

# Research on Foreign Language Cloud-based Examination Driven by Intelligent Technology

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## ABSTRACT

With the rapid development of intelligent technology, a growing number of intelligent products are applied in the educational domain. During the outbreak of Covid-19, cloud-based examination is becoming increasingly pervasive across the globe. This study explores the new model of foreign language cloud examination supported by iFLYTEK A.I. examination system and explains its specific implementation. The exam paper library construction, examination launching, online answering, cloud proctoring, intelligent rating, score analysis, face recognition are all illustrated in details. Thus, a comprehensive assessment system is constructed, with a view to promoting the new development of foreign language cloud examination in the post-pandemic era.

**Keywords:** *Intelligent technology; Cloud exam; Big Data; FIF smart teaching platform; Artificial Intelligence*

## 1. INTRODUCTION

Entering the digital age, the pace of educational informatization is accelerating. Various application scenarios with smart education as the core are constantly emerging in new models, which has brought significant changes in new forms of education and evaluation methods. In the spring of 2020, the sudden outbreak of Covid-19 had a deep impact on people's lives around the world, pressing the pause button of the global economic growth but the fast-forward button of digital education reform. Many new modes and norms are gradually taking shape. The teaching pattern supported by intelligent technologies, such as Artificial Intelligence and Big Data, has become the new norm of teaching in many universities worldwide, reshaping the pedagogy in the new era. This teaching module greatly improves teaching efficiency and enhance the quality of talents training effectively. Today's smart education is to use 5G, big data, Internet of things (IoT), block chain, cloud computing and other new technologies to form a learning environment, and build a learning framework of Internet + Education. So teachers can choose the appropriate information technology to assist teaching flexibly, and satisfy the learners' needs for ubiquitous learning and personalized learning. According to Liu & Wu (2018), there is a big progress in the field of

education assessment, thanks to the rapid development of artificial intelligence in recent years. Big data and other intelligent technologies are widely applied in the educational domain, which has given birth to new models of intelligent education, new forms, and intelligent evaluation. As the Internet progresses along, intelligent technology will continue to create new opportunities for the reform of educational evaluation. The deep integration of intelligent technology and educational assessment has become a major trend. Dong Qi (2021) claimed that the reforming time of science and technology-enabled education evaluation has arrived. At present, 5G and Internet of Things (IoT) technology can achieve the interconnection of "human-machine-thing", which can collect a variety of real data in the process. What's more, intelligent perception technology, such as image recognition and voice recognition, can effectively measure students' behaviors, languages, expressions and other information, which can be utilized to analyze the process of students' learning and developing.

In February 2020, in response to the Guidance of Ministry of Education of China—"The Organization and Management of Online Teaching in Higher Education during the Pandemic Prevention and Control Period", colleges and universities across the country had widely adopted a new model of online teaching and learning. As an important means to measure the effectiveness of

the new pedagogy—examination is an important link in online teaching, which also posed a knotty question to university teachers and administrators during this adversity. In the special period of pandemic prevention and control, college faculty and students were at home located in different cities. How could teachers organize and carry out online examinations in an orderly manner? How could the faculty quickly and easily generate the examination paper? How could the remote examination guarantee the fairness and prevent cheating? The grading task of hundreds of test paper was very arduous, how to complete this time-consuming and laborious job more accurately and efficiently? These exam-related questions above were deeply perplexing many frontline teachers. Thanks to the rapid development of educational information technology, many intelligent examination platforms advent to solve the problems above, and the iFLYTEK A.I. examination system (online examination version) is one of them. This paper will explore the feasibility of large-scale College English cloud exam based on this platform, ranging from exam paper library construction to score analysis.

## 2. PREPARATION

The whole spring academic year of 2020 coincided with the lockdown period of Covid-19. Considering that the students were in various places, who could not return to school to participate in the paper exam in persons. Teachers had to adopt a different test method to assess students' learning effect after one semester's online education. Under such circumstance, a cloud-based examination was in desperate need. Currently, most examinees mainly use the PC-based terminal to log onto the examination system. However, with the increasing use of mobile phones, the Mobile-based terminal becomes more and more necessary among the digital natives. Therefore, a mobile APP version was urgently added to the iFLYTEK A.I. exam system. With that, examinees across the country could freely choose their preferable terminal to take English final examinations—PCs, tablets or mobile phones. This solution broke the limitations of equipment for online examinations.

### 2.1 Teachers' Training

In view of the possible unfamiliarity with the A.I. test system operation throughout the whole process, faculty was organized to accept systematic practical training. A team of technical staff of iFLYTEK was set up to answer teachers' problems online during the operation, such as the test papers combination, online proctoring, appropriate response to some abnormal situations during proctoring, exam paper reviewing, etc. Hence, a sufficient preparation was made for a smoother implementation of formal online examination later.

### 2.2 Students' Simulation Test

Personal computers, tablets and mobile phones—multi-terminals could meet student's different needs to participate in the online test. In order to ensure that each examinee could successfully complete the online exam in different conditions of hardware equipment and networks, a simulated test was carried out before the formal examination. By following the Implementation Rules Guidance, students across the country logged onto the examination website smoothly step by step, debugging their devices and familiarizing themselves with the operations of the platform. Thus, examinees were fully prepared for the formal College English final exam afterwards.

## 3. IMPLEMENTATION OF CLOUD-BASED EXAMINATION

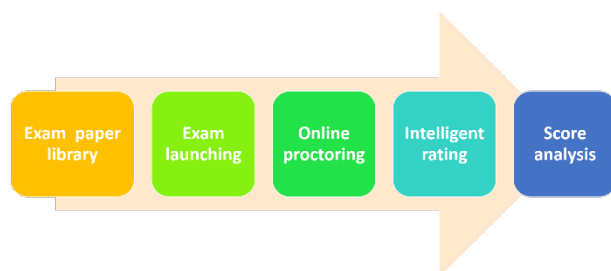
### 3.1 Construction of Exam paper library

The English final examinations involved a wide range of courses—College English II, College English IV, Business English and other different types of English courses. So the construction of exam paper library was undoubtedly an arduous task. With the help of A.I. examination system, various needs of different courses can be easily satisfied. The system supports one-click importing, which means the test paper can be imported in bulk easily by only one click of the mouse. Besides, pictures, audios, video materials can be inserted directly in the test paper. The types of question include blank-filling, multiple choice, True-or-False judgment, short answer questions, translation, composition and other objective and subjective types. In addition, the function of duplicate checking in the system can avoid the recurrence of the same question.

Teachers can build the school-based exam paper library. On the condition that each question is labeled with knowledge points according to its chapter when importing, it will be convenient to combine a new set of test paper subsequently. Next time, prior to examination, teacher only need to select labels in accordance with the testing syllabus, a new set of exam paper can efficiently be generated immediately. On the premise of similar degree of difficulty, this set of exam paper can be generated into several different tests within a few seconds by scrambling the options automatically.

The key application of intelligent technology in the construction of the exam paper library lies in the techniques of question labeling, neural network training, test paper structure generation, OCR text recognition, image positioning and natural language processing. According to the syllabus, a set of test paper with relevant knowledge points can be retrieved accurately and be generated automatically to realize the speedy and efficient combination of exam paper. The full process of

cloud-based exam is shown in Figure 1.



**Figure 1** Process of Cloud-based Exam Implementation

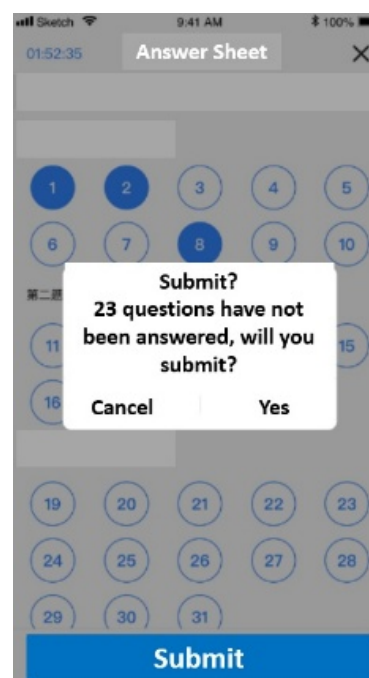
### 3.2 Examination Launching

After the teaching administrator audited the papers, the exam could be launched online. Based on the specific requirements of each English course, teachers set different testing regulations. For instance, the examination duration, examination rules, scoring methods and so on. Anti-cheating function were turned on: pre-test face recognition, photo monitoring during the exam, multiple screen-cutting forced examinees to hand in paper, etc. Among these functions, the most important one was the anti-cheat settings, because teachers could not see the real-time status of examinees in remote examination scenario. In order to guarantee the seriousness and fairness of online examination, the face recognition, photo monitoring, interface-switching times limit and other functions must be switched on. All of the examinees would be informed of those functions before exam in order to minimize the cheating occurrence.

### 3.3 Online Examining

Everything was all set, the online examination could be carried out as planned. When the exam began, students in different places logged onto the FIF Cloud Test website on time to take the exam after signing the Exam Integrity Commitment Letter and making face recognition check. The system provided flexible and convenient methods to answer questions for different courses. Multi-terminal answering was supported. Students could freely choose to answer questions either on PC terminal or on mobile terminal according to their actual situations. Examinees could directly enter text and formula, H5 photo-shooting, picture uploading or handwriting, a variety of forms of answers were available. Humanized question-type display, which was convenient for testees to operate. All of the answer were saved in cloud simultaneously, very stable and safe. Moreover, there was a reminder for examinees to prevent missed answers before submitting their paper (Figure 2). If the examinee frequently logged on to the system, the invigilator could monitor it and dispose of it properly in the background. Provided that the examinee switched interface more than a certain number of times (i.e. 3 times), the system would forcibly hand in his/her

paper at once, and this student's interface would also have the corresponding prompt.

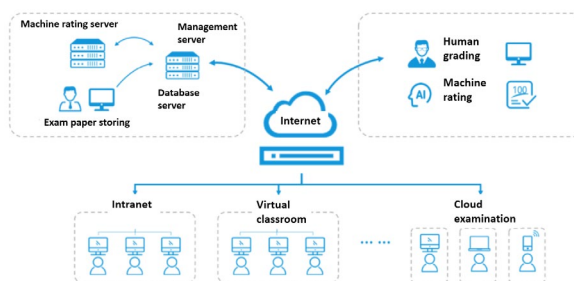


**Figure 2** Interface of Student's Mobile Terminal

### 3.4 Online Proctoring

The fairness of large-scale and high-risk examinations is undoubtedly the top priority of educational equity (He, 2020). During the examination process, invigilator could real-time monitor the students' login record, answering process and submitting of papers through the background. The examination system would record the student login IP and equipment. Invigilators would be reminded of some abnormal situations. The face-capture pictures were recorded from time to time during the exam process. If an examinee encountered a sudden interruption of the exam, such as a power failure or sudden answer of the phone call, the proctor may resume the examination or delay the examination time, or ban the examination and other disposal. A lot of functions were designed to prevent cheating so as to ensure the fairness of remote test to the greatest extent. For example, face authentication before the test; face information capture during the test; Examination Commitment; automatic out of order of test questions and options; multi-point login of the same account was prohibited. The whole exam process was monitored with the synergism of Tencent Meeting or DingTalk system. The intelligent examination scenario is based on artificial intelligence technology to develop intelligent network electronic inspection system, examinee identification verification system, cheating prevention system. For example, the use of image recognition technology, cloud technology, emotional recognition technology, real-time monitoring and intelligent identification of the dynamic data of the

examination room, automatic analysis of the behavior status of examinee, timely identification of abnormal behaviors, the realization of intelligent proctoring in the examination process (Liu et al, 2021). Figure 3 shows the cloud-based examination architecture diagram.



**Figure 3** Cloud-based Exam Architecture Diagram

### 3.5 Intelligent Scoring

When all the examination papers were collected online, the objective questions in the test paper were automatically reviewed by system. Multiple choice questions, blank-fillings and True-or-False judgments could be directly reviewed by machine, which greatly reduced the teachers' reviewing workload and improved the efficiency and accuracy of scoring papers. Intelligent reading and evaluation is the application of handwriting recognition, image recognition, natural language understanding and other technologies. As for the subjective questions, they could be either manually graded by teachers or rated by machine. At present, through automatic analysis and training, a score prediction model is constructed to intelligently score the subjective questions, such as Chinese and English composition, translation and short answer questions. In fact, the subjective questions graded by machine can ensure objectivity and fairness. After the reviewing was completed, the system automatically calculated the scores, instantly generated the score report of each class, and completed the electronic archive storage of the examination paper and data at the same time. Then, teachers may download all examinees' electronic test packages and transcripts quickly in the background. The statistics would be analyzed multi-dimensionally and all of the data was stored properly for future query. This was not only conducive for teachers to understand each student's learning performance on the basis of their examination paper analysis and reflect on their teaching methods, but also helped the university administrators substantially saved the cost of test paper printing, paper archive storing and other test-related economic and labor costs. School administrators viewed the information of all disciplines intuitively and quickly from the colorful pie charts and histograms, understanding the learning performance of each major, each class, and each student. Plus, the statistic supplied invaluable objective data for the follow-up teaching

activities to optimize future teaching in the next semester.

### 3.6 Multi-dimensional Score Analysis

After the data of test scores had been processed, the students logged in the FIF smart examination platform again to view their College English scores. Some visualized pie charts were applied to show their scores and their rankings in class, helping them clearly understand their strengths and weaknesses. Thus, students were aware of their level of learning achievement and knowledge mastery. Meanwhile, teachers just need one click to download all the transcripts in the background, where the whole class results had already been processed and detailed performance reports delivered. Moreover, there was a horizontal comparison between classes, together with a detailed analysis of the score of each skill (translating skill, writing skill, etc.). Comprehensive examination analysis and multi-dimensional exam analysis report provided a supporting basis for teachers to adjust their future teaching plans and teaching focus in the upcoming semester, and helped them to carry out further teaching and scientific researches more accurately.

## 4. REFLECTION

### 4.1 Advantages of cloud-based examination

#### 4.1.1 Simplify process and save resources

Online exams are not limited by space and time, which can save physical space, time and labor costs. Reducing the cost of printing and transportation of examination papers. Saving money and expenses are really environment friendly. Besides, online exam greatly simplifies the examination process, shortens the procedures from exam paper combination to score analysis and improve the efficiency of exam organization substantially.

#### 4.1.2 Convenient construction of exam paper library

A school-based exam paper library is established on the online exam platform by either manually adding questions or bulk importing to enrich the bank. Meanwhile, exam paper can be sorted out and classified properly for later use. When combining new test papers, several sets of similar test paper can be generated through fixed test assembly or random test assembly, so as to mitigate the burden of teachers and improve work efficiency.

### 4.1.3 Efficient intelligent scoring

Online examination saves a lot of time of collecting test papers, revising test papers and calculating statistics. Test papers of online exam are reviewed more accurately and efficiently. Through data collection and analysis of the examination, pie or bar charts are automatically generated, the test results will be displayed visually, which is convenient for teachers and students to master the current teaching / learning situations so that they can make corresponding adjustments and formulate the next learning plan.

## 4.2 Limitations of cloud-based examination

### 4.2.1 High requirement of network stability

The online examination is highly dependent on the network. The network speed in big cities is stable and strong, which can ensure the smooth progress of online examination. Nevertheless, in some remote mountainous areas and small cities, the weak network signals can affect the exam process seriously. If a candidate's network signal is poor, resulting in frequent disconnection, multiple login to the test system might be misjudged as cheating and will be banned from the examination.

### 4.2.2 Occasional interruptions

The terminals used by candidates vary greatly. Computers, mobile phones and tablets may be used for examinations. Yet not all of them is able to log in to the test system normally. For example, some browsers cannot be used to log in to the system stably. Computer lagging, shutdown owing to high equipment temperature, power exhaustion, sudden in-coming calls of mobile phone and other interruptions, the probability of these accidents still exist, which will more or less interfere with the order of online exams and affect examination results accordingly.

## 5. CONCLUSION

In the context of pandemic prevention and strict control, currently the implementation of cloud-based examination is a relatively safer and more reliable assessment method in order to avoid possible massive infections. With the swift advancement of intelligent technologies in the Internet era, the traditional paper-based examinations can no longer meet the diversified needs of examinations. Enabled by intelligent information technology, such as Artificial Intelligence and Big Data, the cloud-based paperless online examination will gradually become the new normal of foreign language examination in universities during the post-pandemic era. Intelligent scoring,

automatic summary analysis of score results, electronic examination papers archive query and other functions provide authoritative data for administrators of colleges and universities to monitor teaching quality. Having the aid of Internet and Big Data technology, the data generated by teaching-learning-evaluation are collected and integrated efficiently, which is helpful to conduct data mining and analysis. Hence, school administrators can carry out a refined management of online teaching construction and coordinate the rational allocation of teaching resources (Xu, 2020).

To sum up, the development of education evaluation in the new age needs the technical support of frontier skills. The development of educational evaluation in the new era needs the support of advanced and cutting-edge technology. The information technology offers an important direction and path. In the future, the core technology of artificial intelligence will be more deeply integrated with college classroom teaching, online learning and cloud examination evaluation. Educators should strengthen the research and development of key technologies in the field of language evaluation, and use the power of science and technology to escort college English teaching and examination in this special period.

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