

Construction of English Teaching Index Evaluation System Based on Artificial Intelligence and Multimedia Technology

Juan Tian^{1,✉}

¹ School of English Literature, Xi'an FanYi University, Xi'an, Shaanxi, 710105, China

ABSTRACT

AI (Artificial Intelligence) technology and multimedia technology are changing with each passing day, and have gradually involved in various fields. At the same time, the use of these technologies in the field of education has also effectively promoted the assessment of English classroom teaching. Since good classroom teaching is inseparable from evaluation, then scientific and reasonable teaching assessment of English classroom teaching can be guaranteed. At present, there is a lack of English teaching index assessment system for AI and multimedia technology. Therefore, this paper conducted in-depth research on improving the assessment system of English classroom teaching, and expounded on AI and multimedia technology. This paper built an assessment system for English classroom teaching based on AI and multimedia technology, and innovated and improves the assessment system. The experiment showed that 85% of the teachers were satisfied with the assessment system of English teaching indicators based on AI and multimedia technology, and 70% of the teachers were satisfied with the assessment system of traditional English teaching indicators. The new system can help to promote a more objective and scientific assessment of English classroom teaching.

Key words: English Teaching Evaluation, Artificial Intelligence, Multimedia Technology, Construction of the System

1. Introduction

With the increasing scale and level of teaching of English, the overall quality of teaching has improved. However, in the era of information, advances in instructional settings, methodologies, and transmission of knowledge are unparalleled. The demands of developing holistic abilities in modern society cannot be satisfied by the traditional educational approach, and it is necessary to combine it with high and new technologies.

Nowadays, there are some studies of scholars on AI-based English teaching. A cross-cultural

✉ Corresponding author.

E-mail address: tianjuan2020@163.com (J. Tian).

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English teaching method based on AI emotion detection and neural network algorithms was suggested by Zhang M [1]. Yang H introduced the researchers' newly developed task-based voice chatbot [2]. Chung B analyzed the possibility of implementing AI applications in English education through the AI English classroom [3]. Liu A analyzed the convergence of AI with university English teaching, especially feedback from self-learning assessment, and attempted to explore new teaching models in the context of AI [4]. Lu X designed an AI writing assessment system widely used in Chinese university English writing, which provided teachers and English learners with online automatic composition assessment services. This not only reduced the workload of teachers, but also improved students' English writing proficiency [5]. The above research analyzed the teaching of English based on AI.

Some of the relevant people's research on English teaching based on multimedia technology is as follows. Wang C developed a varied English teaching assessment system to mobilize students' excitement, initiative, and originality in order to improve the quality of university English teaching after briefly analyzing the existing condition of employing multimedia technology to build such a system [6]. Zhu X believed that in terms of instructional design, teachers should effectively use multimedia to transform traditional English teaching methods and cultivate students' critical thinking [7]. Li X developed a deep convolutional neural network-based algorithm to assess the impact of university English instruction [8]. Zhu Q designed an improved approach to university English proficiency assessment, so as to encourage the fusion of conventional teaching elements and multimedia English instruction [9]. The above research analyzed the teaching of English based on multimedia technology.

The old ideas, ways of thinking, and lives of individuals are altering as a result of cutting-edge disciplines like AI and multimedia technologies. This improves education and elevates human understanding. They have been the focus of study in the area of educational technology in addition to being the lofty goals pursued by today's information technology. In order to improve English teaching practices, this study examined the unique applications of AI and multimedia technologies to the environment and implementation concepts of English teaching assessment.

2. AI and Multimedia Technology

1) Research on the relationship between AI and teaching. AI is the study of how to make computers or intelligent machines imitate, extend, and expand the human brain, and carry out thinking activities such as reasoning, planning, calculation, thinking, and learning, so as to solve various complex problems that still need to be solved by human experts [10]. The history of scientific development would be significantly impacted by the development of AI since it would lead to new differentiation and changes in the overall scientific architecture. By elucidating natural intelligence's functioning mechanism and the structural link between distinct functional components, AI theory builds on the notion of natural intelligence to extend and develop intelligence.

The speed of AI development has accelerated in recent years. To some extent, this has encouraged ongoing change and progress in the field of education while also creating a significant wave in society. Traditional education has been significantly changed by the integration of AI technology with education. Additionally, it has significantly boosted the educational model, instructional standards, and evaluation techniques [11]. The inclusion of AI technology in education requires a high degree of attention to the ontology of education and student-centeredness, so as to form a very personalized and teaching method. With the continuous application of AI technology, the traditional teaching mode has made great breakthroughs. In the process of traditional English classroom teaching, the knowledge-based model is always adopted, that is, the teacher instructs while the students learn by taking notes. There is a serious lack of practical application of what they have learned, which leads to poor practical application ability of students. Teachers can achieve the purpose of human-computer dialogue through communication with AI, and can also use AI platforms to further achieve the new

teaching mode of "everyone learns and learns everywhere". In addition, the integration and development of AI and education provides strong technical support for English classroom teaching and promotes innovation in English classroom teaching and assessment. The AI technology-assisted teaching assessment system is shown in Figure 1.

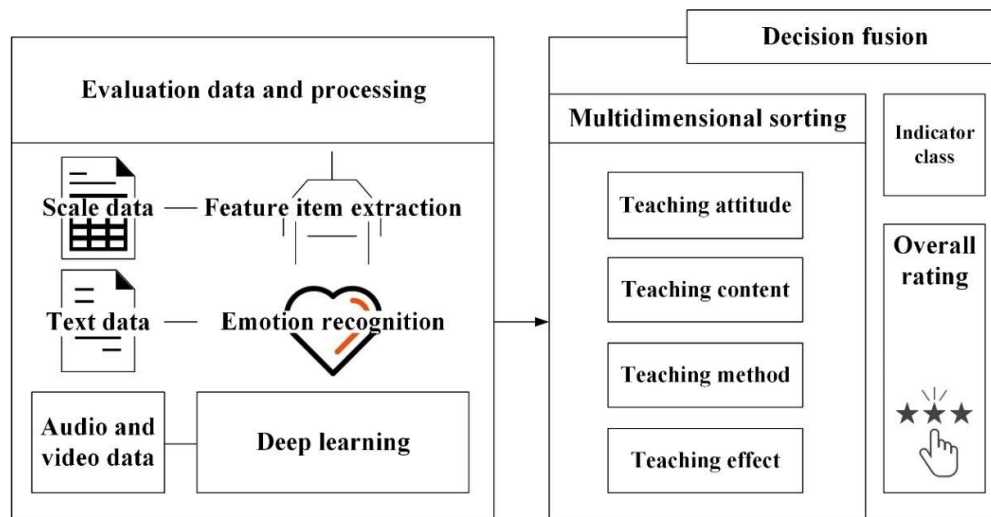


Fig. 1. AI technology assisted teaching assessment system

The system is divided into three modules, namely the assessment data and processing module, the multidimensional sorting module and the decision fusion module. Firstly, the scale data, text data, audio and video data are obtained, and multi-dimensional sorting is prepared for multi-dimensional sorting through feature item extraction, emotion recognition and deep learning. Secondly, the teaching attitude, teaching content, teaching methods and teaching effect are sorted in multiple dimensions, and the index class and comprehensive score are finally obtained.

2) Research on the relationship between multimedia technology and teaching. Multimedia refers to digital media, so text, images, animations, audio, and video presented on a computer can be seen as multimedia modes [12]. A variety of information required for lectures can be transformed by computers, which can be used for screen presentation, capacity storage and word processing.

Multimedia assisted teaching assessment is the use of multimedia equipment for demonstration, and this modern teaching technology is better than the traditional teaching mode. Multimedia assisted teaching is a model of teaching activities carried out by computers as auxiliary tools, and is one of the important practical forms of computer application in education and one of the new educational technologies [13]. This technology has changed the traditional teaching mode and environment, and has been favored by teachers and students for its diversity and flexibility. The multimedia technology-assisted teaching assessment system is shown in Figure 2.

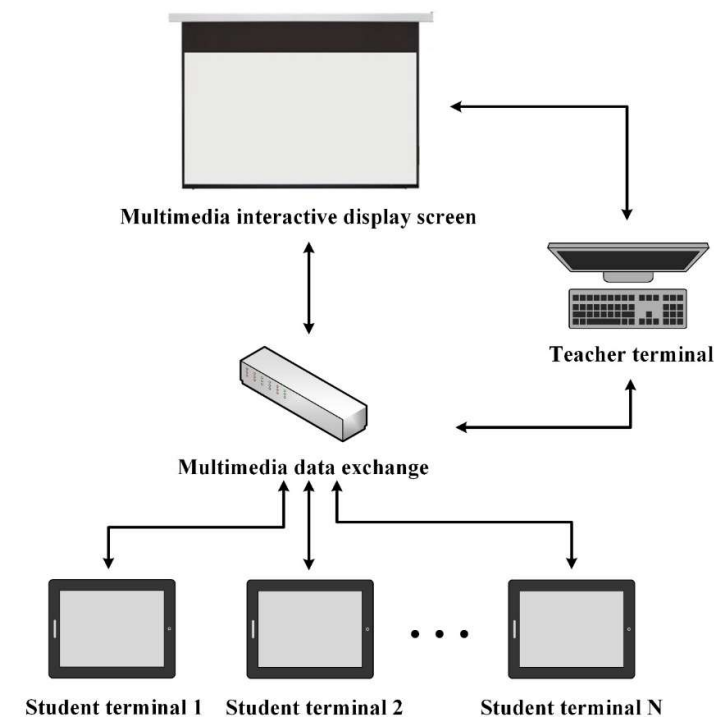


Fig. 2. Multimedia technology assisted teaching assessment system

In the multimedia technology-assisted teaching assessment system, the multimedia display curtain assumes the responsibility of teaching. Teachers and students each have terminals, and the data exchange between them is implemented by a multimedia data switch. Its features are as follows:

Integration: multimedia is characterized by a collection of text, sound, graphics, images and other media in one. It uses audio, pictures and videos to match various documents to diversify and interest information. **Independence:** multimedia independence is the treatment of a medium without compromising other media. **Interactivity:** in actual operation, according to the new needs of using new needs at any time, various multimedia information resources that do not understand each other are reprocessed, transformed, modified and reorganized many times. **Real-time:** it means that when human-computer interaction, information and data would change instantly with time or command. For example, sounds and moving images change over time, while files and programs change with commands. **Multimedia data information** needs to be able to be processed and resolved in a timely manner in various situations, such as audio, video and other audio-visual information in time-related materials. **Large amount of data:** the amount of multimedia data information is unmatched by other traditional data. This problem is a technical problem in the development of multimedia applications.

3. Construction of Innovative English Teaching Index Assessment System

1) The impact of AI on English teaching. The way students study has changed somewhat in recent years as a result of the ongoing upgrading and reform of AI technology [14]. For example, in the process of traditional English teaching, the application of AI technology to English teaching can be analyzed in a targeted manner according to the learning situation and characteristics of students, and a reasonable learning purpose can be formulated for them. It also enables students to get enough time for independent study on the Internet. AI technology can judge students' mastery of knowledge according to their academic performance, so that it matches and targeted practice to achieve the effect of consolidating knowledge, which can effectively mobilize students' enthusiasm and

enthusiasm for learning. It can also transform students' learning style and enhance students' ability to learn independently.

In addition, for traditional English teaching, teachers can only use the limited time in the classroom to communicate and communicate with students, and choose relevant teaching content based on their own teaching experience. In the era of AI, teachers can make full use of AI data analysis to select the most suitable teaching content and materials, and can adjust and optimize their teaching content more flexibly [15]. The use of AI can answer students' questions in a timely manner and effectively improve the level of English teaching, so as to truly teach according to their aptitudes. In addition, English teachers also need to have certain resource integration and mining capabilities in the teaching process to significantly improve their professional capabilities.

2) The current situation of English classroom teaching assessment. Traditional English attaches great importance to the transfer of language knowledge when teaching English. With the passage of time, the assessment of English classroom teaching has gradually shown a development towards the ability to take the wrong test. At this stage of English classroom teaching, the assessment method is still stuck in the final assessment, which is too simple, such as unit tests, mid-term and final tests, and so on. Various tests are used instead of teaching evaluations, and students' learning ability is assessed based on test results. This assessment method has a great adverse effect on students. The main manifestation is that it seriously hinders the smooth achievement of English teaching goals. The current test assessment method that is too single that cannot evaluate the actual English ability of students from a comprehensive perspective, and cannot give an objective assessment to the outside world. It misleads students about their learning goals. The excessive emphasis on the authority of the examination would gradually change the purpose of requiring students to study, and the purpose and motivation of English learning would be regarded as coping with the examination.

3) Innovation of English classroom teaching assessment system. With the emergence and application of AI and multimedia technology, it has significantly aided in the ongoing innovation and reform of the assessment of English classroom instruction. This article put out the idea of procedural English classroom evaluation with the use of artificial intelligence and multimedia technologies. This assessment method is applied to the English teaching process, which is mainly manifested in the classroom teaching process, extracurricular learning process, cooperative learning ability, comprehensive ability, etc. When conducting procedural English classroom teaching assessment, it pays attention to both students' English learning performance and the whole process of student learning, so as to effectively optimize the English classroom teaching assessment system. This can ensure that the students' learning process and learning outcome assessment can be harmonious and unified, so that English assessment can better serve English teaching. The characteristics of this assessment system are shown in Figure 3.

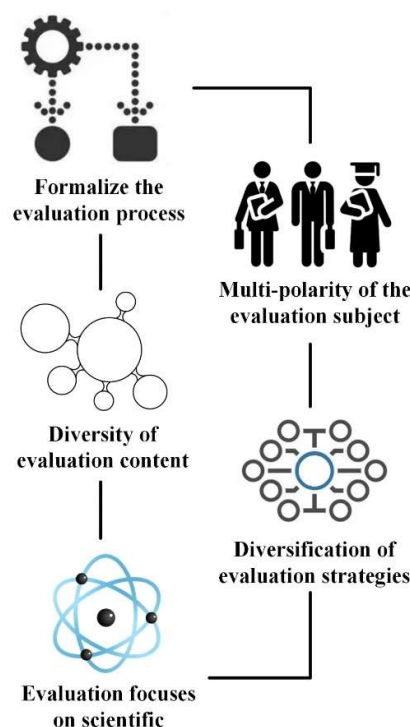


Fig. 3. Assessment system features

(1) Formalization of the evaluation process. Since English classroom teaching belongs to the dynamic teaching process, the teacher assessment should be gradually included into the students' learning process in the classroom. This makes it possible to examine students' English knowledge, abilities, and feelings in a thorough and careful manner. The evaluation of English classroom instruction should primarily use the process assessment method and focus on the students' English learning process. It constantly examines whether students have achieved their intended learning goals, and no longer uses test scores to evaluate students' learning.

(2) Assessment of subject multipolarization. From the current point of view, the traditional model of English classroom teaching assessment is basically the responsibility of the English teacher. This assessment model is not only very single, but also has many important information that cannot be grasped by English teachers alone, such as students' learning attitudes, learning habits, and the heavy and difficult points in the learning process. However, at the advent of the era of AI, it has promoted the innovation of the assessment system of English classroom teaching and constructed a multipolar assessment model. Student self-evaluation under the multipolar assessment model is crucial. In the process of self-evaluation, students need to objectively evaluate all behaviors in the learning process, such as: learning objectives, learning motivation, learning content, learning methods and learning progress.

(3) Diversified assessment content. In English classroom teaching, its teaching objectives include not only the elements of students' academic performance, but also the elements of students' intellectual development and emotions, such as learning interests, team spirit, classroom participation and other diversified characteristics. The so-called assessment is actually the assessment of people, and more important is the assessment of human development. Therefore, the assessment method should be open-ended and have a certain degree of flexibility, which can promote the development of students' intelligence. The assessment system of English classroom teaching constructed by AI and multimedia technology should have needs analysis, classroom teaching, curriculum design and assessment.

Under the diversified assessment content, the innovation of English classroom teaching assessment is realized.

(4) Diversification of assessment strategies. When there is a variety of assessment content in English classroom teaching, it is impossible to achieve accurate assessment if only by means of testing. Therefore, diversified assessment content needs to be equipped with a variety of different assessment strategies to obtain comprehensive and accurate assessment results. However, the test method is only an important means of evaluating English classroom teaching. Regardless of the test method, reasonable assessment strategies can also be selected according to the specific situation of English classroom teaching, such as classroom activities, extracurricular activities, student learning file records, online self-study records and student self-evaluation reports. Observation and assessment of students' English learning through diversified assessment strategies can better promote student learning.

(5) Assessment focuses on science. With the emergence of AI, it has tremendously aided in the reform of English teaching methods, causing the evaluation of English classroom teaching to advance to a previously unheard-of new level and entirely shattering the final evaluation of conventional English classroom teaching. A more thorough and logical evaluation of students' learning processes and results may be accomplished through the use of process assessment. The process evaluation technique gives more weight to students' all-around abilities. In order to make sure that the English classroom teaching assessment is more accurate and scientific, the innovative English classroom teaching assessment gives greater emphasis to the process assessment and the evaluation of students' language usage abilities.

4. Technical Points of the Assessment Process

1) Reasoning machine design. The inference machine as an important part of the assessment system is essentially a collection of computer programs. The system implements the inference mechanism of combining forward inference and reverse inference. It first matches known facts and knowledge bases through forward rule reasoning, and then solves the conflict. Reverse uncertainty reasoning is used to determine the students' understanding of each knowledge point after identifying the knowledge points covered by the analysis questions have been identified.

Forward inference is expressed in the multi-input multiple-output rule, and the multi-input multiple-output rule can be digested into multi-input multi-single output:

$$R(k) = CF(y_k) \quad (1)$$

The knowledge base principles in this system are founded on reliability. Therefore, in the implementation process of the uncertainty inference machine, the uncertainty reasoning method is used for reasoning. The fuzzy relationship formula for establishing the English assessment system is shown in Formula (2):

$$\mu_z = \{\mu_y \cdot W\} \quad (2)$$

The inference relationship can be derived as shown in Formula (3):

$$\mu_y = \mu_{CF} = \mu_z \quad (3)$$

In the Formula (3), μ_y represents the vector after the forward inference conclusion is quantified.

It is supposed there is a sample of students' exercise answers, which are matched to the rules in the knowledge base, and the quantification is shown in Formula (4):

$$\mu_{yk} = \frac{x}{n} \quad (4)$$

2) Implicit knowledge base based on neural networks. Knowledge is represented by:

$$\text{IF}(x_1, x_2, \dots, x_n)^T = (1, 0, \dots, 0)^T \quad (5)$$

$$\text{THEN}(y_1, y_2, \dots, y_m)^T = (0, 1, \dots, 0)^T \quad (6)$$

Among them, $(x_1, x_2, \dots, x_n)^T$ is the description of the knowledge points after the conversion of some questions in the question bank position, and $(y_1, y_2, \dots, y_m)^T$ is the diagnostic result mode of the knowledge points.

The determination of whether students have mastered certain knowledge points actually serves to identify where they have fallen short. The forward multilayer network is the most popular and efficient in the field of defect diagnostics. It uses a learning mode with the smallest mean squared deviation. Error is used to backpropagate to the input layer during the learning phase, and layer by layer forward propagation to the output layer during the working phase. The input layer is on the bottom; the concealed layer is in the center, and the output layer is on top. The network's nearby tiers are connected to one another. The individual neurons within a layer do not interact with one another, and there is no connection between the input and output layers. It can be demonstrated that the employment of a three-layer forward neural network may accomplish arbitrary approximation of arbitrary continuous functions when the hidden layer nodes can be flexibly adjusted on demand.

The transformation function is shown in Formula (7):

$$f(x) = \frac{1}{1 + e^{(-x)}} \quad (7)$$

The output error of the network is shown in Formula (8):

$$E_p = \frac{1}{2} \sum_{i=0}^{n-1} (t_{pj} - o_{pj}^l)^2 \quad (8)$$

The number of nodes of the hidden layer can be determined according to the empirical formula, as shown in Formula (9):

$$l = \sqrt{m + n} + a \quad (9)$$

Among them, m is the number of neurons in the input layer, and n is the number of output neurons.

In the database logic design, the user information is shown in Table 1.

Table 1. User info

Field name	Type of data
Sequence	int
UserID	varchar
Password	varchar
UserType	int

5. Exploration of the Effectiveness of Teaching Assessment Using New Models

The assessment of 20 English teachers was selected as a sample, and numbered A to T. A total of 20 questionnaires were distributed and 20 questionnaires were recovered. There were 20 valid

questionnaires with a recovery rate of 100%. The effective rate was 100%. The questionnaire was conducted on the satisfaction of English teachers with the assessment system of English teaching indicators using AI and multimedia technology. It investigated from multiple levels and perspectives, and involved the entire process of classroom teaching. The score was greater than 2 points to be satisfied, otherwise it was dissatisfied. The improved English assessment system was named IES, and the traditional English assessment system was named TES.

1) Assessment form satisfaction score. The act of determining whether the teaching activities have actual or potential value is known as teaching assessment. It is the process of evaluating the value of the teaching process and the teaching results in relation to the teaching objectives and serving the teaching decision. The study of the value of faculty teaching and student learning is called pedagogical evaluation. In general, teaching assessment entails evaluating instructors, students, teaching materials, teaching techniques and means, the teaching environment, and teaching management, although it focuses primarily on evaluating students' learning outcomes and teachers' instructional strategies. The two basic components of teaching assessment are instructors' instructional efforts and students' learning results. The teacher's satisfaction rating of the assessment form is shown in Figure 4.

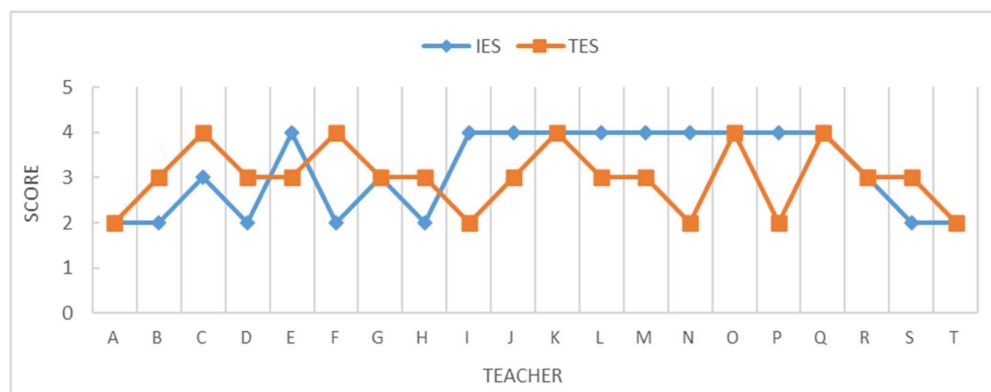


Fig. 4. Assessment form satisfaction score

Figure 4 shows the satisfaction rating of English teachers in the sample for the new model assessment form. Most teachers had a rating of 3 or more, and no teacher gave a full score. It was proved that most of the English teachers in the sample were satisfied with the assessment system of English teaching indicators based on AI and multimedia technology.

2) Assessment of the subject's satisfaction score. As far as the assessment subject is concerned, this paper emphasized the pluralism and interactivity of the assessment subject, so that teachers and students can become assessment participants, and enable students to transform from passive status to active participation in the assessment subject. In addition to the teacher's assessment, the student's self-evaluation was added. In the assessment, it is not only necessary to ask questions, but more important is to explore the root causes of problems and ways to solve them. The assessment of teachers should play a leading role and strive to be accurate, meticulous, fair and just. In the process, it is needed to pay attention to methods and strategies, so that assessment becomes emotional communication between teachers and students. Student self-evaluation can enable students to understand their strengths and weaknesses, and enhance learning initiative and self-confidence. It plays a role in self-motivation, self-reflection, self-regulation and other functions in assessment. The teacher's satisfaction rating for the assessment subject is shown in Figure 5.

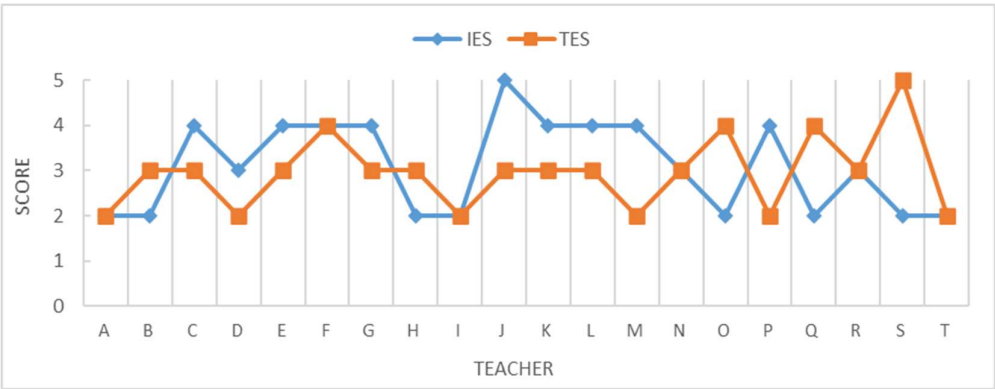


Fig. 5. Assessment subject satisfaction score

The satisfaction score of English teachers in the sample with the new model assessment subjects can be obtained from Figure 5. From Figure 5, it can be obtained that regarding the satisfaction rating of English teachers in the sample on the assessment subjects of the new model, a small number of teachers scored 2 points, and 1 teacher gave a full score. For the satisfaction score of the traditional model assessment subjects, most of them were given 3 points, and 1 teacher gave a full score assessment. This proved that teachers' satisfaction with both models was virtually indiscriminate.

3) Assessment content satisfaction score. The teacher's satisfaction rating of the assessment content is shown in Figure 6.

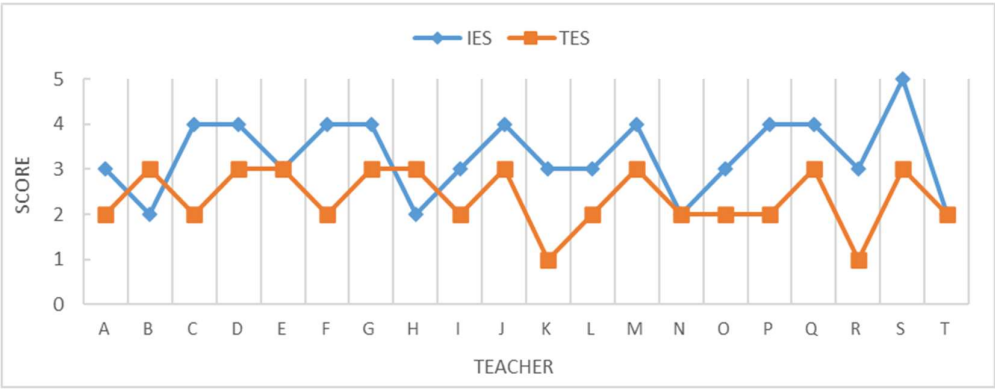


Fig. 6. Assessment content satisfaction score

Figure 6 shows the satisfaction rating of English teachers in the sample for the content of the new model assessment, most teachers had a score of 4 or more, and 1 teacher gave a full score. It was proved that most of the English teachers in the sample are satisfied with the assessment of English teaching indicators based on AI and multimedia technology.

4) Comprehensive satisfaction survey. The scores of the above sample teachers were calculated to obtain the proportion of satisfied people, and then the overall satisfaction situation was inferred. The result is shown in Figure 7.

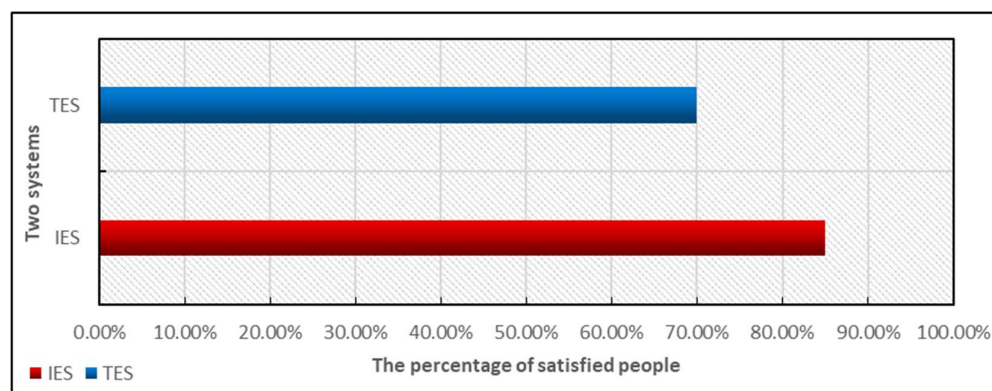


Fig. 7. The percentage of satisfied people

Figure 7 shows the proportion of teachers in the sample who are satisfied with both systems. The proportion of teachers satisfied with the assessment system of English teaching indicators based on AI and multimedia technology was 85%, and the proportion of teachers who were satisfied with the assessment system of traditional English teaching indicators was 70%, which showed that the sample teachers were satisfied with the assessment of English teaching indicators of AI and multimedia technology was relatively high.

6. Conclusions

With the recent quick advancements in science, technology, and network technology, education has seen significant changes and improvements as well. In significant part, the development and use of AI technology has given the evaluation and innovation of English classroom education a more potent technological foundation and resource platform. In order to better develop and enhance the evaluation system for the teaching of English in the classroom, this paper has completed innovation through the process of assessment form, multipolarization of assessment subjects, diversification of assessment content, diversification of assessment strategies, and scientific emphasis on assessment. While providing services for the assessment of English classroom teaching, it can also promote students' creative play. In the experiments, the results of the satisfaction score of the assessment form, the satisfaction score of the assessment subjects, the satisfaction score of the assessment content and the comprehensive satisfaction survey results were obtained. The combination of English classroom teaching assessment and AI and multimedia technology has greatly improved the shortcomings of the current English classroom teaching assessment model, and also provided a more objective assessment method for English classroom teaching assessment.

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