

Evaluation of the Model of College English Classroom Teaching Effect in the Digital Learning Environment

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ABSTRACT Digital learning environments generate continuous streams of heterogeneous interaction data, creating increasing demands for efficient monitoring, information fusion, and adaptive evaluation. This study proposes a data-driven classroom effectiveness assessment framework by integrating the Plan–Do–Check–Act (PDCA) cycle with an ant colony optimization algorithm. A multidimensional evaluation architecture is established to characterize classroom vitality, organizational structure, and system resilience through teacher–student interaction data, learning-behavior records, and resource-utilization information. To improve evaluation reliability and optimization efficiency, the ant colony algorithm is employed to perform adaptive indicator-weight adjustment and evaluation-path optimization, while the PDCA mechanism provides a closed-loop feedback process for dynamic system refinement. Experimental results demonstrate that the proposed framework improves the efficiency of multi-source data integration, analysis, and feedback generation by approximately 16% compared with conventional evaluation approaches. Furthermore, the optimized model achieves higher consistency with teacher and student perceptions and exhibits enhanced adaptability in dynamic digital environments. The proposed framework provides an effective methodology for intelligent monitoring, multi-source information fusion, adaptive optimization, and data-driven decision support, offering potential references for networked sensing, information-processing, and intelligent evaluation systems.

INDEX TERMS multi-source information fusion, intelligent monitoring, ant colony optimization, adaptive decision support

I. INTRODUCTION

THE low efficiency of English classroom teaching has always been the focus of attention. How to improve the efficiency of college English teaching is the key to solve this problem. Most teachers have not established a student-centered teaching concept and have not changed the traditional English teaching model. This model focuses on the teaching of language skills. It is not the teaching concept that teachers do not want to change, but they do not know how to do it. In fact, many teachers try to improve their professional skills, while college English teachers seldom receive systematic professional training.

Teaching effect evaluation is widely used in college English classes. Zhang Jiayi aimed to improve the state of English learning and performance in language learning by systematically modeling the contextual acquisition experience of English learners, which is of interest to researchers and practitioners [1]. Meng-yue Cao's study found that university English teaching should cover both language acquisition and cultural learning by making cultural instruction an integral part of the university English curriculum [2]. Yang

Xiaoming used an evaluated and well-reliable student evaluation form for the quality of CECT, elaborated the rationale of the triangular fuzzy number assessment method based on hierarchical analysis and the range method, and integrated the nonlinearity and fuzziness of the evaluation factors [3]. Du Yanxia aimed to examine non-English majors' self-managed learning capability, self-learning psychology and self-learning behavior in three dimensions. Results of the experiment showed that the flipped classroom-based self-directed learning model of college English can greatly enhance the comprehensive English proficiency of college students [4]. Yan Liping explored applied co-operative learning in college English writing on the WeChat channel using a one-semester study and pre- and post-test questionnaires [5]. Hoang Ngoc Tue investigated the perspectives of English teachers in a number of vocational institutions and the barriers they face in converting face-to-face classes to online classes [6]. Chau Ka Yin investigated that online university English learning communities based on collaborative communication, reciprocal learning and knowledge sharing are an effective online approach to learning and can help

build knowledge building and innovation [7]. All the above studies have described the college English classroom, but there are still some deficiencies in the research of teaching effect evaluation.

Many scholars have analyzed and studied the evaluation of teaching effectiveness (ES). Rebecca J. Kreitzer reviewed the literature on biases in student teaching evaluation and pointed out that in the evaluation system of language courses, the uniformity of evaluation standards often leads to misinterpretation of teachers' diverse teaching styles, which provides a warning for building a more inclusive evaluation system for college English classroom effectiveness [8]. Jason A. Grissom measured teacher efficiency from multiple dimensions. His research suggested that in the digital environment, the effectiveness of college English teachers based solely on a single classroom performance cannot be judged, but long-term student language acquisition data should be combined with teachers' professional development trajectory for comprehensive consideration [9]. Luis A. Rodriguez used administrative data to explore the impact of evaluation reform on teacher mobility patterns. This finding supported the view in this paper that a scientific and reasonable CECT evaluation mechanism can effectively reduce the professional burnout and turnover rate of excellent English teachers by providing constructive feedback rather than simple performance appraisal [10]. Although Friederike Mengel revealed the problem of gender bias in specific disciplines, and his core findings indicated that the subjective cognitive bias of the evaluator can significantly interfere with the objectivity of the evaluation results. Therefore, this paper introduces the ant colony algorithm to eliminate the interference of human emotional factors on the evaluation of college English teaching through data-driven methods [11]. David D. Liebowitz found a direct link between administrator behavior and school organizational health and student performance, which further corroborated the viewpoint proposed in this paper, that is, in college English teaching, in addition to routine teaching management, establishing a dynamic evaluation feedback mechanism based on the PDCA cycle is a key potential tool to improve students' language application ability and teachers' well-being [12]. Christopher Redding studied the positive educational experience of students of color after being assigned to classes taught by teachers of the same race or ethnicity. This study is based on the belief that cultural fit between students and teachers can improve students' academic and non-academic performance at school [13]. All of the above studies have analyzed teaching effectiveness (ES), but there are still some shortcomings in college English classrooms. English Learning Classroom (CECT) refers to the teaching scenario itself in a digital environment, while the Teaching Effectiveness Evaluation System (ES) is a measurement tool built specifically for this scenario.

In college English teaching, classroom teaching effect evaluation is very important. Good classroom teaching evaluation not only helps to improve teachers' teaching skills

and English teaching quality, but also helps to stimulate students' learning interest and improve teaching methods. People should give full play to the role of English teaching evaluation, promote the improvement and development of teachers' teaching concepts and methods, and promote the common development of schools, teachers and students.

II. EVALUATION OF CLASSROOM TEACHING EFFECT EVALUATION ELEMENTS

A. CLASSROOM TEACHING EFFECT

The effect of college classroom English teaching mainly refers to the knowledge or skills that teachers teach in the classroom to enable students to acquire language skills and abilities. Teachers master teaching strategies and methods to achieve the established teaching objectives. From the perspective of teachers, these factors include teaching methods, teaching style, language level, professional skills, overall quality, sense of responsibility and self-confidence. From the perspective of students, it includes cognitive skills and styles, learning goals and ideas, learning attitudes and motivations, learning interests and enthusiasm, learning methods and strategies, emotional factors, and attention, and it may include learning time. From the perspective of external factors, it may include curriculum, content, educational management, evaluation methods, curriculum and other matters, language environment, educational conditions, class number, etc.

B. TEACHER'S TEACHING CONCEPT AND CONTENT

Despite the growing popularity of the student-centered teaching philosophy, its practical implementation remains significantly hampered. Surveys show that the vast majority of teachers still rely heavily on pre-designed lesson plans. This rigid approach to lesson preparation leads to a mismatch between content and students' actual abilities: some teachers design content that significantly exceeds students' cognitive boundaries, while others oversimplify the material, failing to stimulate deep learning. More importantly, few teachers are able to dynamically adjust their teaching based on students' immediate feedback during class.

The reasons for this are twofold: firstly, teachers' assessments of students' learning situations are often flawed; secondly, the instructional design process fails to adequately consider students' actual needs. Many teachers' lesson preparation remains centered on the textbook content, rarely deconstructing and reconstructing it based on students' existing knowledge, cognitive characteristics, and learning difficulties. Consequently, it's difficult to effectively transform textbook knowledge into content that students can understand and apply. This difference manifests itself in two ways: is it "teaching with the textbook"—organizing teaching content according to curriculum objectives and student needs, flexibly introducing background knowledge and building cognitive scaffolding; or is it "teaching the textbook"—mechanically replicating the language knowledge, vocabulary, and textual difficulties in the textbook?

The core difference lies in whether the focus of teaching activities is the textbook content itself or the actual learning outcomes students gain from the textbook. Of course, most teachers are serious and meticulous in their lesson preparation, as shown in Figure 1. They usually carefully review and master basic knowledge points, new vocabulary, key language points, and even the tone of the text. However, if this rigor is not effectively combined with students' actual learning paths, it may manifest more as a one-way output of teaching content than as an interactive process that promotes deep learning.

This may seem contradictory to the dynamic and personalized nature advocated by digital learning environments, but it actually reveals a key entry point for digital transformation. Pre-prepared lesson plans provide a basic teaching structure and content guarantee, but the value of digital technology lies not in discarding them, but in empowering teachers to achieve "dynamic generation" on this structure. Digital tools (such as real-time feedback systems, adaptive learning platforms, and collaborative whiteboards) enable teachers to instantly capture generative resources in classroom interactions, flexibly adjust the pace and strategies of teaching, and thus greatly enrich the forms of interaction and the adaptability of content within the framework of ensuring the achievement of teaching objectives. Therefore, the "vitality" and "humanization" promoted by digital environments do not stem from the negation of planning, but are reflected in the transformation of static "pre-set plans" into a "dynamic teaching process" that can be intervened in real time and dynamically adjusted, making the interaction between "teaching" and "learning" more flexible and responsive.

C. BASIC PRINCIPLES FOR BUILDING A REASONABLE AND EFFECTIVE ES OF CECT

People need to help teachers and students change the traditional concept according to scientific plans and objectives, and better understand the current teaching situation. The design of the ES consider the majority of people from different angles, and comprehensively evaluate the education system. It also needs to meet the needs of different groups to the greatest extent, narrow differences, and encourage the evaluation object to recognize and actively cooperate with each other. However, in each stage of the learning process, to ensure that the evaluation is reasonable and effective, the evaluation must objectively and accurately reflect knowledge, skills, and emotions. People need to actively explore and improve the new teaching ES, mobilize the enthusiasm of students to learn English, change the traditional evaluation methods, and vigorously promote the formation of an ES to make the English teaching ES more scientific and comprehensive.

III. CURRENT SITUATION OF CECT EVALUATION

A. LACK OF TEACHER SELF-EVALUATION AND STUDENT EVALUATION

The evaluation of college classroom English teaching effect is usually carried out by experts, while the self-evaluation of teachers and students is usually ignored. Experts and peers randomly choose classes to listen to, and use comprehensive quantitative indicators to analyze teachers' teaching and provide results. The evaluation of college classroom English teaching is usually the evaluation of teachers' education level at a certain stage, or the evaluation and examination of school qualifications. Classroom teaching evaluation is very important. Through peer review, teachers' self-evaluation and students' evaluation can promote the exchange of learning experience between experts and teachers to a certain extent and improve teaching quality. However, due to teachers' self-evaluation and students' evaluation, the results of teaching evaluation are incomplete. Teachers and students are the main participants in teaching, and the impact of teaching effect evaluation cannot be ignored, as shown in Figure 2:

B. LACK OF PARTICIPATION OF TEACHERS AND STUDENTS IN THE DEVELOPMENT OF INDICATOR SYSTEM

The evaluation index system of English classroom teaching is formulated by evaluation experts and school teaching management personnel according to the relevant provisions of the national English teaching standards. During the construction of the teaching evaluation index system, the participation of teachers and students as an important part of teaching is not taken into account, and the determination of the teaching evaluation criteria is irrelevant to the theme. The reason is that most evaluators, especially teachers, doubt the ability of students to evaluate the curriculum, so each evaluator does not conduct strict tests in the actual classroom environment, and lacks usability and objectivity. College English teaching is different from the teaching of other disciplines, and has its own characteristics and needs. In short, these performance indicators only focus on the evaluators' evaluation of learning content, learning methods, learning characteristics, etc, ignoring the evaluation of students' learning ability, learning attitude, learning methods, etc, which is difficult to promote the reform and development of English teaching.

C. COUNTERMEASURES TO CHANGE THE CURRENT SITUATION OF CECT EVALUATION

The main purpose of education is to promote students' development and improve their ability to master English and apply it in real life. Students' English skills and application level directly reflect teachers' education level, which requires a new teaching ES. The leadership of teachers and the leading position of students determine that teachers are the main body of education evaluation. It is necessary to listen to teachers' emotional attitude, teaching performance for self-evaluation, students' evaluation and opinions and other

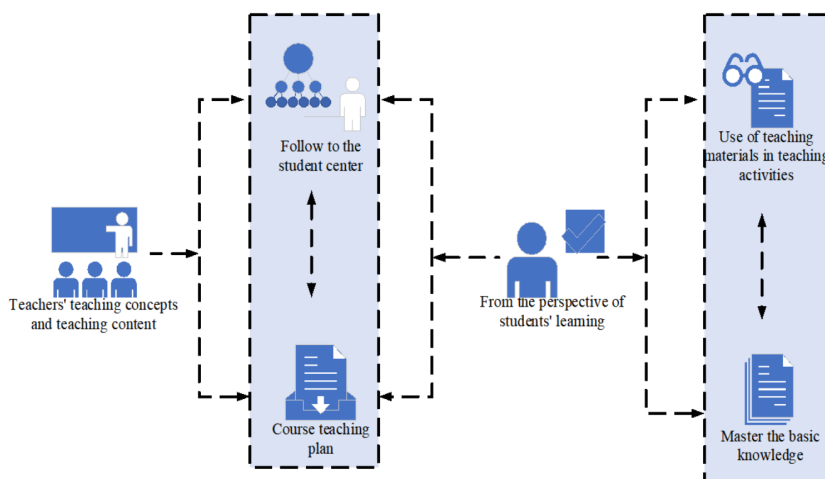


FIGURE 1. Teachers' teaching concepts and teaching content

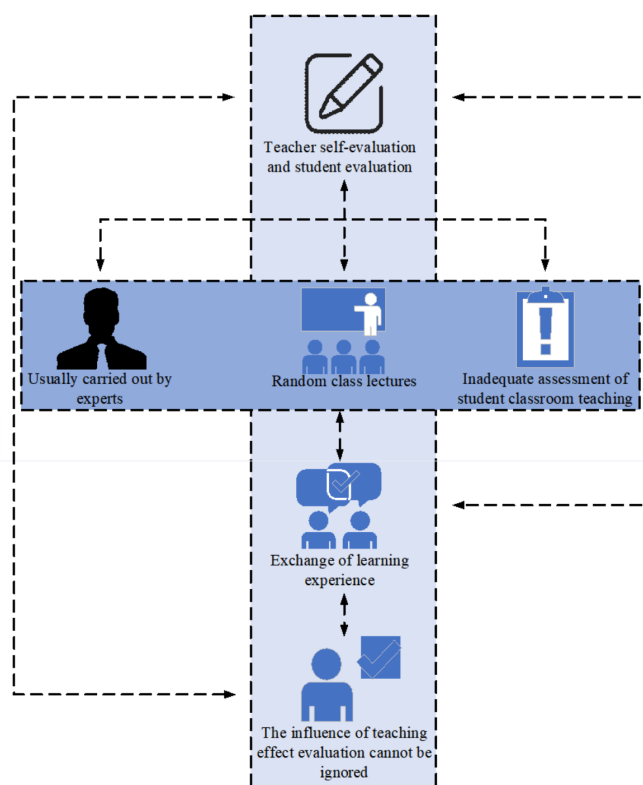


FIGURE 2. Lack of teachers' self-evaluation and student evaluation

aspects, improve the information of problem solving and enhance students' understanding, determine the problems in teaching practice, and ensure the teaching quality and the adequacy of solutions. Students are the main part of teaching. They have long-term contact with teachers in the classroom. They also have the most profound and real experience in what teaching methods are attractive and what teaching content is more interesting. Compared with the evaluators who suddenly listen to the lecture, the students' evaluation is more objective and true. Therefore, when evaluating teachers' teaching in the classroom, teachers' teaching should not ignore the evaluation of students, pay

attention to the evaluation of teachers and students, and improve the teaching ES.

IV. USING ANT COLONY ALGORITHM BASED ON PDCA CYCLE TO STRENGTHEN THE CONSTRUCTION OF CECT EFFECT EVALUATION MODEL

Evaluation of teaching effectiveness in a digital learning environment is a complex system problem involving multi-dimensional, non-linear indicators and requiring continuous optimization. While the PDCA cycle (Plan-Do-Check-Act) provides a systematic management framework, it struggles to effectively analyze and optimize the massive and fuzzy

evaluation data during the “Check” phase. Ant Colony Algorithm (ACA), as a metaheuristic optimization algorithm, excels at finding near-optimal paths in complex networks, but lacks a management loop that drives continuous iteration and improvement. Therefore, combining the two is logically necessary: the PDCA cycle provides a structured, iterative “management process” for evaluation activities, ensuring that evaluation is a complete process with planning, execution, feedback, and correction; while the Ant Colony Algorithm is embedded in the “Check (C)” and “Act (A)” phases of the PDCA cycle, serving as a core “data analysis and decision optimization engine.” Specifically, in the context of digital classroom evaluation, “pheromone” is abstractly defined as the “historical efficacy trace” of the relationship between teaching elements or evaluation indicators. For example, the pheromone concentration accumulated along the path from “high-frequency teacher-student interaction” to “improved student classroom test scores” represents the strength of the effectiveness of such associations in improving overall teaching effectiveness in historical data. Therefore, pheromones are no longer a direct transplantation of a biological concept, but rather a dynamically generated data weight in iterative evaluation. Their numerical values quantitatively characterize the contribution of a specific teaching behavior chain to “teaching quality,” thereby providing a data-driven, non-subjective optimization direction for the “adjustment” phase of the PDCA cycle.

The mathematical model of the ant colony algorithm is:

$$P_{ij}^k(\alpha) = \frac{[\mu_{ij}(\alpha)]^\delta \cdot [\eta_{ij}]^\beta}{\sum_{j \in allowed} [\mu_{ij}(\alpha)]^\delta \cdot [\eta_{ij}]^\beta} \quad (1)$$

α and β represent the relative importance of pheromones and heuristic factors, respectively. The PDCA cycle provides the organizational framework for this algorithm: the “Plan (P)” phase initializes the evaluation indicators (nodes) and pheromones; the “D” phase runs the ant colony algorithm to generate evaluation paths (i.e., indicator evaluation sequences); the “Check (C)” phase calculates the effectiveness of the paths based on actual teaching feedback (such as student grades and questionnaire data), and updates the pheromones accordingly according to the following rules:

$$\mu_{ij}(\alpha + n) = (1 - p) \cdot \mu_{ij}(\alpha) + \Delta\mu_{ij} \quad (2)$$

$$\Delta\mu_{ij} = \sum_{k=1}^m \Delta\mu_{ij}^k \quad (3)$$

p represents pheromone; $(1 - p)$ represents information residue factor; $\Delta\mu_{ij}$ represents the pheromone of (i, j) paths in the cycle. Through multiple PDCA cycles, the algorithm can adaptively strengthen the evaluation path that is positively correlated with high teaching effectiveness, thereby achieving the convergence of the evaluation model from the initial state to the dynamic optimization state. Its “effectiveness” focuses on the correlation strength between

indicators reflected by the pheromone distribution during the iteration process, rather than random or static indicator evaluation.

$$\Delta\mu_{ij} = \begin{cases} \frac{k}{p_{mn}} & 0 \end{cases} \quad (4)$$

If ant k passes through (i, j) in the cycle path, the result is as follows:

$$\eta_{ij} = \frac{1}{(100 - p_{ij})} \quad (5)$$

V. EVALUATION OF COLLEGE ENGLISH CLASSROOM EFFECT EVALUATION INDICATORS IN THE DIGITAL ENVIRONMENT

A. VITALITY INDICATORS OF CECT SYSTEM IN THE DL ENVIRONMENT

The vitality of the classroom education system is formed by the energy that teachers and students bring to the system through teaching activities. It is a social and psychological energy that promotes the development of the classroom education system. It must be evaluated indirectly through clearly defined forms of activities [14]. By analyzing the types and characteristics of teaching activities of teachers and students, an indicator system of effectiveness and vitality is established. Teachers’ activities include training teachers and supporting classroom teaching. Students’ activities include classroom learning and other activities. The characteristics of teaching activities can be measured from teachers’ enthusiasm and class time. Similarly, students’ enthusiasm for learning refers to the depth of their learning and the breadth of their efforts. This is the positive attitude of students in the learning process, which can be divided into learning initiative, concentration and autonomy according to the learning process of students. The vitality of teachers is teachers’ motivation and learning time, and students’ learning enthusiasm and learning time.

B. ORGANIZATIONAL STRUCTURE MEASUREMENT INDICATORS OF CECT EVALUATION IN DL ENVIRONMENT

Classroom vitality index is a comprehensive indicator that measures the cognitive and emotional energy invested by teachers and students in teaching activities. Its core is that only when these energies are reasonably distributed and flowed in the classroom system network can the energy generated by spontaneous interaction between teachers and students form an orderly organizational structure, thereby ensuring the efficiency and effectiveness of classroom energy transmission. The organizational structure of the classroom system is specifically manifested in the mode and quality of teacher-student interaction. In the remote learning environment, classroom interaction not only includes communication between teachers and students and among students, but also includes interaction with online resources

and platform functions, and has the characteristics of multi-subject and cross-media. The “compatibility” of this interactive structure is often used to measure the degree of organization of the classroom system [15]. Compatibility means that teaching can meet the needs of all participants, so that teachers and students, learners and learning environment can adapt to each other and promote each other, forming a virtuous cycle of energy. Specifically, it is reflected in four dimensions: goal matching, content matching, method matching, and direction matching, as shown in Figure 3, which together ensure the smoothness and effectiveness of classroom energy flow.

C. RESILIENCE INDICATORS OF CECT EVALUATION IN THE DL ENVIRONMENT

The flexibility of the classroom system refers to the ability of the classroom to maintain the stability of its core structure and function when dealing with external changes and challenges. In order to ensure the continuous and effective operation of the teaching system, the classroom environment needs to establish an effective adjustment mechanism, which aims to strengthen positive protective factors and actively identify and overcome potential risk factors. This requires the teaching activities themselves to be reflective, and to be able to keenly perceive and deal with risk factors that may threaten the classroom organization. These risk factors mainly include: mismatch between teacher-student interaction goals and content, teaching attitudes and methods that are difficult to meet learning needs, and teachers’ and students’ maladaptation to the remote learning environment, etc. [16]. In order to overcome these challenges, teachers and students need to conduct reflection together, identify the existence of risk factors, and take targeted measures to resolve risks, activate classroom vitality, optimize organizational structure, and promote the classroom teaching environment to develop towards a more ideal state, as shown in Figure 4. The classroom effect evaluation derived from the reflective ability of the dynamic subject of the classroom environment includes two key indicators: “self-motivation” and “adaptability”. Self-motivation is reflected in teachers overcoming professional burnout and maintaining their commitment, and in students overcoming declining learning motivation and maintaining their efforts; adaptability is reflected in the ability of both teachers and students to adapt to changes in interaction methods, and the ability to effectively use digital resources to carry out or support teaching activities.

VI. ANT COLONY ALGORITHM COMBINED WITH PDCA CYCLE AND EXPERIMENTAL INVESTIGATION AND EVALUATION

To explore the current state of the evaluation system for English classroom teaching effectiveness, this paper selected three universities and conducted a questionnaire survey of 150 students. The survey results showed that students generally believed there were many shortcomings in the

current English classroom teaching effectiveness. To more accurately pinpoint the problems, the questionnaire included common teaching problems as independent variables. As shown in Figure 5, the three universities were labeled A, B, and C, respectively, and the feedback rates for each of the four independent dimensions—“low teaching efficiency,” “problems with teaching methods (styles),” “lack of learning interest,” and “outdated evaluation methods”—were presented.

Figure 5A shows the percentage of students from the three universities who believe that the current CECT suffers from “low teaching efficiency” and “problems with teaching methods (styles)”. Figure 5B shows the percentage of students from the three universities who believe that the current CECT suffers from “lack of learning interest” and “outdated assessment methods”. It should be noted that “problems with teaching methods (styles)” is an independent dimension and is not directly equivalent to “low teaching efficiency,” but it is one of the important factors that may affect efficiency. As can be seen from Figure 5A, there are differences in the students’ views on these two issues among the three universities. Specifically, 41% of students at University A believed that the current teaching suffered from low efficiency, and 31% believed that the teaching methods (styles) were problematic; the corresponding percentages for University B were 36% and 28%, respectively; and the corresponding percentages for University C were 34% and 38%, respectively. As can be seen from Figure 5B, there were also differences in the feedback from students of the three universities on the two dimensions of “lack of learning interest” and “outdated assessment methods”. Among them, 48% of students at School A felt they “lacked interest in learning,” and 71% felt the evaluation methods were “outdated.” The corresponding percentages for School B were 51% and 74%, respectively; and for School C, the corresponding percentages were 56% and 68%, respectively. This method of independent presentation and analysis helps to more clearly and scientifically identify the specific distribution of different teaching shortcomings, avoiding the simple bundling of variables of different natures, thus providing a more precise basis for subsequent targeted improvements.

Three colleges and universities were selected to investigate the accuracy of the evaluation of structural integrity, self-motivation and system perfection in the current ES of English classroom teaching effect, which the English teachers of three colleges and universities believed. The three universities in the survey were set as A, B and C, and 90 English teachers were surveyed. The survey results are shown in Table 1.

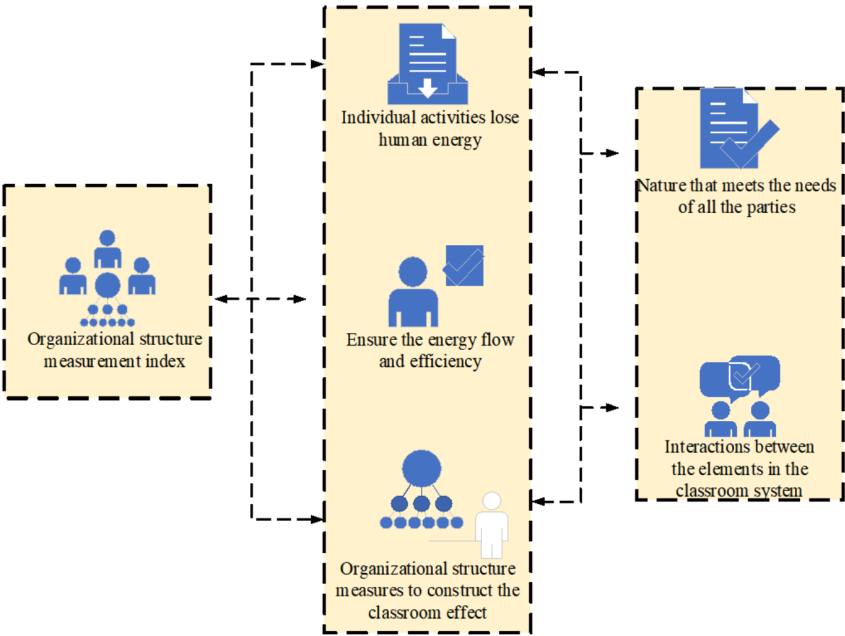


FIGURE 3. Measurement index of the organizational structure of CECT evaluation in the DL environment

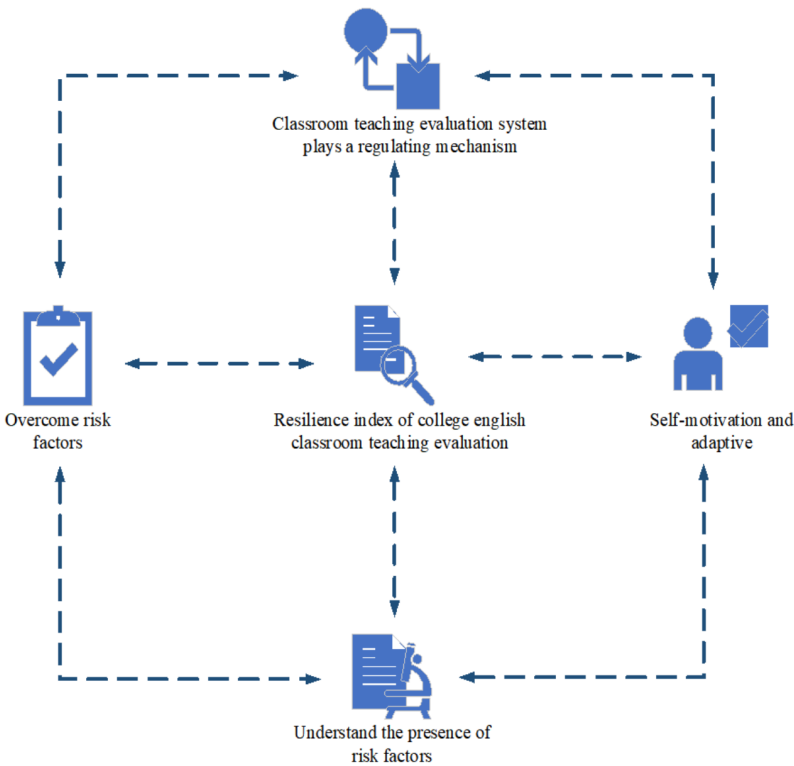


FIGURE 4. Resilience index of CECT evaluation in the DL environment

TABLE 1. The evaluation accuracy of different aspects in the current CECT effect ES

	Evaluation of the structural integrity	Self-motivation	System perfection
A	71%	55%	74%
B	76%	52%	84%
C	74%	61%	77%

It can be seen from Table 1 that the teachers of University A believed that the accuracy of the evaluation of the integrity of the evaluation structure in the ES of CECT effect was 71%; the accuracy of the self-motivation evaluation was 55%; the accuracy of the evaluation of the system perfection was 74%. University B teachers believed that the accuracy of the evaluation of the integrity of the evaluation structure

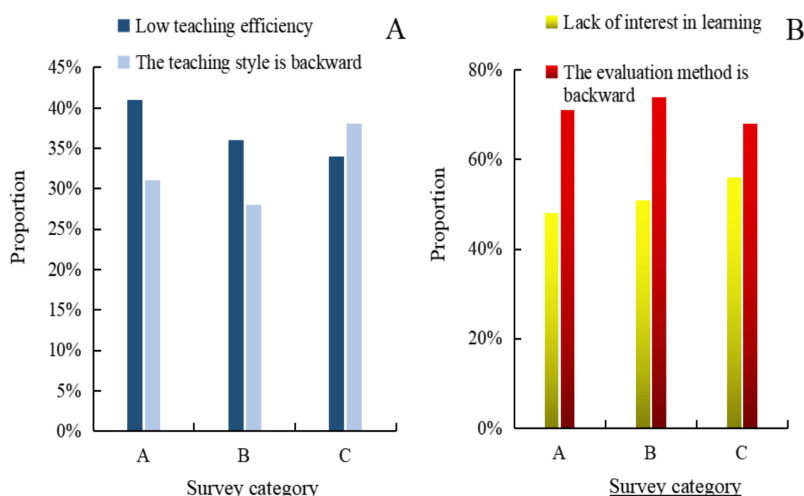


FIGURE 5. The deficiencies in the current CECT effect: A Low teaching efficiency and backward teaching style; B Lack of interest in learning and backward evaluation methods

in the ES of CECT effect was 76%; the accuracy of the self-motivation evaluation was 52%; the accuracy of the evaluation of the perfection of the system was 84%. The teachers of University C believed that the accuracy of the evaluation of the integrity of the evaluation structure in the ES of CECT effect was 74%; the accuracy of the self-motivation evaluation was 61%; the accuracy of the evaluation of the perfection of the system was 77%.

To enhance the evaluation accuracy of the current CECT effect ES, the digital technology and the ant colony algorithm of PDCA cycle were introduced into the CECT effect ES, and a new type of English classroom teaching effect ES was constructed. In order to investigate the practical application effect of the new English classroom teaching effect ES, the new system was introduced into three colleges and universities for evaluation. After a period of experiment, 150 teachers from three colleges and universities were surveyed by questionnaire. According to the survey of teachers, the recognition degree in the ES of the new English classroom teaching effect was mainly the proportion of four aspects: regulation mechanism, teacher-student interaction, overcoming risks, and the integrity of the teaching system. The three universities were set as A, B, and C, and the specific effect is shown in Figure 6.

Figure 6A shows the recognition of teachers in three universities for the adjustment mechanism and teacher-student interaction in the new English classroom teaching effect ES. Figure 6B shows the teachers' recognition of overcoming risks and the integrity of the teaching system in the ES of the new English classroom teaching effect in three universities. It can be seen from Figure 6A that teachers in the three universities had different recognition of the adjustment mechanism and teacher-student interaction in the new English classroom teaching effect ES. Among them, the recognition of teachers in University A for the adjustment mechanism in the new English classroom teaching effect ES

was 84%, and the recognition of teacher-student interaction was 91%. The recognition of the adjustment mechanism in the ES of the new English classroom teaching effect by the teachers of University B was 86%, and the recognition of the interaction between teachers and students was 88%. The recognition of the adjustment mechanism in the ES of new English classroom teaching effect by teachers in University C was 88%, and the recognition of teacher-student interaction was 78%. It can be seen from Figure 6B that the teachers of the three universities had different recognition of overcoming risks and the integrity of the teaching system in the ES of the new English classroom teaching effect. Among them, the teachers of University A had 88% recognition of overcoming risks in the ES of the new English classroom teaching effect, and 81% recognition of the complete teaching system. In the ES of the new English classroom teaching effect, the recognition rate of overcoming risks by teachers in University B was 79%, and the recognition rate of the teaching system integrity was 84%. The recognition rate of teachers in University C for overcoming risks in the ES of new English classroom teaching effect was 76%, and the recognition rate of teaching system integrity was 88%.

To investigate the difference between the efficiency of the traditional English classroom teaching effect ES and the new English classroom teaching effect ES in the evaluation of CECT effect, this paper compared the satisfaction of teachers in a certain university with the traditional and new English classroom teaching effect ES, and surveyed 50 English teachers in a certain region, with satisfaction being satisfactory, average and dissatisfied, respectively. The specific effect is shown in Figure 7.

Figure 7A shows the satisfaction of 50 English teachers in a university with the traditional English classroom teaching effect ES, and Figure 7B shows the satisfaction of 50 English teachers in a university with the new English classroom

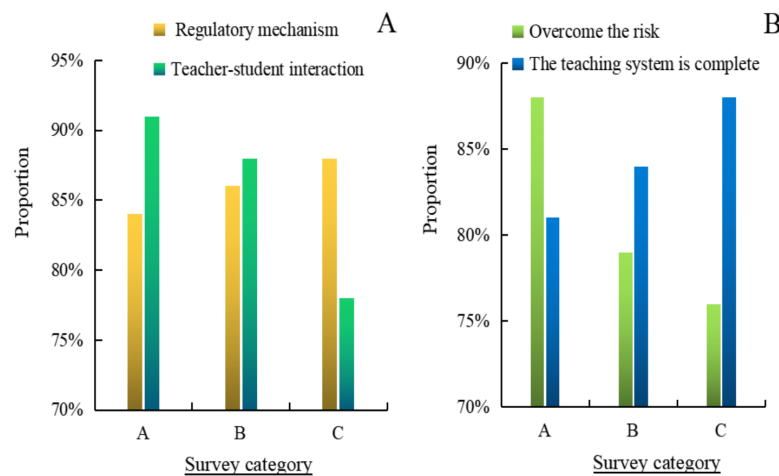


FIGURE 6. The practical application effect of the new English classroom teaching effect ES: A Adjustment mechanism and teacher-student interaction; B Overcoming risks and the integrity of the teaching system

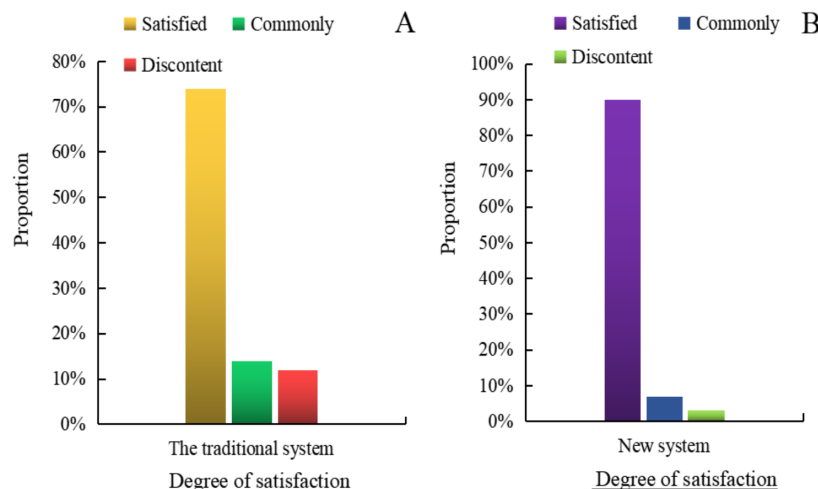


FIGURE 7. Teachers' satisfaction with the traditional and new English classroom teaching effect ES: A Traditional English classroom teaching effect ES; B New English classroom teaching effect ES

teaching effect ES. It can be seen from Figure 7A that among the English teachers surveyed, 74% were satisfied with the traditional English classroom teaching effect ES; 14% were generally satisfied; 12% were dissatisfied. It can be seen from Figure 7B that among the English teachers surveyed, 90% were satisfied with the introduction of digital technology and the ant colony algorithm of PDCA cycle into the ES of CECT effect to build a new ES of English classroom teaching effect; 7% were generally satisfied; 3% were not satisfied. According to the experiment and investigation, for the introduction of digital technology and the ant colony algorithm of PDCA cycle into the ES of CECT effect, building a new ES of English classroom teaching effect can improve the efficiency by 16%.

VII. CONCLUSIONS

The quality of higher education is the most important lifeline of the development of a school, and also the most important

embodiment of whether the school can achieve long-term development. It also relates to the quality of talent training and the level of school management. The ES of CECT effect must guide the correct conceptual evaluation. According to the characteristics of the English subject, the corresponding teacher evaluation institutions should be selected systematically, and the reasonable and practical evaluation should be selected to promote the common development of teachers and students. At present, the teaching form in colleges and universities is still based on the classroom, but scientific and reasonable evaluation of teaching quality is the future of classroom teaching and the basis of classroom innovation and improvement of English teaching methods. People should continue to learn more comprehensive and perfect ES, so that high-quality English ES can play an important role in improving students' English level.

AUTHOR CONTRIBUTIONS

Cheng Huang designed the experiments, collected data for experimental comparison usage and drew the curve, modeling and wrote the first draft of the paper.

CONFLICTS OF INTEREST

All author declares that they have no conflicts of interest.

HUMAN RESEARCH SUBJECTS

In this paper, all relevant personnel involved in the questionnaire survey and the teaching assessment system experiment have given their consent to the content of the experiment and the publication of the article.

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