

# *Oral English CAF Evaluation of the Internet of Things Corpus Using Virtual Reality Scenarios*

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**Abstract:** With the development of modern educational technology, virtual reality technology has also been used in the field of English teaching. Virtual reality technology emphasizes multiple intelligences, immersion, interactivity and imagination. It can provide virtual context for English learners and greatly stimulate learners' interest in learning. At present, the evaluation system of spoken English complexity, accuracy and fluency (CAF) has made great progress, but poor conversational and communicative abilities are common in English communication. At present, English teaching in schools has shifted from traditional teaching methods to teacher-centered teaching methods. The traditional CAF oral evaluation system is outdated, lacking authentic corpus information and accuracy, and relatively lagging behind in oral proficiency and oral fluency tests. It can be seen that it is an important task to reform the CAF evaluation system of spoken English and improve the level of spoken English. This article first summarizes and organizes the content and importance of IoT corpora, and then analyzes and discusses the application trends and shortcomings of IoT corpora in English speaking CAF evaluation systems; secondly, this paper analyzes the construction of oral English CAF evaluation system using Internet of Things corpus, introduces the forced matching algorithm under edge computing, and proposes more achievable improvement strategies and schemes; finally, it summarized and discussed the experiment. According to the survey and experiment, the CAF evaluation system for spoken English in the new IoT corpus built by using the forced matching algorithm under edge computing and virtual reality technology can improve the evaluation effect by 39%.

## 1. Introduction

With the strengthening of global economic integration and the improvement of international exchanges, the demand for English talents is growing rapidly. The requirements of the society for English professionals have changed from writing and translation skills to the ability to communicate freely in English. In addition, in recent years, the employment situation is still grim, and oral English has become the most important and obvious indicator for employers to measure job seekers' English level. In current rural education, teaching spoken English is a significant challenge. The

scarcity of resources in rural schools is an important factor affecting English oral teaching, and it is difficult for teachers to obtain sufficient resources to teach students in rural schools. Moreover, rural students have limited exposure to English and lack interest in it, which has led to a phenomenon of poor oral proficiency among them. Therefore, how to improve the oral English proficiency of rural students is one of the current teaching issues that needs to be emphasized.

At present, the research on the establishment of oral English CAF evaluation system remains to be enriched. Najmi Kazem aimed to find out the relationship between complexity, accuracy and fluency of different language levels, and provided teachers, syllabus designers and language evaluators with teaching inspiration and suggestions [1]. Tokutake Hayato explored the impact of different levels of interaction in the language learning system on learners' oral task performance. The reasons for these results were discussed and provided inspiration for teachers [2]. Hidalgo Maria Angeles investigated the compositions of English as a foreign language learner, and advocated to include the overall measurement when analyzing students' works [3]. Wu Shu-Ling discussed new insights on nature, namely reconstruction, integration, modal independence and indirect connection with communicative competence, making this English tool widely useful to the second language research community [4]. Chapelle Carol A explored the creation of an assessment to reveal English learners' language competence in science and other content areas [5]. Strobl Carola's research explored the appropriateness of the applicability or fluency of narrative tasks and the measured value of vocabulary variation with the two dimensions from the aspects of language complexity, accuracy, fluency and functional adequacy [6]. Teng Xuan has empirically studied the impact of blended learning on the development of foreign language learners' oral competence. The results showed that blended learning has a significant effect on improving oral accuracy and fluency, but has no significant impact on improving oral complexity [7]. The above research would be clear about the oral English CAF evaluation system, but it does not include the research on the Internet of Things corpus.

Corpus refers to a large-scale electronic text base that has been scientifically sampled and processed. It is the basic resource of corpus linguistics research and the main resource of empirical language research methods. It also needs to be processed to become a useful resource. Venkatraman S proposed to combine naive Bayesian classification with concept and semantic similarity technology, and conducted experiments on corpus, spam and other benchmark datasets [8]. Qian Kun proposed a new multitask speech corpus for the study of COVID-19 [9]. Foretiero Agostino believed that the traditional information management methods in distributed systems are usually not suitable for the modern Internet of Things environment. He also proposed an agent-based algorithm to realize distributed resource organization in the Internet of Things environment [10]. Noura Mahda proposed a new corpus. The expansion of the glossary in the field of the Internet of Things is an ongoing research work aimed at solving the semantic interoperability problem of the Internet of Things [11]. Cui Laizhong proposed an anomaly detection framework of the Internet of Things based on edge intelligence, which used clustering and classification methods to quickly and accurately detect anomalies in the Internet of Things traffic [12]. Nguyen Tu N proposed a new and advanced Internet of Things network detection method, which used dynamic analysis to improve the graph based features generated based on static analysis [13]. Fu Shu proposed a distributed user cluster algorithm, which was proved to be effective through a large number of simulations. It also revealed some interesting insights for the actual UAV assisted IoT network [14]. The above corpus for the Internet of Things is relatively rich, but it is not related to the oral English CAF evaluation system.

English ability has been paid more and more attention by the society. As the most direct expression of English proficiency, oral English communication ability has also received great attention. The oral English CAF evaluation system objectively increased the attention of students

and teachers to oral English. In the design of the oral English CAF evaluation system, the progressiveness, usability and scientificity of the test object must be taken into account. It is a long process to improve oral English, which requires every teacher to pursue and explore tirelessly.

## 2. Overview and Importance of IoT Corpus

### (1) Overview of corpus content

At the beginning of the development of the corpus, people only made a general analysis of word frequency statistics, and later added the tag of word grammatical attributes. So far, people have begun to mark corpus at different levels, such as word formation, pronunciation, symbols and vocabulary. Corpus has not caused much response at the initial stage of development, but it has been recognized and applied more and more in language analysis, language teaching, lexicography, artificial intelligence and other fields. After decades of development, corpora have become mature in theory and technology. In language learning, corpus is used to analyze the mistakes students often encounter in language learning, and determine the priority of language learning projects, and automatically generate different types of exercises.

### (2) The importance of Internet of things corpus in oral english

From the perspective of spoken language teaching, this paper discusses the importance of building the Internet of Things corpus. The IoT corpus expands the input access to English content, and students who only accept the content of textbooks can obtain more styles than English. The IoT corpus provides a platform for oral English courses to communicate with each other. English teachers can find the teaching goals they want to set in the IoT corpus and incorporate English grammar related materials into the IoT corpus. The IoT corpus is based on real materials, which makes the learning content more practical, and enables students to practice oral English, which is closer to real life. Only when teachers and students compare vocabulary and find out oral English errors can classroom activities adapt to local realities according to students' abilities, as shown in Figure 1. Only when the dual roles of teachers and students are fully considered, can the quality of oral English CAF be comprehensively improved.

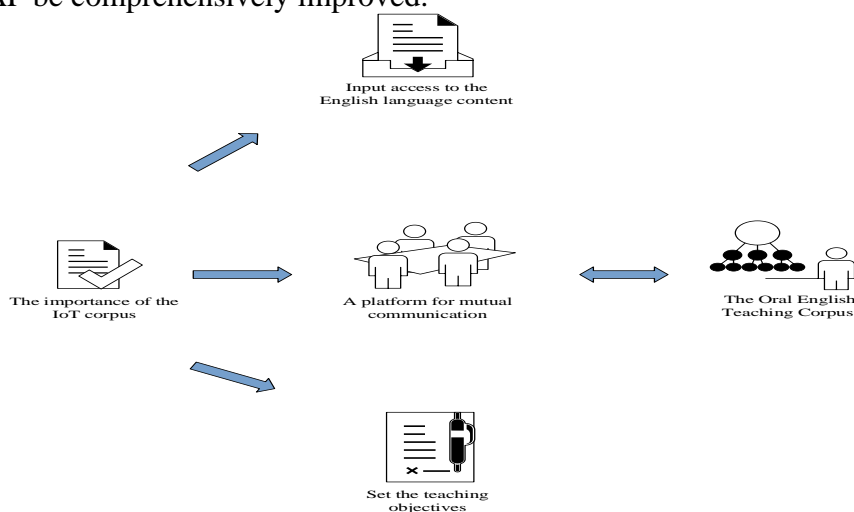


Figure 1: The importance of the IoT corpus in the spoken language

## 3. Application Trend and Defects of IoT Corpus in Oral English CAF Evaluation System

(1) Research and development and improvement of automatic scoring system and plagiarism identification system

At present, with the help of the Internet of Things corpus, the automatic scoring technology has been greatly improved, but mainly focused on language feature analysis. The automatic scoring system for spoken English is still under development. With the application of computer technology, automatic scoring should be based on the analysis and comparison of a large number of samples in the Internet of Things corpus. Only when the characteristics of writing and speaking ability are determined, the scoring system can reflect the actual level of the tester more accurately, objectively and fairly. The International Examination Center has widely used the plagiarism identification system and follows the following principles. The tester's text is matched with the text stored in the IoT corpus in terms of word frequency, keywords, sentences and text structure to find out the degree of similarity. If the similarity exceeds a certain value, the expert would evaluate and analyze the composition of the material suspected of theft by the tester and draw a conclusion. However, the existing plagiarism recognition system is similar to the automatic scoring program, which can only analyze the surface features of the language, and cannot check the deep meaning of the article, as shown in Figure 2.

The further development of the functions of the Internet of Things corpus in the CAF evaluation system of spoken English

The development of oral English CAF evaluation system involves many links, including the preparation of test questions and the selection of materials. In the preparation and selection of test questions, the IoT corpus began to show its potential. On this basis, people can further explore the value of the Internet of Things corpus in the assessment of oral English CAF. For example, people can further explore the value of the IoT corpus and discuss how to use the IoT corpus resources to create or modify the test system to make it more objective and instructive. People can also consider using the Internet of Things corpus to verify the representativeness and coverage of oral tests. In most cases, the test belongs to the academic examination in most cases, and in some cases, it is conducted as part of the school examination. The IoT corpus can also provide researchers with important information, help research students develop writing and speaking skills, understand testers' answer strategies, generate new question types, investigate the impact of language varieties on testers, and determine the degree of awareness of language varieties in the test. In general, IoT corpus has a broad application prospect in oral English CAF assessment.

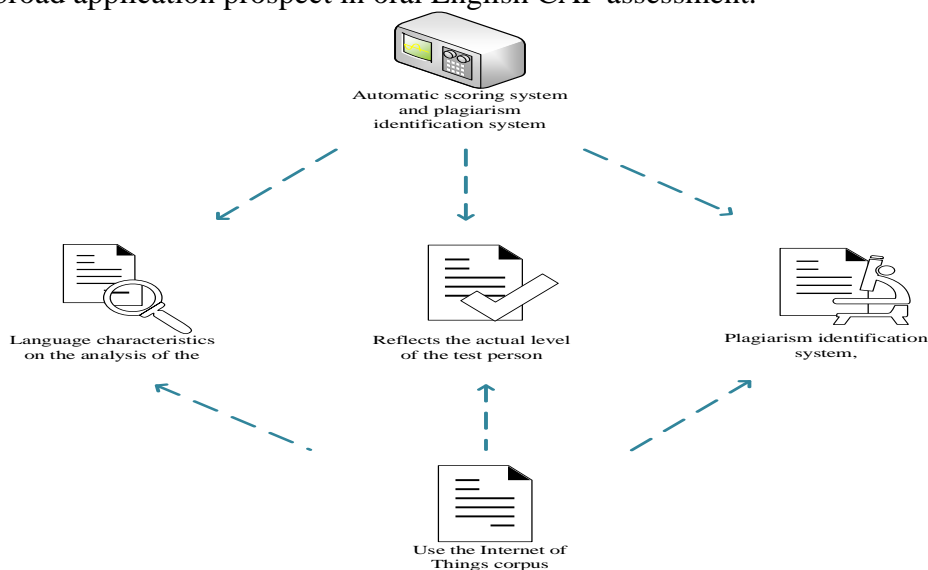


Figure 2: Development and improvement of automatic scoring system and plagiarism identification system

### (3) Limitations of IoT corpus in the application of oral English CAF assessment

The IoT corpus provides important information and help for researchers who conduct oral English CAF assessment, but it is only a database and does not provide all the information needed for the test. In addition, there are some restrictions on the use of information contained in the IoT corpus. First, different IoT corpora have different links. The corpus of each facility is designed according to different parameters and objectives. Therefore, when using the Internet of Things corpus, people should consider the representativeness and relevance of the samples in the Internet of Things corpus, rather than arbitrary use. Secondly, the data in the IoT corpus is uncertain. Researchers should use information in other languages in the database to verify and supplement information. Special theoretical knowledge is required to interpret data and statistical data in the IoT corpus. This is because many corpus based databases, especially user databases, are limited to test tasks, and test types and other requirements, as shown in Figure 3. Therefore, when interpreting the data in the IoT corpus, researchers must consider many factors that affect these data.

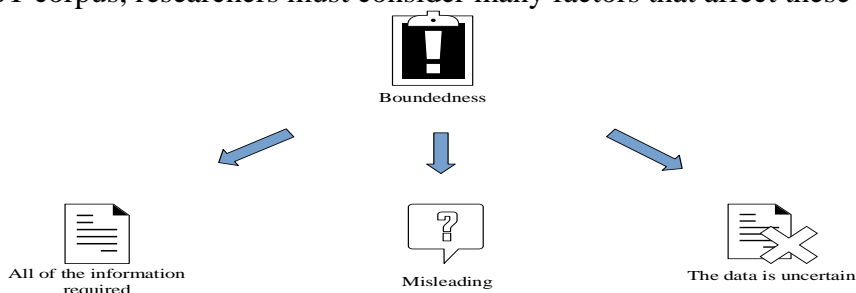


Figure 3: Limitations of IoT corpus in language test application

#### 4. Use virtual reality scene technology to construct the CAF evaluation system of spoken English from the Internet of Things corpus

The construction of CAF evaluation system for spoken English is shown in Figure 4.

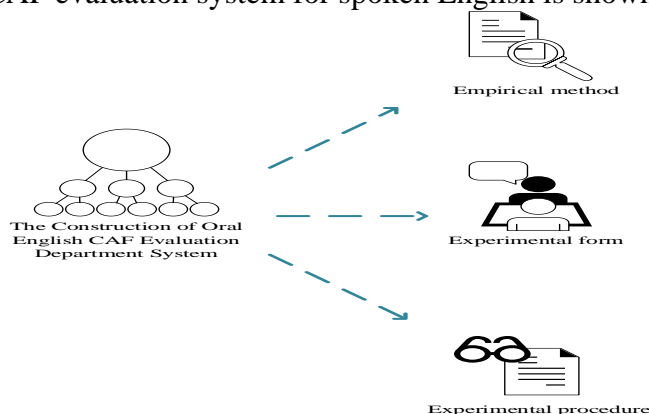


Figure 4: Construction of oral English CAF evaluation system

(1) Use virtual reality scene technology to improve English teaching courseware and English skills

(2) Based on virtual reality technology, English teaching materials should be reorganized into text, sound, image, video and other media forms through appropriate technologies such as 3D graphics processing library and virtual reality to form intuitive, vivid and systematic teaching materials [15]. The training materials should be interactive. Through immersive learning, students can immerse themselves in the virtual environment and communicate effectively with virtual roles. Virtual reality technology usually uses 3D technology to provide students with a large number of

audio materials to make the teaching materials more realistic. Many English pronunciation methods have been introduced into English teaching through virtual reality technology, using common spoken habits and popular expressions. Virtual reality technology provides students with a more realistic story line and adjusts the story at the same time. The script and language of virtual characters should not be too complex, and too complex story lines cannot meet their interests. The greatest advantage of constructing virtual reality technology is that it can overcome geographical constraints and realize students' vision. That is to say, through listening and other ways to visit the culture of English-speaking countries, students can be familiar with the surrounding landscape, communicate with virtual characters, are communicating with foreign cultures, display their own culture through communication, cultivate cross-cultural communication skills, obtain information, improve independent investigation ability and interest in cultural diversity.

### (3) Experimental method and form

(4) The main process of oral English CAF evaluation is to record the language output of the subjects, and then objectively evaluate the oral ability of each subject with the quantitative index of fluency. During the test, each subject will be recorded separately to eliminate the psychological pressure on the tester when facing the examiner. Combining the CAF assessment system of spoken English with classroom teaching reduces the assessment time. Specific methods: consult relevant research reports in the Internet of Things corpus, learn relevant experience, and obtain theoretical support from relevant research. On the one hand, record and sort out the oral CAF of the test subjects. On the other hand, the characteristics of the changes in the oral CAF of the tester are described and explained. The CAF assessment of spoken English is usually conducted in the form of personal report, dialogue and picture narration, so that the tester can continue to narrate spoken English. The form of personal report oral test is simple and feasible. It can directly reflect the ability of the tester to speak and express ideas, and has become the most commonly used test method. By reading pictures and presentations, the tester can concentrate on obtaining specific information, maintain the consistency of the conversation content during the test, and make the results more objective, fair and accurate. This is an evaluation method to show the actual communication ability of the tester, reflecting the actual communication ability of the tester. On the basis of a comprehensive review of the CAF assessment of spoken English, practical exercises were conducted in the form of reports and simulated discussions. Personal reports can take two forms: putting forward suggestions and answering questions. On the one hand, it can ensure that the evaluator can open his mind and speak freely. On the other hand, it can maintain interest in oral learning and attract evaluators to participate in oral activities with great interest.

### (5) Experimental steps

(6) The oral English CAF assessment is conducted according to the established procedures. The first step is to introduce the topic proposal and related vocabulary to the tester. The second step is to give the tester time. During this period, the tester can use dictionaries, mobile phones, etc. to search for unfamiliar words in the language organization, and use them to write demonstration programs or even speech outlines. The third step is to encourage the tester to start from the preparation of the speech, and speak to himself or to the tester next to him, and encourage the tester to repeat the statement several times to improve his oral English fluency. The fourth step is for the tester to join the group to present the oral work. In this process, the evaluator does not put forward any suggestions or comments to avoid the integrity and consistency of the results obtained orally by the tester. After the oral English CAF evaluation, the evaluators put forward appropriate suggestions to improve oral English. The fifth step is to encourage the evaluators who summarize the evaluation results, and make great efforts and make progress after all the teams have completed the evaluation, and appropriately remind the evaluators who do not make enough efforts.

## 5. Results and Discussions

### 5.1 Teaching Effectiveness Evaluation Methods

Before assessing students, this article provides pre training for invigilators and evaluates them according to the unified English speaking assessment scoring standards. The entire assessment process achieves unified question setting, unified invigilation, unified scoring, and reduces human interference

### 5.2 Statistical Methods

This article applies the SPSS 12.0 software package to conduct statistical analysis on the collected data using descriptive statistical analysis and group t-test.

In order to investigate the problems existing in the current oral English CAF evaluation system, 5 rural and urban primary and secondary schools in 5 regions were selected to conduct a questionnaire survey to investigate the students' views on the problems existing in the current oral English CAF evaluation system. The survey contents are mainly summarized as follows: text plagiarism, complex oral test forms, vague evaluation results, and low oral test coverage. This paper investigates students' problems in the current oral English CAF evaluation system from these four points. The school is set as A, B, C, D and E, and the number of people surveyed is 500, as shown in Figure 5.

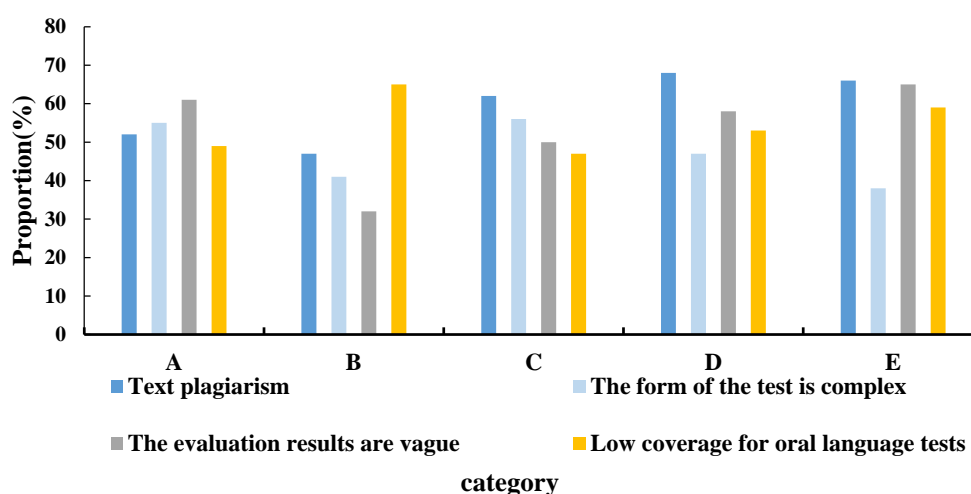


Figure 5: Students' problems in the current oral English CAF evaluation system

It can be seen from Figure 5 that 52% of students in School A think that text plagiarism is a problem in the current oral English CAF evaluation system; 55% think that the oral test forms are complex; 61% think that the evaluation results are vague; 49% think that the oral test coverage is low. In the current oral English CAF evaluation system, 47% of students in School B think there is a problem with text plagiarism; 41% think the oral test form is complex; 32% think the evaluation result is vague; 65% think the oral test coverage is low. In the current oral English CAF evaluation system, 62% of students in School C think that the problem of text plagiarism is a problem; 56% think that the oral test form is complex; 50% think that the evaluation result is vague; 47% think that the oral test coverage is low. In the current oral English CAF evaluation system, 68% of students in School D think that the problem of text plagiarism is a problem; 47% think that the oral test form is complex; 58% think that the evaluation result is vague; 53% think that the oral test coverage is low. In the current oral English CAF evaluation system, 66% of students in School E

think that the problem of text plagiarism is a problem; 38% think that the oral test form is complex; 65% think that the evaluation result is vague; 39% think that the oral test coverage is low.

In order to investigate the problems in the current oral English CAF evaluation system, 5 rural and urban primary and secondary schools in 5 regions were selected and a questionnaire survey was conducted to investigate the students' satisfaction with the current oral English CAF evaluation system in 5 rural and urban primary and secondary schools. The satisfaction was divided into three types: satisfied, average and dissatisfied. The schools were set as A, B, C, D and E, and the number of respondents was 500. The survey is shown in Table 1.

Table 1: Students' satisfaction with the current oral English CAF evaluation system

	satisfied	commonly	discontent
A	49%	30%	21%
B	53%	31%	16%
C	61%	26%	13%
D	58%	21%	21%
E	62%	28%	10%

As shown in Table 1, the students in the 5 rural and urban primary and secondary schools are less satisfied with the current oral English CAF evaluation system. The average proportion of satisfied students is about 55%. The proportion of students who think the oral English CAF evaluation system is general is about 27%, while the proportion of dissatisfied students is about 18%. The existing oral English CAF evaluation system is relatively backward, which can not reflect the shortcomings of the tester in the oral test in time, and there is no specific and effective evaluation system for complexity, accuracy and fluency.

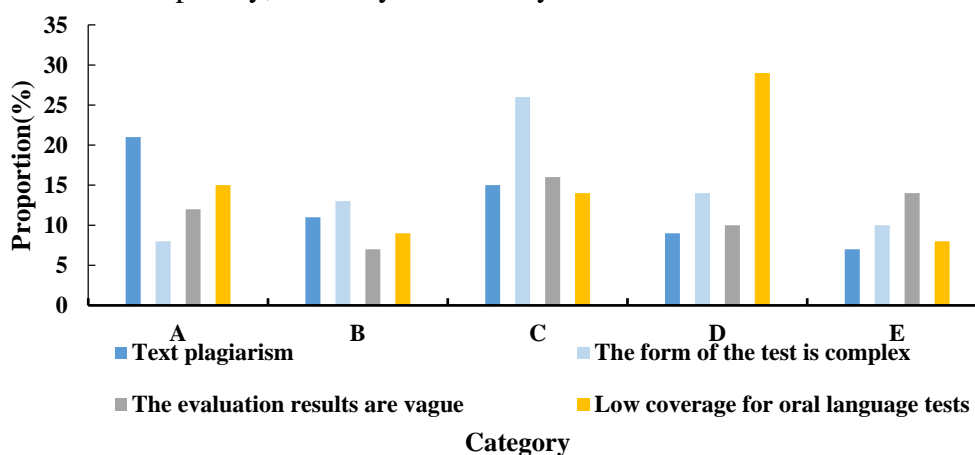


Figure 6: Students believe that the improvement effect of the corpus of the new Internet of Things oral English CAF evaluation system

In order to further improve the ability of the spoken English CAF evaluation system of the Internet of Things corpus, the virtual reality technology is used to add and supplement the evaluation system. The forced matching algorithm based on edge computing is applied to the spoken English CAF evaluation system of the Internet of Things corpus, so as to detect the new spoken English CAF evaluation system of the Internet of Things corpus built by the forced matching algorithm based on edge computing and virtual reality technology. 5 rural and urban primary and secondary schools were investigated for evaluation, including A, B, C, D and E, to test the improvement effect of students in the school on the problems of text plagiarism, complex form of oral test, fuzzy evaluation results, low coverage of oral test, etc., of the new Internet of Things corpus spoken English CAF evaluation system. The evaluation results are specifically reflected in



the survey of students' improvement effect on the new Internet of Things corpus spoken English CAF evaluation system, with a sample number of 500 people. The specific effect is shown in Figure 6.

As shown in Figure 6, the students of 5 rural and urban primary and secondary schools have a relatively high evaluation of the improvement effect of the new IoT corpus oral English CAF evaluation system built by using the forced matching algorithm under edge computing and virtual reality technology. For the new oral English CAF evaluation system, the students of School A think that 21% of the text plagiarism problem, 8% of the people think that the oral test form is complex, and the evaluation result is vague at 12%, the coverage of oral test is as low as 15%. For the new Internet of Things corpus spoken English CAF evaluation system, 11% of the students in School B think that the problem of text plagiarism is the problem, 13% think that the form of oral test is complex, 7% think that the evaluation result is vague, and the coverage of oral test is low 9%. For the CAF evaluation system of the new Internet of Things corpus for spoken English, 15% of the students in C school think that the problem of text plagiarism, 26% think that the form of oral test is complex, 16% think that the evaluation result is vague, and the coverage of oral test is low 14%. For the CAF evaluation system of the new Internet of Things corpus for spoken English, 9% of the students in School D think that the problem of text plagiarism is a problem, 14% think that the form of oral test is complex, 10% think that the evaluation result is vague, and the coverage of oral test is low, 29%. According to the survey and experiment, the CAF evaluation system for spoken English in the new IoT corpus built by using the forced matching algorithm under edge computing and virtual reality technology can improve the evaluation effect by 39%. For the new oral English CAF evaluation system, the students of School E think that 7% of the text plagiarism problem, 10% of the people think that the oral test form is complex, and the evaluation result is vague at 14%, the coverage of oral test is as low as 8%.

In order to test the satisfaction of the tester with the new Internet of Things corpus spoken English CAF evaluation system, a survey was conducted on the satisfaction evaluation of the students of a comprehensive university on the new Internet of Things corpus spoken English CAF evaluation system after using the new Internet of Things corpus spoken English CAF evaluation system. Satisfaction is divided into satisfaction, general satisfaction and dissatisfaction. The number of students surveyed is 200. The students are freshmen, sophomores and juniors. The specific evaluation is shown in Figure 7.

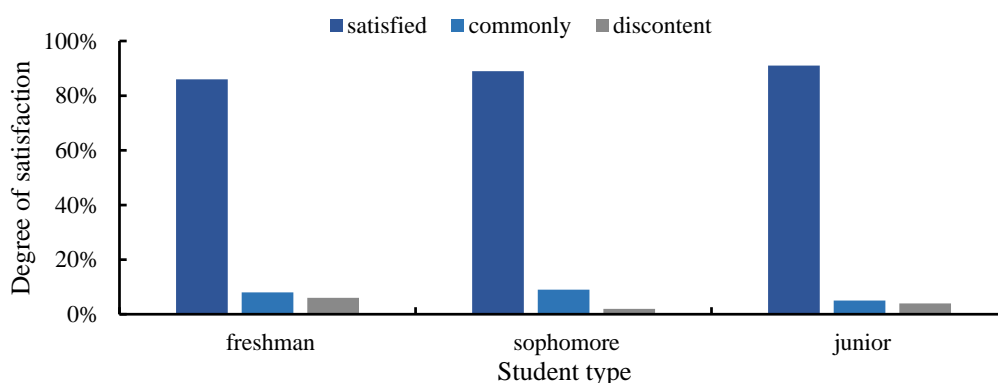


Figure 7: Student satisfaction evaluation of the new Internet of Things corpus spoken English CAF evaluation system

It can be seen from the bar chart in Figure 7 that the freshmen, sophomores and juniors show high satisfaction after testing their spoken English through the new Internet of Things corpus CAF evaluation system. Specifically, the freshmen are satisfied with 86%, generally 8%, and dissatisfied with 6%. The satisfaction rate of sophomores was 89%, 9% in general, and 2% in dissatisfaction.

Third-year students are satisfied with 91%, generally 5%, and dissatisfied with 4%.

### 5.3. Discussions

To sum up, according to the survey and experiment, the English speaking accuracy and fluency evaluation system in the new IoT corpus built by using the forced matching algorithm under edge computing and virtual reality technology has been improved significantly compared with the traditional methods, with the evaluation effect increased by 39%. It is expected that improving the oral ability of rural students in teaching has important guiding significance, and also provides reference for further exploration and development of English oral teaching suitable for rural areas.

Rural students have a severe local accent, a stiff intonation, passive and timid communication awareness, are shy to speak up, dare not respond, are not good at expressing personal opinions, and cannot express basic meanings clearly. In response to the current deficiencies in English speaking skills in rural middle schools, this article proposes the following suggestions on how to improve the English speaking ability of rural middle school students:

1) Create a relaxed language learning environment in the classroom

The truly effective situational education is to make life the foundation of all situations. Teachers should naturally create situations in the process of classroom teaching, allowing students to gradually integrate into the classroom, driving their emotions and integrating classroom content.

2) Cultivate students' interest in learning English;

Nowadays, classrooms in rural schools are also equipped with electronic devices such as computers. Teachers should use these resources to attract students' interest, display animated short films about English through multimedia, or teach students oral English through pictures and voice.

3) Strengthen the accumulation of basic knowledge among students and focus on cultivating cooperative habits

Collaboration between students and teachers is crucial in the learning process. In the process of cooperation, it can not only help improve students' communication skills and deepen the friendship between teachers and students, but also provide more opportunities for students to exercise their English speaking skills. In the process of cooperation, students should be required to use English, even if sometimes they cannot express themselves, they should speak boldly.

### 6. Conclusions

To sum up, the developers and researchers of the spoken English CAF evaluation system use the Internet of Things corpus as an important tool for developing tests and researching problems. The use of virtual reality technology in oral English teaching can solve the limitations and dilemmas faced by current English teaching, enable students to be exposed to the English language environment, conduct oral training and communication anytime and anywhere, create a relaxed and pleasant learning atmosphere, solve the problem of teachers shortage, stimulate students' interest in learning, improve students' active learning ability, and enable students to truly confidently communicate in oral English, Promote the reform of English teaching in rural and urban areas. The information in the Internet of Things corpus makes the test questions more authentic, accurate and representative, and the evaluation table more objective, reliable and universal. The establishment of CAF evaluation system for spoken English based on the Internet of Things corpus not only saves time and improves efficiency, but also enables learners to evaluate their own shortcomings and improve learning efficiency. At present, the Internet of Things corpus is widely used, but there is little discussion about the use of corpus in spoken English CAF evaluation system. The specific application and broad prospects of the Internet of Things corpus in the field of spoken English fluency testing described in this paper. In the spoken English CAF evaluation, language testers must

understand the potential of the Internet of Things corpus and actively use this powerful tool to improve the quality of the spoken English CAF evaluation system.

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