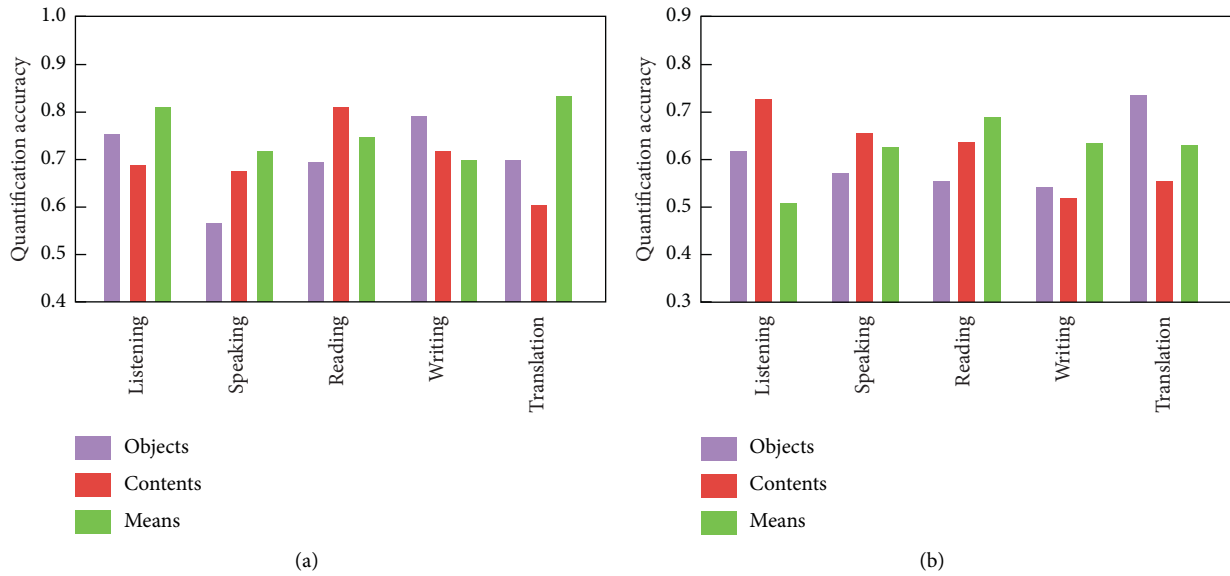


FIGURE 4: Quantification efficiency (a) and accuracy (b) in the quantitative dimension construction of teaching effect of college English course based on multivariate matrix evaluation model.

The multivariate matrix evaluation model is quantified according to the students' English level; since students at different levels have great differences in learning performance, attitude, psychology, and potential, the model should also adopt an effective teaching method. In the teaching process of college English courses, there are many factors that affect the quality of teaching and it can usually be summarized into four aspects: teaching attitude, teaching content, teaching method, and teaching effect. Teaching attitude is the precondition of quality assurance, teaching content is the foundation of quality assurance, teaching method is the means to ensure quality, and teaching effect is to reflect teaching quality from the perspective of students [19]. The teacher's classroom teaching quality evaluation system uses the evaluation methods of student evaluation, peer evaluation, and dean evaluation to evaluate this index, respectively, and finally obtains the weighted average, that is, the final result of the evaluated teachers. The multivariate matrix evaluation model mainly evaluates students' behavior from the following aspects: students' English expression, accuracy, and fluency of English expression; interactivity, initiative, respect for peers, and the actual effectiveness produced in communication activities; and analyze the flexibility, innovation, self-confidence, and use of strategies in problem-solving.

In the multivariate matrix evaluation model, teachers should create various quantitative carriers for students in combination with teaching content and examine students' various intelligences through different teaching activities. In the existing quantification methods, students are passive quantification objects, and teachers are active quantification subjects. Multivariate matrix believes that human intelligence is diverse, so it advocates quantifying students from multiple angles and aspects. The combination of teacher quantification, peer evaluation, and student self-evaluation can not only obtain quantitative information from different channels, making the quantification more objective and credible, but also allow

students to change their roles and actively participate in the quantification process. Teachers can quantify the status, methods, results, etc., of students in the process of learning. Students can also quantify themselves and their peers from the above aspects. At the same time, they can also quantify teachers' teaching content, teaching methods, and teaching effects. In this way, teachers will be transformed from a single quantitative subject to one of multiple quantitative subjects and at the same time the subject to be quantified, and students will also be transformed from a single quantitative subject to one of multiple quantitative subjects and multiple quantitative subjects, which can not only mobilize the enthusiasm of students in class. It makes students participate more actively in the classroom, and can cultivate students' spirit of cooperation and interpersonal skills, and develop introspective intelligence.

4.3. Quantitative System Design of Teaching Effect of College English Course Based on Multivariate Matrix Evaluation Model. Multivariate quantification is a process of self-knowledge and self-reflection, and it is also a process of strengthening the goals of college English learning. In the process of multiple quantifications, students will become the main body of evaluation. Students change from quantitative objects to quantitative subjects, which are conducive to creating a positive learning atmosphere, improving learning motivation, giving students a successful emotional experience, and enhancing students' confidence in actively participating in classroom learning activities. Multiple quantifications provide students with an opportunity for continuous reflection, continuous improvement, and continuous self-improvement, enabling students to actively participate in the learning process [20]. However, the key to the multivariate quantification of college English lies in the need for teachers to formulate grading standards with strong operability. Therefore, as shown in Figure 5, teachers

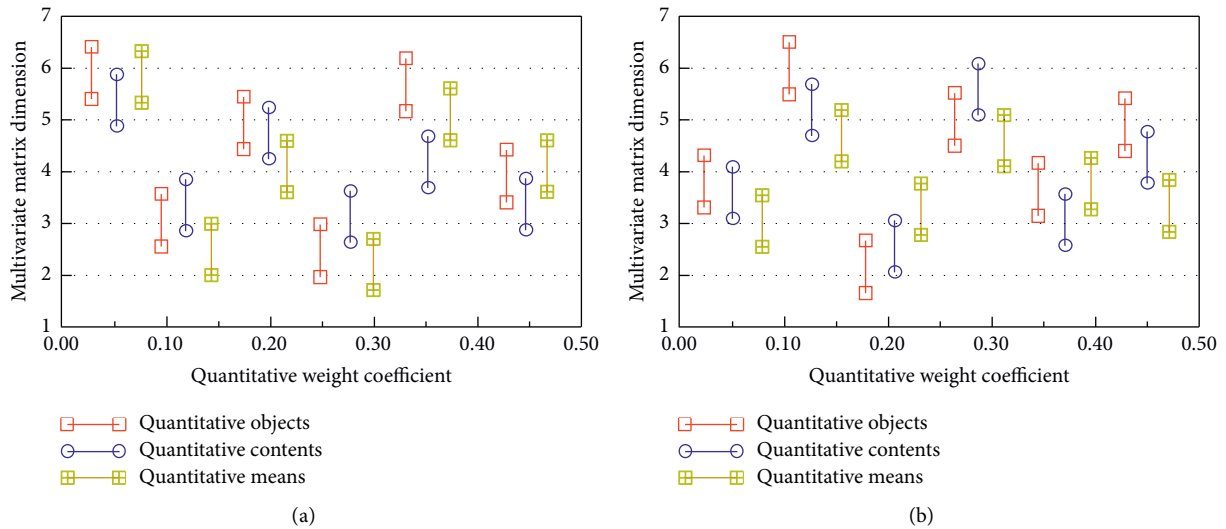


FIGURE 5: Relationship between multivariate matrix dimension and quantitative weight coefficient of quantitative objects, contents, and means in quantification dimension establishment (a) and system design (b).

should formulate detailed scoring standards from various aspects such as ideological content, language expression, and chapter structure, and use sample essays to carefully explain and comment on students on how to operate. Group evaluation provides a platform for students to discuss and communicate together, in which teachers can divide the whole class into groups of several people, and each group elects a group leader to be responsible for group evaluation. Members of the group discuss and exchange opinions in the online group discussion area, collectively grade the composition of the group members, and give suggestions for revision.

In terms of quantitative content, teachers first identify students' intellectual advantages through questionnaires and other means, and integrate interpersonal communication, self-cognition, visual space, and other intelligence into English classroom teaching according to students' existing English proficiency. The multivariate matrix evaluation model designs teaching experience tasks involving different intelligences and comprehensively quantifies the students' learning process according to the students' completion of various tasks. It includes the students' preclass preview, classroom participation, after-class task completion, online self-study records, and performance in various teaching activities into the quantitative scope. The multi-dimensional matrix evaluation model pays timely attention to students' superior intelligence and encourages them appropriately in teaching, helping students to establish self-confidence in autonomous learning, thereby generating motivation for language learning. In terms of the subject of quantification, this quantification method will change the subject status of teachers as quantifiers, and the right to quantify will be appropriately transferred to students themselves, so as to give full play to the subject role of students, reduce the pressure on students in teaching quantification, and make students become quantified participants and reflectors. In terms of quantification, a combination of students' self-evaluation,

mutual evaluation, and teacher quantification will be implemented to enhance students' enthusiasm for quantification [21].

The multi-dimensional matrix evaluation model also places special emphasis on individualized teaching and students' autonomous learning, and makes full use of computer teaching technology. In this way, students can carry out English listening and speaking training independently and repeatedly, while teachers can guide students in class and teach students English skills in listening, speaking, reading, writing, translation, and other aspects in the teaching process. Teachers and students cooperate with each other, and students can also choose appropriate learning content for themselves based on learning time and their comprehensive ability under the guidance of teachers in the classroom, and at the same time, they can also quickly improve their comprehensive English ability through computer assistance [22]. The multi-dimensional matrix evaluation model of college English uses the creation of a multivariate learning atmosphere and the full play of students' autonomy to realize the all-round and in-depth expansion of extra-curricular subject-assisted learning activities. At the same time, it effectively promotes the integration of teaching resources by further improving the English learning environment with the utilization and optimization of teaching effect. In addition, teachers should also use a dynamic quantitative method of development to evaluate students. Students' learning situation can be directly and truly reflected through teacher evaluation, and a gradient evaluation system can be established to evaluate students' performance in each semester and academic performance.

5. Conclusions

This study analyzed the feedback and guiding function of the teaching effect quantification result of college English courses, discussed the motivation and diagnosis function of

the teaching effect quantification result of college English courses, conducted analyses of factors affecting the teaching effect quantification of college English courses, constructed the quantitative dimension of teaching effect of college English courses based on the multivariate matrix evaluation model, and finally designed the quantification system of teaching effect of college English courses based on the multivariate matrix evaluation model. The quantification of the teaching effect of college English courses using the multivariate matrix evaluation model is based on the evaluation theory, based on the multivariate matrix evaluation model and the characteristics of college English teaching, and at the same time uses a variety of methods to make value judgments on the teaching effect of college English courses. The multivariate quantification method of listening training effect in college English course teaching uses knowledge map to analyze the process of English listening training and selects the quantitative index of English listening training effect. According to the characteristics of English listening practice, the indicators are selected from four aspects: teaching attitude, teaching method, teaching content, and teaching level. The research results show that the quantitative analysis process of the teaching effect of college English courses has the characteristics of complex structure and many hierarchies, and there are also mutual influences and functions between its subsystems. In order to ensure the rationality and effectiveness of comprehensive quantification, the index system construction of the multivariate matrix evaluation model follows scientific, systematic, and focused principles. The teaching effect quantification process combines four influencing factors of perspective, content, mode, and method with the quantification standard, and constructs a hierarchical quantification structure with target layer, restriction factor layer, and restriction sub-factor layer.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] Z. Sun, M. Anbarasan, and D. Praveen Kumar, "Design of online intelligent English teaching platform based on artificial intelligence techniques," *Computational Intelligence*, vol. 37, no. 3, pp. 1166–1180, 2021.
- [2] A. P. Gilakjani and N. B. Sabouri, "Teachers' beliefs in English language teaching and learning: a review of the literature," *English Language Teaching*, vol. 10, no. 4, p. 78, 2017.
- [3] D. Lasagabaster, "Fostering team teaching: mapping out a research agenda for English-medium instruction at university level," *Language Teaching*, vol. 51, no. 3, pp. 400–416, 2018.
- [4] V. Lavy and E. Sand, "On the origins of gender gaps in human capital: short- and long-term consequences of teachers' biases," *Journal of Public Economics*, vol. 167, pp. 263–279, 2018.
- [5] L. S. Teng and L. J. Zhang, "A questionnaire-based validation of multidimensional models of self-regulated learning strategies," *The Modern Language Journal*, vol. 100, no. 3, pp. 674–701, 2016.
- [6] G. H. Khajavy, B. Ghonsooly, A. Hosseini Fatemi, and C. W. Choi, "Willingness to communicate in English: a microsystem model in the Iranian EFL classroom context," *Tesol Quarterly*, vol. 50, no. 1, pp. 154–180, 2016.
- [7] M. F. Teng, "The role of metacognitive knowledge and regulation in mediating university EFL learners' writing performance," *Innovation in Language Learning and Teaching*, vol. 14, no. 5, pp. 436–450, 2020.
- [8] Y. Xu and G. T. Brown, "University English teacher assessment literacy: a survey-test report from China," *Papers in Language Testing and Assessment*, vol. 6, no. 1, pp. 133–158, 2017.
- [9] A. P. Gilakjani, "A review of the literature on the integration of technology into the learning and teaching of English language skills," *International Journal of English Linguistics*, vol. 7, no. 5, p. 95, 2017.
- [10] T. Teo, F. Huang, and C. K. W. Hoi, "Explicating the influences that explain intention to use technology among English teachers in China," *Interactive Learning Environments*, vol. 26, no. 4, pp. 460–475, 2018.
- [11] L. S. Teng, P. P. Sun, and L. Xu, "Conceptualizing writing self-efficacy in English as a foreign language contexts: scale validation through structural equation modeling," *Tesol Quarterly*, vol. 52, no. 4, pp. 911–942, 2018.
- [12] L. S. Teng and L. J. Zhang, "Effects of motivational regulation strategies on writing performance: a mediation model of self-regulated learning of writing in English as a second/foreign language," *Metacognition and Learning*, vol. 13, no. 2, pp. 213–240, 2018.
- [13] H. Alsowat, "An EFL flipped classroom teaching model: effects on English language higher-order thinking skills, student engagement and satisfaction," *Journal of Education and Practice*, vol. 7, no. 9, pp. 108–121, 2016.
- [14] A. P. Gilakjani and N. B. Sabouri, "The significance of listening comprehension in English language teaching," *Theory and Practice in Language Studies*, vol. 6, no. 8, p. 1670, 2016.
- [15] M. Eryilmaz and C. Cigdemoglu, "Individual flipped learning and cooperative flipped learning: their effects on students' performance, social, and computer anxiety," *Interactive Learning Environments*, vol. 27, no. 4, pp. 432–442, 2019.
- [16] D. M. R. Ahmadi and M. Reza, "The use of technology in English language learning: a literature review," *International Journal of Research in English Education*, vol. 3, no. 2, pp. 115–125, 2018.
- [17] E. Macaro, S. Curle, J. Pun, J. An, and J. Dearden, "A systematic review of English medium instruction in higher education," *Language Teaching*, vol. 51, no. 1, pp. 36–76, 2018.
- [18] N. Guan, J. Song, and D. Li, "On the advantages of computer multimedia-aided English teaching," *Procedia Computer Science*, vol. 131, pp. 727–732, 2018.
- [19] B. Master, S. Loeb, C. Whitney, and J. Wyckoff, "Different skills? Identifying differentially effective teachers of English language learners," *The Elementary School Journal*, vol. 117, no. 2, pp. 261–284, 2016.

- [20] S. Eshghinejad, "Retracted article: EFL students' attitudes toward learning English language: the case study of Kashan University students," *Cogent Education*, vol. 3, no. 1, Article ID 1236434, 2016.
- [21] J. Tao and X. Gao, "Teacher agency and identity commitment in curricular reform," *Teaching and Teacher Education*, vol. 63, pp. 346–355, 2017.
- [22] Y. X. Jin and J.-M. Dewaele, "The effect of positive orientation and perceived social support on foreign language classroom anxiety," *System*, vol. 74, pp. 149–157, 2018.