

# *Quality Evaluation Model of Innovation and Entrepreneurship Education Based on Intelligent Genetic Algorithm under Virtual Reality Technology*

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**Abstract:** The acceleration of globalization and the tremendous changes in people's lives, today's China especially needs to develop a spirit of innovation and strengthen the spirit of innovation and entrepreneurship. The application of virtual reality technology in education is a leap in educational technology. This creates a good atmosphere for autonomous learning; from the traditional learning mode of promoting learning by teaching to a new learning method, that is, learners acquire knowledge and skills through interaction with the information environment. At present, college students' innovation and entrepreneurship practice teaching process is formalized, practical experience is insufficient, and the content is too single. The combination of virtual technology and entrepreneurship education can further reduce the cost of internship and break through the limitations of teaching time and space. Improve the innovative spirit and entrepreneurial spirit of college students. Innovation and entrepreneurship education in universities should introduce virtual reality technology into teaching, which is also a choice for universities and colleges to combine virtual reality technology. This paper draws on the research results of quality evaluation of innovation and entrepreneurship education, uses the evaluation model and method of intelligent genetic algorithm to discuss the connotation and characteristics of colleges and universities and their innovation and entrepreneurship education, and carries out in-depth quantitative research on the evaluation index system, evaluation model and method, so as to provide scientific reference for the research of quality evaluation system of innovation and entrepreneurship education in Chinese colleges and universities. Through the construction of an education quality evaluation model and the survey data of school students and teachers, the OBE concept is used to check the satisfaction and quality level of students' IEE. Explore and improve the quality of innovation education and entrepreneurship. The results of data analysis show that 80% of learners are satisfied with the quality of IEE of the OBE concept in this study, and there is still much room for improvement in the quality of IEE.

## 1. Introduction

Virtual reality technology is an emerging technology that integrates computer graphics, multimedia, human-computer interaction, network, stereoscopic display, simulation, etc. It is a virtual world that can be used to create and experience. It uses image model and perception technology to create a realistic virtual environment with multiple senses. Users can use multiple interactive devices to interact with virtual entities and obtain various spatial and logical information in the virtual environment in an all-round way. Virtual reality technology has been widely used in military, production, education, teaching, life and other fields. In addition, in intelligent manufacturing, virtual reality technology can be used to reproduce the production scene in the virtual environment, thus realizing the control of the production process. The quality evaluation of innovation and entrepreneurship education is affected by many factors. It is difficult for a general evaluation system of innovation and entrepreneurship education to have high reliability and validity. Therefore, it is a feasible method to apply it to innovation and entrepreneurship education in colleges and universities. Under the guidance of network theory, the laws and research of student education management are gradually improving. To this end, schools should simplify the use of interactive online and offline network communication technologies, and enhance context and key management based on the student-centered OBE concept, according to the characteristics of different students in different disciplines, And established a "scientific and reasonable" information management system, network communication system, etc., to further improve the educational efficiency of college personnel. Researchers engaged in IEE. As a product of the combination of innovation education and entrepreneurship education, education is a new requirement for higher education with the development of society. IEE has become an important aspect of the development of higher education.

## 2. Model steps of the Quality Evaluation Method of Innovation and Entrepreneurship Education

### 2.1 Educational Theoretical Foundation

The phenomenon of students failing to achieve the expected results under the guidance of teachers was first paid attention to by European and American scholars. Then in 1860, Spencer discussed the goal theory of educational planning from the perspective of knowledge in the book "On Education" [1-2]. Herbart's educational teaching principles put forward in 1924 elaborated on the importance of gradually guiding the teaching process by educational goals. In 1949, the famous Taylor principle deepened the guidance of educational goals in curriculum construction and instructional design. Taylor used four classic questions to formulate curriculum design around "learning goals" [3]. The theory of educational goals explained by Taylor's principle has been widely used in curriculum design and has become its theoretical origin. The aforementioned theories about educational goals form the basis of the OBE concept [4]. In the middle of the 20th century, Bloom explained the classification of educational goal development, and therefore proposed the mastery of learning theory. His discourse on educational cognitive theory became an important criterion for describing the learning effect in the OBE model [5]. At the same time, under the impetus of the American educational reform thought, the OBE concept has become a widely influential education model and gradually entered the education field.

### 2.2 Introduction to the Model Method

(1) Entropy method

When calculating the quality of university education, each indicator has a different weight. This article uses entropy weighting method to give weight to the index. The entropy weight method calculates the entropy weight of the indicator according to the entropy of the information and the degree of deviation between the indicators, and then determines the weight of the indicator through the entropy weight [6]. This method can objectively reflect the information hidden in the data, improve the accuracy of the index, and fully convert the index information. The smaller the entropy of the pointer, the greater the entropy weight, the greater the importance of the pointer, and vice versa [7].

#### (2) TOPSIS model TOPSIS

TOPSIS is a sorting method that is close to the ideal solution. It is a common method of multi-feature analysis and decision-making technology often used in system engineering. It uses the distance between the evaluated object and the evaluation standard as the standard for evaluating the advantages and disadvantages of the evaluated object and the evaluation method. The quality of education is evaluated by calculating the degree of closeness (or deviation) between the goal and the best solution. The worst solution can fully and objectively reflect the true impact of university IEE.

#### (3) Intelligent genetic algorithm model

In an intelligent genetic algorithm, the best chromosomes are preserved in each generation of the population. In the intelligent genetic algorithm, the two most important steps are crossover and mutation, and the mating method is through the plastic total mating, so that each gene in the selected parent chromosomes through complete information interaction to produce a counterpart daughter chromosome. And it can regulate the odds of mating. This variable probability allows it to adjust its search area appropriately to avoid lingering in a local area. Because the mutation rate is too low, it is difficult to ensure the best results in local search, and too high mutation probability will cause too much random search, wasting efficiency. The machine learning method is used to evaluate the cost function. When the cost function stays in the local space, the search scope is appropriately increased through the appropriate change probability, so as to improve the search efficiency and obtain the global optimal solution.

### 2.3 Innovation and Entrepreneurship Education Quality Evaluation Model

Innovation and entrepreneurship education in colleges and universities is a complex systematic project, involving all aspects of the government, schools and society. There are many influencing factors, and it is difficult for a single evaluation system to reflect and measure comprehensively, objectively and objectively. Many evaluation contents must be regarded as the form of value realization of system components. And through the form of "elements + relations" to make feasible objective expression, at the same time should follow the strategic goal orientation, system coordination, comprehensive integrity, objective science, dynamic flexibility, comparable operability and other basic principles. This paper studies the influence of college students' family, individual characteristics and the environment for innovation and entrepreneurship on the education system from the perspectives of level, characteristics, objectives, content and structure.

(1) Government level. The government plays an important guiding role in innovation and entrepreneurship education. The government should increase capital input, introduce relevant preferential policies, actively guide college students' innovation and entrepreneurship, establish professional organizations, and formulate corresponding management systems and measures to actively guide and manage students' innovation and entrepreneurship activities.

(2) University level. College students are the subject, unit, place and realization of college students' innovation and entrepreneurship. Specifically, it includes: formulating school-running

ideas and implementation plans for innovation and entrepreneurship education, setting up professional innovation and entrepreneurship education management institutions, perfecting effective management system, cultivating excellent innovation and entrepreneurship teaching staff, setting up reasonable curriculum system and course content, establishing corresponding educational facilities and practice bases, and creating a good atmosphere for innovation and entrepreneurship education in the whole school and even the whole society. Specifically, it includes the following three aspects.

1) University environment. The environment for innovation and entrepreneurship is the organization and funds needed for innovation and entrepreneurship activities in colleges and universities, including the soft and hard levels: innovation and entrepreneurship funds, entrepreneurial infrastructure and other material security; The second category refers to the academic environment and culture in which the school encourages innovation, promotes entrepreneurship and tolerates failure, and uses corresponding policies and measures to stimulate students' enthusiasm for entrepreneurship, which is the internal guarantee of creating entrepreneurship education.

2) Teaching staff. Innovation and entrepreneurship education is ultimately completed by all teachers. Therefore, teacher team is the key factor to measure teaching quality, including: teacher background, namely teachers' educational background, professional title, professional knowledge, quality and skills, work experience and other basic conditions, in which the evaluation focus on teachers' political quality, professional knowledge quality, ability quality and so on. Teachers' innovation and entrepreneurship ability, namely teachers' scientific research innovation consciousness, ability and related results; Teachers' innovation and entrepreneurship ability refers to students' skills in creating entrepreneurship theories and teaching methods.

3) Teaching links. Teaching is an important link of innovation and entrepreneurship education, which improves students' innovation and entrepreneurship spirit by innovating the content and form of the course. Its main assessment contents include: entrepreneurial awareness, entrepreneurial awareness, entrepreneurial knowledge, entrepreneurial strategy, entrepreneurial ability, entrepreneurial quality and other relevant theoretical and practical courses; A variety of teaching methods such as social research, case analysis, interactive lectures, entrepreneurship simulation and business practice should be added to traditional classrooms, teachers and textbooks.

(3) The level of students. Innovation and entrepreneurship education is to cultivate talents with innovative and creative spirit in a comprehensive, comprehensive, comprehensive and effective way. The goal of innovation and entrepreneurship education for college students is the effect of innovation and entrepreneurship education, and its influencing factors include: scientific research ability and innovation results. Entrepreneurship rate, participation in actual activities of innovation and entrepreneurship education, such as the number and frequency of scientific research, publication of scientific research results, innovative works and award-winning performance in competitions; The quality of college students includes their own background, performance and satisfaction with innovation and entrepreneurship. Among them, the background of college students refers to their family, education, ideology, character, ability and other aspects of knowledge; Students' academic performance refers to the effect of their learning and practice activities on innovation and entrepreneurship. Student satisfaction refers to students' identification, initiative and participation in innovation and entrepreneurship education courses and teaching methods.

(4) Social level. Society is an important support force for innovation and entrepreneurship education, whose core content is: social identification and recognition of entrepreneurship, and the construction of the entire social environment. It mainly refers to the university's social influence and academic status in innovation and entrepreneurship. Social groups and business organizations give active support and support to innovation and entrepreneurship activities of the university; A series

of associations and outcomes with external innovative scholarship; College students' ability of innovation and entrepreneurship.

## 2.4 Steps of Model Construction

(1) Construct a standardized evaluation matrix

Suppose there are an evaluation indicators and b objects to be evaluated to construct an initial evaluation matrix

$$X = (X_{ij})_{a \times b} \quad (1)$$

Among them, under the i evaluation index, is the evaluation value of the J object to be evaluated. Normalize the matrix X to get the standard matrix H. If the evaluation index is income type (the greater the income, the better), then

$$H_{ij} = \frac{X_{ij}}{\sum_{j=1}^n X_{ij}} \quad (2)$$

If the evaluation index is cost-based (the smaller the cost, the better). Then

$$H_{ij} = \frac{\frac{1}{X_{ij}}}{\sum_{j=1}^n \left(\frac{1}{X_{ij}}\right)} \quad (3)$$

(2) Determine the index weight

The entropy method can consider the degree of index change and objectively reflect its importance. The calculation formula is:

$$s_i = \frac{1 - B_i}{h - \sum_{i=1}^n B_i} \quad (4)$$

Among them, the characteristic proportions of the indicators are:

$$B_j = \frac{r_j}{\sum_{j=1}^n r_j} \quad (5)$$

## 3. IEE Model

Before designing and developing OBE-based open online course resources, a good theoretical model must be established for their development. Therefore, in order to design a curriculum resource model suitable for OBE, it is necessary to conduct a demand analysis of the objectives, environment, objectives and curriculum content. Lay a good foundation for follow-up work.

### 3.1 Vocational Education Student Training

This research is aimed at vocational college students and belongs to the category of higher education. As an important part of the school education system, vocational education has its strong purpose, organization and planning. Its training targets are adults with complete abstract thinking

and strong learning ability. The purpose of learners in vocational schools is more inclined to improve their vocational access ability and conduct academic education, in order to better adapt to the social and professional needs of the new era. According to Robbie Kidd's adult education theory, the students' training objects are analysed from the following aspects.

#### (1) Study preparation

Most students have experienced failures in the high school and college entrance examinations. Through investigations, there are generally insufficient self-confidence and distractions. The online open course resources based on OBE can fully take into account the physical and mental characteristics of students, and combine the physical and mental characteristics of students. The characteristics of development stages and Vygotsky's theory of recent development zones, all online course resources are designed to meet the cognitive level of higher vocational students. Difficult knowledge is made easier, thereby enhancing students' self-confidence in learning. Each resource gives full play to the advantages of being short and succinct, so that students can focus on the knowledge points firmly. Online resources can be played repeatedly, which is convenient, does not waste too much time, and can effectively overcome the easy-to-forget problem.

#### Learning motivation

The so-called learning motivation refers to the inner power that directly requires students to learn and stimulates their own learning needs. Students have a strong inner motivation, which can be explained from two aspects:

The first is to meet social needs. Students' strong motivation for learning comes from meeting the current society's higher demand for vocational education talents and improving their vocational access ability. They must constantly improve themselves to meet social needs. The second is to meet personal needs. The imbalance caused by the psychological frustration of higher vocational students will be transformed into an internal motivation, which drives them to continuously improve themselves and obtain a sense of satisfaction. The online open course resources based on OBE fully consider the enterprise's requirements for students' skill level and the students' acceptance ability to arrange course resource settings, making it easier for students to achieve the various abilities required by the society. At the same time, taking into account the personal psychological needs of students, curriculum resources mostly adopt task-driven methods, and game teaching methods run through them.

### **3.2 OBE Structural Model Framework**

As an educational structure model, OBE is organized, implemented, and evaluated, and focuses on the effectiveness of predefined learning. For the realization of the OBE structural model, Akria pointed out four main steps: definition (definition of learning output), realization (realization of learning output), evaluation (evaluation of learning output) and use (using learning output). It can be seen that this mode is basically related to the elements of PDCA Cycle (PDCA Cycle, also known as Deming Cycle).

### **3.3 The Three Links of the Education Model**

#### (1) Define learning output

The OBE model of educational construction has such characteristics. The first part is to construct a complete education system. And combined with the development of the frontier fields of the times, and then analyse its trends, and then according to the arrangements of students and teachers, the education system can be quickly adjusted, so that the entire system can continue to be maintained. At the same time, while improving the learning results, it becomes concrete and operable. Bloom's target classification system perfectly supports the description of learning output. From students'

knowledge, skills, and providing accurate vocabulary related to emotion and control, different types of subjects have different requirements and descriptions, and learning output is defined accordingly. The purpose is to ensure that students obtain the corresponding learning results and obtain the abilities required under the dynamic development of the market. Therefore, a clear and clear definition of learning output can ensure that students obtain the corresponding core abilities and accomplishments. This step is crucial.

(2) Achieve learning output

This design is based on the retrospective ability of connected definition learning output. I think it is possible to build a huge resource system for courses that can improve learning and realize the construction of learning resources, so as to facilitate the addition of more curriculum resources and increase the speed of resource construction, and at the same time, it also reduces the blindness in the construction of curriculum resources, and the clear target system formed by the reverse design of learning output provides a reliable direction for the construction and development of each curriculum resource.

(3) Evaluation of learning output

The evaluation of learning outcomes is accompanied by the whole process of achieving learning outcomes. A formative assessment is carried out according to various assessment resources available to dynamically understand the learning conditions of learners and adjust the educational environment and training methods when necessary. Better understand the impact of learning outcomes. The evaluation of learning outcomes should emphasize the combination of process evaluation and outcome evaluation, and emphasize multi-level, multi-directional and multi-topic educational evaluation viewpoints.

#### 4. Investigation and Analysis of the Status Quo of Student IEE

This article designs a questionnaire survey experiment; the purpose of the experiment is to understand the students' views on the Institute of Electrical Engineers. And this article divides the questionnaire survey into five major modules for investigation, namely, the understanding of the Institute of Electrical Engineers, the arrangement of the courses of the Institute of Electrical Engineers, the views on the composition of the teachers of the Institute of Electrical Engineers, the understanding and understanding of the research methods and rules of the Institute of Electrical Engineers. Based on this, the design of this research is as follows:

(1) Research design and implementation

Table 1: Basic characteristics of the respondents

project	category	Number of people	% Of total
gender	man	343	61.11%
	woman	217	38.89%
Education	Specialist	80	14%
	Undergraduate	394	70.6%
	Postgraduate and above	86	15.4%
Entrepreneurship experience	have	115	20.61%
	no	443	79.39%

The samples selected this time include undergraduates, junior college students and graduate students, of which undergraduates account for the vast majority, but there are also a few junior college students and graduate students who also participated in this survey. Then a total of 600 answers were recovered from the questionnaire experiment. The following table lists the statistical



data describing the basic situation of the valid questionnaires, as shown in Table 1.

Organize a seminar with 30 students, accounting for 47% of the total number of students (64 in total), divided into 6 groups, and 6 participants in the report. Learning effectiveness can be divided into three aspects: task completion, learning methods and professional attitudes. The effectiveness of seminars is analyzed, summarized and reflected. The overall evaluation and sub-item evaluation of the learning effectiveness of each group are shown in Figure 1:

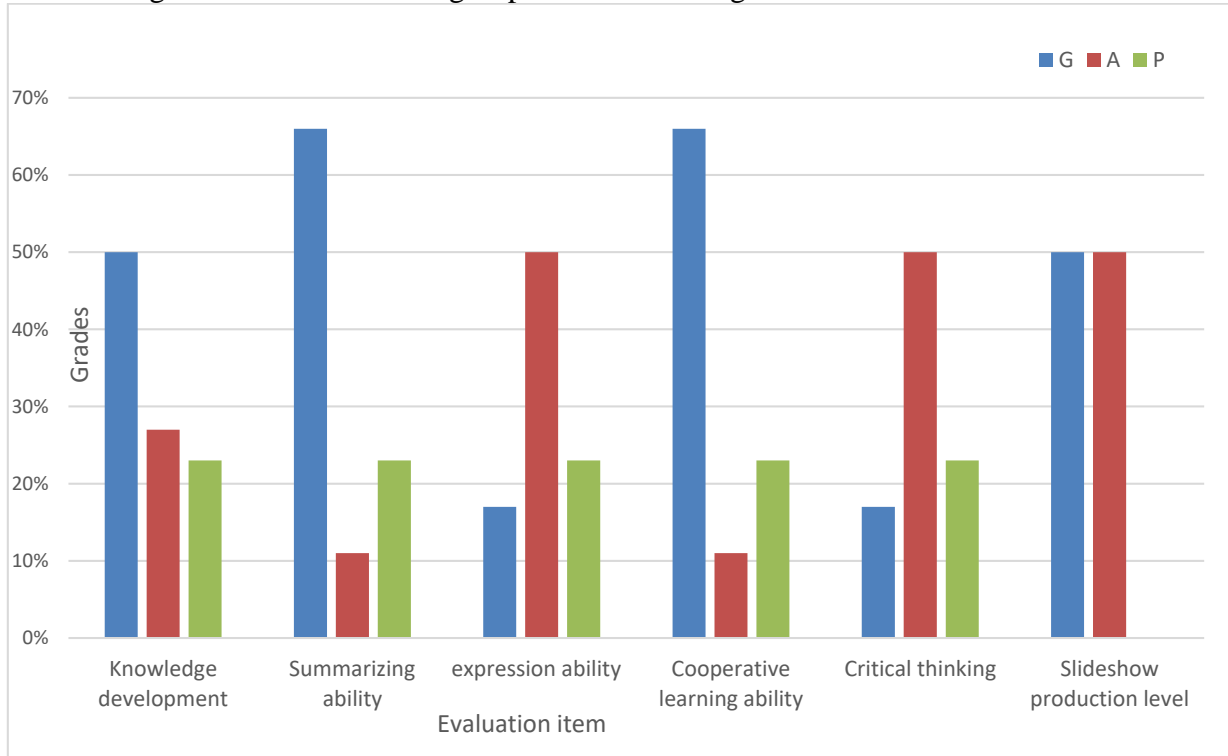


Figure 1: Analysis of learning effectiveness

It can be analysed from the degree of task completion. There is a relatively obvious gap between the groups, and there is also a certain gap between the completion of the learning task and the present learning effect.

Table 2: Student information

Name code	gender
WL	male
LL	Female
NYT	male
QXY	male
ZP	Female
WPP	male

Through the interview survey, we will again randomly select 6 people out of the 30 students who participated in the seminar to conduct interviews on the status of the students' learning effectiveness in this seminar, as shown in Table 2. The research results of the workshop based on intelligent genetic algorithm are shown in Figure 2:



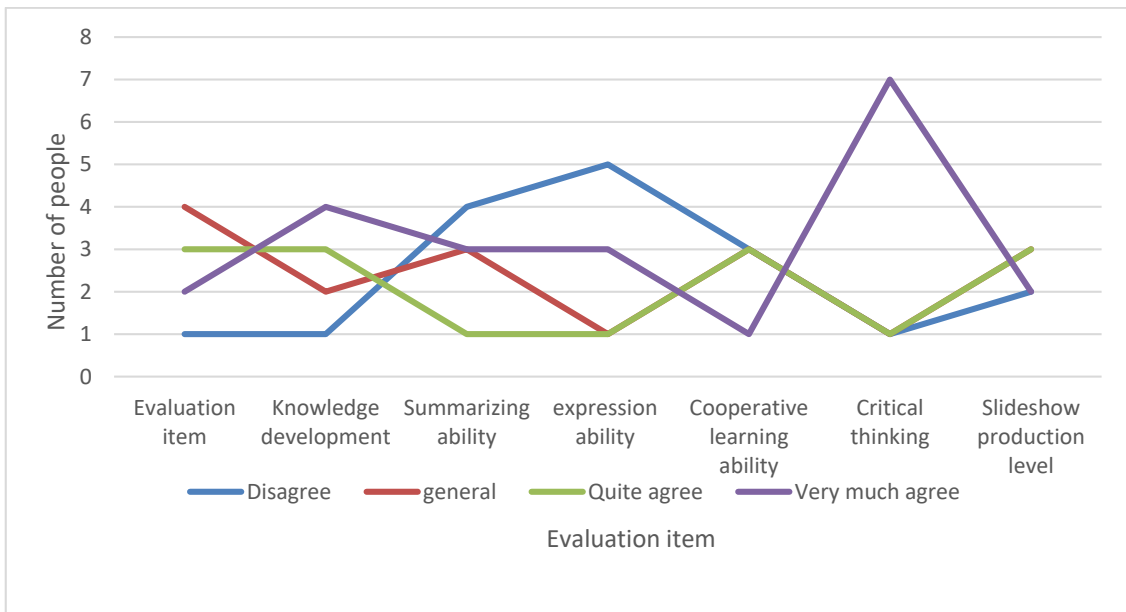


Figure 2: Degree of achievement of learning effectiveness

In the interviews on the achievement of learning effectiveness, most students said that the learning effectiveness of this course can be basically achieved, but the effectiveness standard should be improved to increase the degree of challenge. Respondent WL said, "Among these abilities, my expressive ability has been improved very well. I used to not dare to express my views in front of everyone, but now I have overcome this aspect", WPP said, "It is very interesting to be able to communicate and study with classmates, and there will be many new ideas." LL believes that "this kind of classroom requires a lot of early learning, which is very helpful for expanding knowledge. Only a lot of reading and thinking can have knowledge points. The following is the effect of research and teaching courses, as shown in Figure 3:

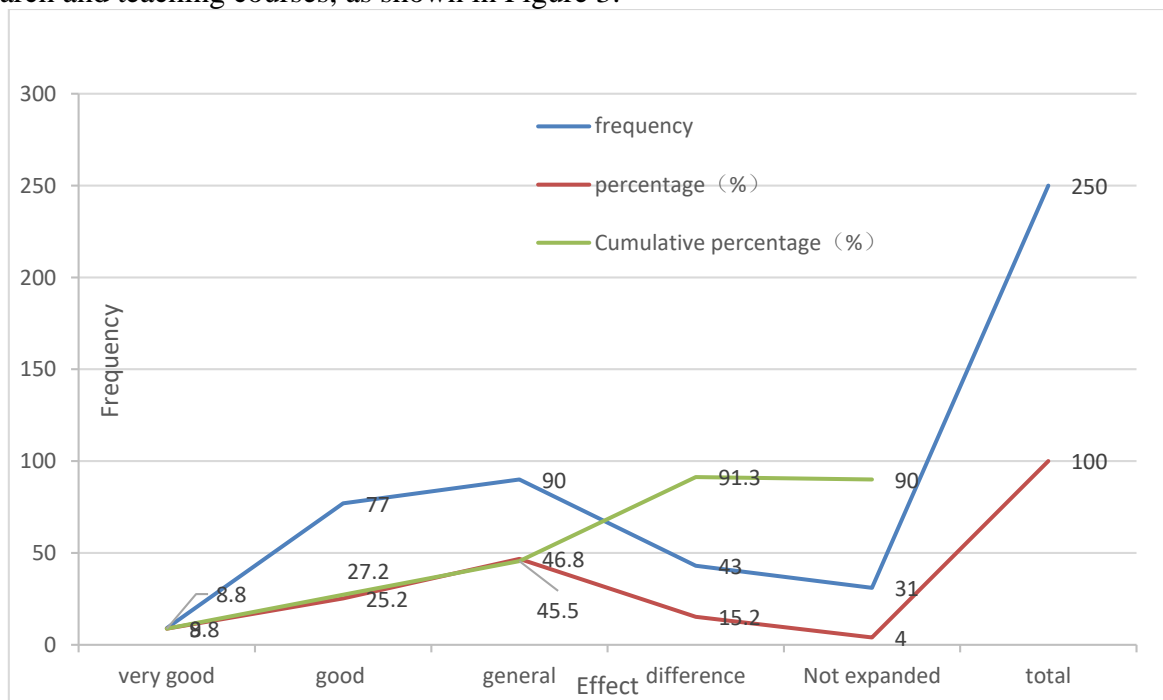


Figure 3: The effect of the development of seminar-teaching courses

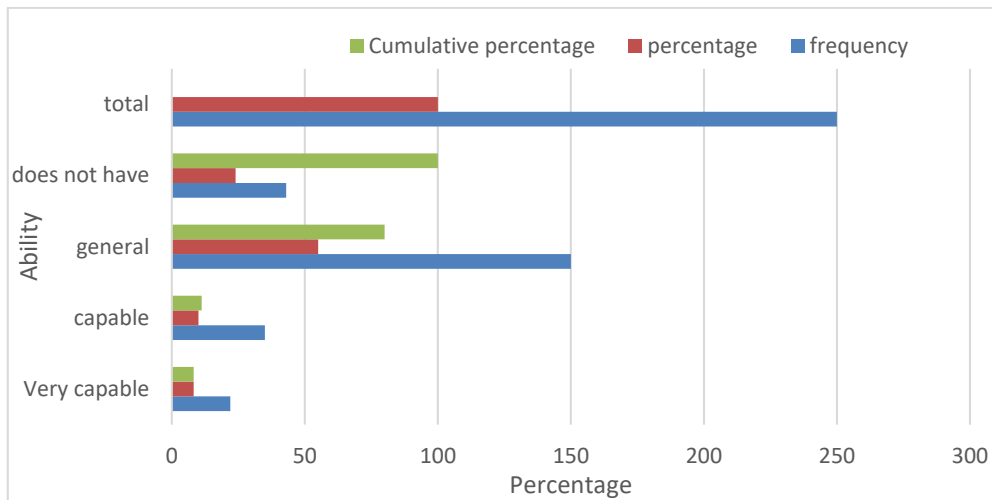


Figure 4: Teachers in charge have the necessary abilities to discuss teaching-oriented courses

According to the above figure, 46.8% of the students think that the school's seminar-teaching course has a general effect, 25.2% of the students think the effect is good, and 8.8% of the students think the school's seminar-teaching course has a good effect. 15.2% of students think that the effect of the development is poor, and 4% of the students report that it has not been carried out. For the classroom, the teacher's ability to discuss teaching courses is very important, and the teacher has the ability to discuss teaching courses as shown in Figure 4:

As can be seen from the above figure, 55% of the students think that the teacher has the average ability, while 24% of the students think that the teacher does not have the ability to study the teaching-type curriculum. This shows that the teacher lacks the ability to study the teaching-type curriculum. It reflects the lack of research-oriented teachers in schools, and the current teachers are unable to meet research-oriented teaching courses in terms of their skills and qualities. This also puts forward higher requirements for the comprehensive quality of teachers.

## 5. Conclusions

This research is based on the intelligent genetic algorithm and combined with the OBE concept to carry out the design research on the significance of student IEE under the new normal. On the basis of analyzing the needs of talent training in the "Internet+" era, analyzing the constructive problems of online open curriculum resources, and drawing on the successful experience of OBE concept in the field of engineering education, the significance of student IEE under the new normal is analyzed. It summarizes the current research status of students' new entrepreneurship education, clarifies the relationship between education quality and innovation and entrepreneurship, and proposes the content, methods and theoretical basis for improving IEE. Through empirical research, it points out the problems in school students' IEE, and systematically analyses the existing problems, and then guides the government, colleges and universities, the construction of the teaching team, and the support of the society to provide IEE for colleges and universities. The research provides reference. Information about the previous and subsequent situations is limited. Therefore, there may be some deficiencies in the understanding of the situation of each school, which will have a certain impact on the research of the paper, but this is usually consistent with the basic situation of each school. To strengthen innovation and entrepreneurship education in colleges and universities, we should start from five aspects: to improve the relevant policies and systems; Actively promote the theoretical research of innovation and entrepreneurship education in colleges and universities; Strengthen the systematization and scientization of innovation and

entrepreneurship education; To provide customers with better information and intermediary services and create a good market atmosphere; Increase investment in manpower, technology and capital. Only through multi-party cooperation can the innovation and entrepreneurship education system in Chinese universities be effectively operated and improved. I hope that the IEE in universities will continue to develop and flourish, and I hope to get more political support from the country and extensive participation from all walks of life. It is hoped that the IEE Department will continue to develop, and college teachers and students will work together to promote the innovation process and entrepreneurship education of college students. In the context of the new normal, the country has made due contributions to the development of innovative talents and made contributions to the implementation of the innovation-based national development strategy.

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